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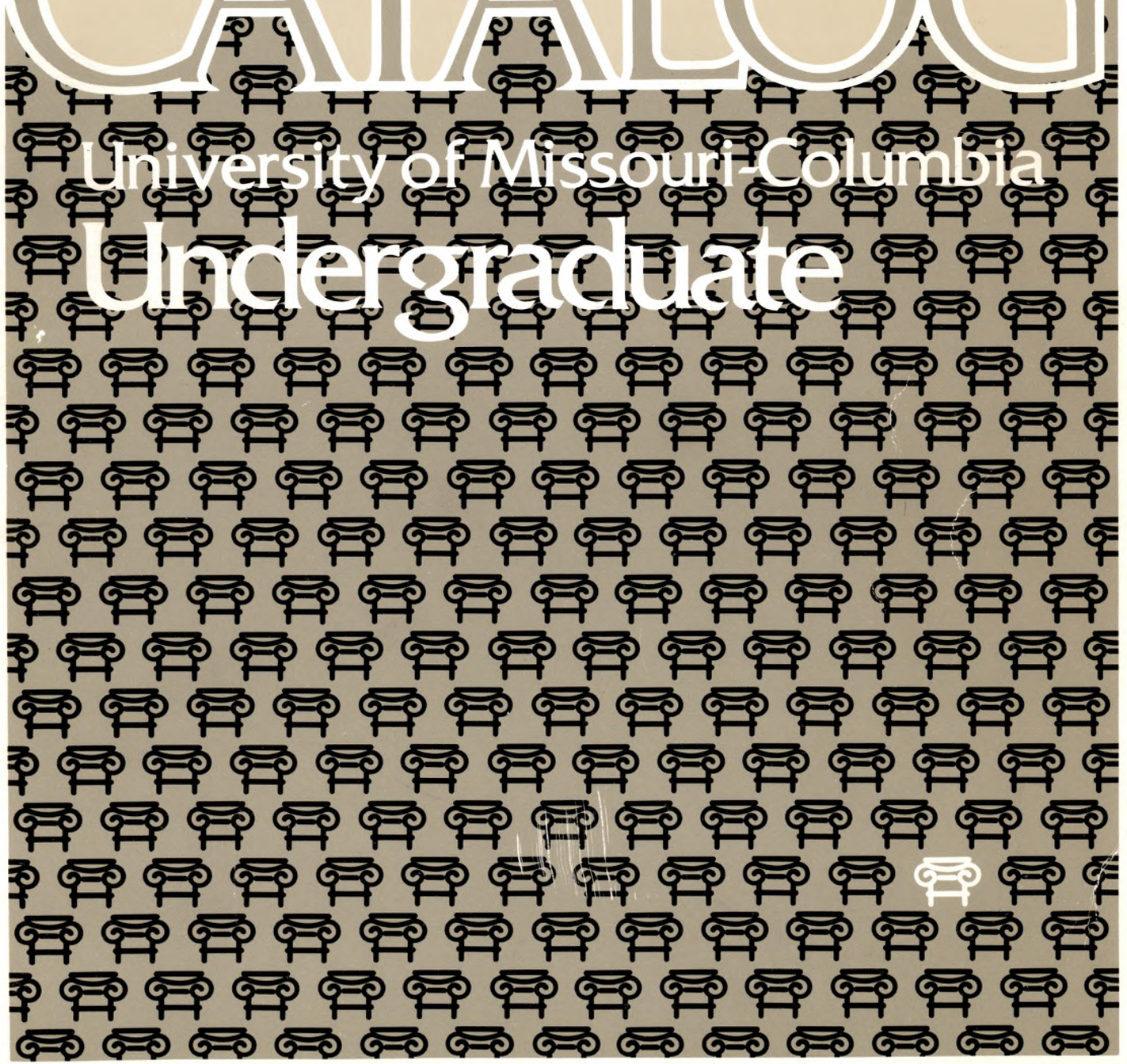
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UNIVERSITY OF  
MISSOURI  
FEB. 22 1985

# CATALOG

University of Missouri-Columbia

# Undergraduate





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## UNIVERSITY OF MISSOURI-COLUMBIA CATALOG (651-82000)

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# THE UNIVERSITY OF MISSOURI-COLUMBIA

The University of Missouri was established at Columbia in 1839 as the sole public university in Missouri. The University of Missouri-Columbia (UMC) is the oldest state university west of the Mississippi River and the largest of the four campuses of the University of Missouri system. The University of Missouri's Columbia campus has undertaken its historic mission through a commitment to excellence in instruction, and scholarship and service—both on its residential campus and throughout the state.

UMC has a commitment to diversity and comprehensive education at both the undergraduate and graduate level. Within this comprehensiveness in its educational program, the University of Missouri-Columbia remains as the premiere public institution for graduate and professional training in selected areas. Within the University of Missouri system, the Columbia campus is the only campus to offer formal programs in agriculture, forestry, fisheries and wildlife, home economics, journalism, veterinary medicine, and library and informational science.

Formal areas of study also are conducted in arts and sciences, business and public administration, accountancy, education, engineering, health related professions (including nursing and medicine), law, public and community services, and social work.

UMC is unique in Missouri in comprehensiveness of educational inquiry. It is a campus which provides a rich environment in which both students and teachers can reach beyond traditional fields of study and explore the realm of total intellectual interdisciplinary inquiry.

## UMC STUDENTS

The number of UMC students who are National Merit/Achievement Scholars places the University of Missouri-Columbia among the top 10 public institutions nationally. UMC students have received national recognition and honors in virtually every academic field.

More than 76 percent of UMC's students are undergraduates. Of the total undergraduate enrollment, 33 percent are freshmen, 23 percent are sophomores, 21 percent are juniors, and 23 percent are seniors; 49 percent are women and 51 percent are men.

Because of the comprehensiveness of its educational program, UMC enrolls students from every state in the nation as well as 100 other countries. The majority of out-of-state students come from Illinois and Kansas. More than 85 percent of the total number of UMC students are Missouri residents. Each year, about 30 percent of the undergraduates are new students, freshmen or transfers.

## UNIVERSITY SUPPORT

The University of Missouri-Columbia is the largest and most comprehensive institution of higher education in Missouri. Approximately

one-half of the campus's total budget comes from state appropriation. The sources for the remainder of the UMC budget are private gifts, grants and fees. In 1979-80, UMC received more than \$35 million in sponsored research funds. In 1980-81, UMC received more than \$7.5 million in private gifts.

UMC is further supported by the activities of its Alumni Association. The University of Missouri-Columbia has more than 100,000 living alumni.

## PROFESSIONAL SCHOOLS

The University of Missouri is the only state supported institution in Missouri offering professional and doctoral degrees—many of these are available only on the Columbia campus. Students wishing additional information on the schools of medicine or law or the College of Veterinary Medicine should consult the individual school or college catalogs.

**The School of Medicine** was established at the University in 1845. The Medical School educates physicians and health care professionals of the highest competence through undergraduate, postgraduate and continuing medical education. The University Hospital and Clinics provides general and highly specialized care for patients from every Missouri county. Within the School of Medicine is the undergraduate School of Health Related Professions which is described in this catalog.

**The UMC School of Law** was established in 1872, and it has been a powerful force in Missouri and the nation ever since. Graduates have served at the highest levels of national, state and local governments. The majority of Missouri laws that regulate our lives have been written by UMC law faculty and students. The School of Law educates lawyers who practice not only in Missouri but throughout the world.

**The College of Veterinary Medicine** was established in 1946. While principally serving Missouri, graduates of veterinary medicine are located throughout the United States and the world in a wide variety of fields related to animal health and well being and food production, and activities related to human health.

## GRADUATE STUDY

Advanced degrees at the University of Missouri were awarded as early as 1846, and a graduate department was formally organized in 1892. Presently, the Graduate School offers degree-granting programs in 75 departments and areas, and UMC ranks among the nation's top 35 institutions in the number of doctoral degrees granted. Students wishing additional information on graduate degree programs should consult the *UMC Graduate Catalog*.

The School of Library and Informational Science, established as a graduate program in 1966, accredited by the American Library Association in 1968 and reaccredited in 1976

and 1982, currently is the only such accredited program in Missouri and one of two in the Big Eight universities. Information on the School of Library and Informational Science is included in the *UMC Graduate Catalog*.

## INTELLECTUAL OPPORTUNITIES OUTSIDE THE CLASSROOM

One of the important advantages offered by a large university is a broad spectrum of intellectual experiences outside of the classroom. Various campus groups, including many student organizations, sponsor programs of interest throughout the year. These programs include such diverse events as highly technical, specialized seminars and colloquia; talks and lectures of broad interest; concerts; and popular musical and dramatic productions.

There is a wide variety of opportunities for growth and intellectual stimulation in a schedule that features many well-known public speakers, and a variety of concerts and other musical and dramatic offerings by student and faculty groups, as well as by touring companies and artists. The cultural base of the University is broadened by its many international students, representing approximately 100 nations, who often present programs highlighting the traditions of their homelands. Throughout the year, several organizations sponsor showings of both American and foreign films where admission generally is free. Numerous open house programs are held by many departments. Some, like the weekly sessions at the University observatory, are held on a regular basis.

In addition to the many cultural and intellectual activities offered by UMC, both Columbia College and Stephens College (located in Columbia) offer a full schedule of cultural events.

All students are urged to take advantage of these programs to broaden and liberalize their educational experiences. In addition, there is opportunity for participation in many of these programs, either in a performing or a supporting role.

## FACILITIES

The 692-acre Columbia campus has 233 buildings, including those of the University of Missouri system administration, equine center, Research Park and the health sciences complex.

The 18 schools and colleges of the University of Missouri-Columbia offer the undergraduate a broad spectrum of resources and research facilities.

## LIBRARIES

The University library system consists of Ellis Library (the main library) and nine branch libraries: engineering, geology, health sciences, journalism, law, library annex, mathemat-

ics, research park and veterinary medicine. All libraries are open to undergraduates. The University libraries have a collection of more than 2 million volumes, more than 2 million microforms, and currently receive approximately 10,000 magazines and journals. Ellis Library is arranged into seven subject divisional libraries with a reading room, reference collection and staff for each area. Other reader services include the general reference collection, current periodicals reading room, reserve desk, recorded sound collection, special collections (including rare books) and library services for the disabled.

The staff of the general reference area, seven subject divisional units, special collections and branch libraries are available to assist students in finding answers to specific questions as well as to provide advice and instruction on solving research problems. Also available to aid students are library orientation tours and library instruction classes. The libraries offer computer literature searching (for a fee), which provides access to more than 100 databases. Ellis Library and most of the branches maintain photocopy equipment and microfilm readers and printers. In addition, Ellis has a typing room and more than 200 lockers available for student use.

## SPECIAL LIBRARY COLLECTIONS

**The Library of the State Historical Society** shares Ellis Library building and has an extensive collection of Missouriana and early West documents and memorabilia.

**The Western Americana Collection** of the State Historical Society features material on Missourians and the Great Plains. These collections are especially rich in travel narrative and contemporary accounts of life among the pioneers.

**The Western Historical Manuscripts Collection** of the State Historical Society features material relating to the Missouri River and the Great Plains region.

## COLLECTIONS IN ELLIS LIBRARY:

**The Rare Book Collection** emphasizes titles important in the history of books and printing and contains outstanding examples of specific types of illustrated books.

**The Newspaper Collection** contains microfilmed back issues of more than 1,000 newspaper titles, including a large collection of early American titles. Additionally, numerous current newspapers are available in the Journalism Library in Walter Williams Hall, and Missouri newspapers are available in the State Historical Society Library.

**The Microform Collection** makes available to users virtually all American publications before 1820 and most British publications before 1700. Also available are numerous archival collections, primary resources in history, and back issues of periodicals.

**Federal and State Documents** are maintained as separate collections. The library has been a depository for federal documents since 1862, and a depository for Missouri documents since 1977.

## COLLECTIONS IN THE LAW LIBRARY:

**The Lawson Collection of Crime and Criminology** houses publications, written in the popular style, on famous trials.

## MUSEUMS AND COLLECTIONS

**Museum of Art and Archaeology** collections are representative of all parts of the world and all periods from Paleolithic to the present, including ancient art and archaeology of the Near East, Egypt, Greece and Rome; Oceanic, African and pre-Columbian art; old master paintings (with the Kress Study Collection as its core); South and Southeast Asian art; and drawings and prints. A large amount of material from the Museum's excavations at Tel Anafa in Upper Galilee is available for archaeology students. The Gallery of Casts of Greek and Roman sculpture exhibits full-size plaster copies of many of the most famous classical statues. The museum also houses a gift shop.

**Anthropology Museum** contains collections of American Indian archaeological and ethnological materials, as well as anthropological specimens from other areas of the world.

**Entomology Museum** houses the largest collection of Arthropoda in Missouri; collections are primarily for research and teaching.

**Geology Museum** contains more than 100,000 specimens including invertebrate and vertebrate collections, mineral and clay collections, and polished fossil woods.

**The Herbarium** includes a general plant collection, primarily of North America, and also material from South America, Australia, Asia and Africa; as well as tropical and subtropical material from Central America.

**Fishery and Wildlife Collections** provide a research collection of vertebrate animals of Missouri and surrounding states as well as collections of birds, mammals, waterfowl, freshwater and saltwater fish.

## COMPUTING FACILITIES

Instruction and research programs, as well as medical and management systems computer processing needs, are supported by the University computer services delivery system, which consists of a communications network and a central facility with an Amdahl 470/V7 and an Amdahl 470/V8 processor computer system.

Several departments and divisions support specialized minicomputers and other computer-based support facilities. The computer science department has a minicomputer; the College of Engineering supports a number of completely equipped minicomputer systems; the College of Business and Public Administration has a computer-based business and social science research support facility—the Research Center; the University libraries conduct online searches of bibliographic and statistical data bases. There also are other small computers on campus for specialized research work and data acquisition in various departmental laboratories.

## RESEARCH CENTERS AND RESOURCES

**Center for Research in Social Behavior**, a research and training facility operated by social science faculty, provides facilities and services for social science field and laboratory investi-

gation and sponsors lectures, seminars and visits from social science scholars.

**Research Center** is a computer-based, research-support facility of the College of Business and Public Administration.

**Administrative Behavior and Survey Research Laboratory** was established by College of Business and Public Administration for use in instruction and research of individual and small group activities, such as decision making, problem solving, conflict resolution and communication.

**Freedom of Information Center**, located within the School of Journalism, maintains a day-to-day study of actions by government, media and society affecting the movement and content of information.

**Dalton Research Center** is a facility for biological research.

**Missouri Cultural Heritage Center**, a research organization of the Graduate School, conducts and serves as a clearinghouse for multidisciplinary research projects, curriculum development, and outreach programs attending to the sphere of cultural studies in the state and region. The center stresses service to both the campus and community, and encourages research programs that yield versatile end-products such as teacher workshops, exhibitions, scholarly symposia, town meetings, curriculum enrichment in the schools and publications. Through its activities, the center seeks to document, conserve, interpret and celebrate the rich heritage of the region, and to foster a deeper understanding and appreciation of our own cultural history. On campus, the center increases awareness of—and facilitates course work in—cultural studies for students who want a broad educational experience.

**Research Reactor** is the highest powered, highest flux university research reactor in the nation.

**Sinclair Research Farm** is a 560-acre farm which aids research on aging and chronic disease of farm animals.

**Missouri Agricultural Experiment Station** facilities are part of an agricultural research program coordinated by the U.S. Department of Agriculture with all land grant colleges.

**Veterinary Medical Research Farm** is a 90-acre pasturage and research facility.

**Equine Center**, located on a 288-acre farm, offers instructional courses in equine medicine and surgery.

**University Forest** is 7,300 acres of forest for teaching and research.

**Ashland Mo. Wildlife Area** is a 2,200-acre reserve for teaching and research.

**Low-Level Radiation Laboratory** contains a low-level, whole-body radiation counter designed to measure natural and induced radioactivity in animals and humans.

**Laws Observatory** is open to the public during certain hours and special programs are often offered during academic year.

*Columbia Missourian* serves as a teaching newspaper and has general circulation for Columbia and mid-Missouri.

**KBIA Radio** and **KOMU-TV**. The UMC public FM radio station has a 100,000-watt stereo signal; the UMC television station is an ABC affiliate.

## **SPECIAL PROGRAMS AND SERVICES**

### **THE LEARNING CENTER**

The Learning Center provides free individual/group tutoring and study skills help for eligible undergraduates. (Federal guidelines require that 2/3 of the students served be first generation college students who are from low income families and the other 1/3 may be either first generation, low income, or physically handicapped.) In addition, a math program includes structured lab sessions. The writing lab staff will help students with organization, composition and grammar, and will assist students in putting together a paper for any class. The reading and study skills lab offers ideas for reading, note-taking, scheduling and test preparation. The Learning Center, located at 304 Watson Place, also offers preparation sessions for the Graduate Record Exam and the Law School Admission Test.

### **ROTC**

The Army, Navy and Air Force ROTC programs offer college men and women the opportunity to become commissioned officers in the military service of their choice. Upon completing ROTC course requirements and receiving a bachelor's or advanced degree, the student is commissioned. Active duty commissioned officers earn starting salaries of \$19,240 a year and are assigned leadership positions which provide valuable managerial experience.

There is no obligation connected with taking ROTC during the freshman and sophomore years. Obligations begin only at the start of a student's last two years of college, during which the ROTC student is paid \$2,500. There are one-, two- and three-year scholarships available to students taking ROTC. These scholarships pay tuition, books and \$100 a month.

For program requirements, see Air Force and Army ROTC in the College of Arts and Science, the Navy and Marine ROTC in the College of Engineering sections of this catalog.

### **HONORS COLLEGE**

A variety of special courses and a special honors degree program are offered through the Honors College, located at 612 Kuhlman Court. A description of the program is included in the College of Arts and Science section of this catalog.

### **GENERAL STUDIES**

The general studies degree program offers students the opportunity to explore a wide variety of courses. Each degree is tailored to fit a student's needs and interests. Additional information is available in the College of Arts and Science section of this catalog.

### **WOMEN STUDIES**

Students can design an interdisciplinary area of concentration in women studies in the College of Arts and Science. Information on current course offerings and programs is available from the Women Studies office, 207 Jesse Hall. A description of the women studies core curriculum and requirements is included in the College of Arts and Science section of this catalog.

### **BLACK STUDIES**

An interdisciplinary area of concentration in black studies can be designed in the College of Arts and Science.

Information on course offerings, Black Theatre Workshop, programming on the black experience, etc., is available at the Black Studies office, 207 Hill Hall, UMC, Columbia, Mo. 65211 or call (314) 882-6229.

### **STUDY ABROAD**

Several academic areas at UMC frequently offer special programs that include studies or tours in other countries and are available to undergraduate students.

Such programs include the following: A year in Japan (general liberal arts curriculum); summer school in Mexico (undergraduate credit available); semester at the University of Reading in England (undergraduate credit from the College of Education); study tours offered in agriculture, music, Asian studies and home economics (optional credit available). UMC students attend programs in Germany, France, Russia, Italy and elsewhere.

For additional information contact the Study Abroad Coordinator, 106 Gentry Hall, UMC, Columbia, Mo. 65211.

### **MID-MISSOURI ASSOCIATED COLLEGES AND UNIVERSITIES**

The University of Missouri-Columbia is one of five institutions in MMACU, formed in 1964 to encourage the sharing of experiences and resources among its members. In addition to UMC, consortium institutions now include William Woods College, Columbia College, Stephens College and Lincoln University. Concerts, lectures, special programs and library resources are available to all students and faculty of the member institutions. Full-time students of the four MMACU institutions may take courses for credit at any of the four campuses. The intent of cross-registration is to facilitate students' educational needs when a desired course is unavailable at the home institution, or when there are inherent schedule conflicts. In order to qualify for cross-registration, a student must be in good academic standing and enrolled full time at the home institution. (Full time defined by the home institution includes hours taken at both the home and cooperating institution.) Forms and additional information are available from the MMACU office, 116 Jesse, UMC, Columbia, Mo. 65211.

### **EASY ACCESS PROGRAM**

The Easy Access Program is intended to serve only non-degree-seeking individuals. Community residents may register for any course on a space-available basis without providing previous transcripts. Compliance with course prerequisites is necessary and is the students' responsibility. Enrollment takes place after regular registration. Students who have completed work at another institution will provide evidence of good standing (or eligibility) to re-enroll at that institution by letter from the institution or complete a provisional form until such time as a letter may be obtained. Students on dismissal status from any institution are not eligible to participate in this program until one year has elapsed since their

dismissal. Easy Access students may elect to receive grades and undergraduate credit for their courses. Payment of fees is on the same basis as regularly enrolled students. Easy Access students may enroll only as part-time students (maximum of six hours a semester or three in summer). If students—enrolled via Easy Access—later desire to become regular students, they must make application to UMC for a future semester. Credit received while enrolled in Easy Access will be evaluated by the division selected for enrollment. A student regularly enrolled in a division cannot transfer to Easy Access during the semester.

### **CENTER FOR INDEPENDENT STUDY**

A broad curriculum of 169 college credit courses are available through independent study. The Center for Independent Study offers courses year around, enabling students to maintain continuity and make progress in their education during times when their academic residency is interrupted by vacations, illness or employment. At least 30 semester hours of credit, when earned in correspondence courses or extension courses taken from the University of Missouri, shall be counted toward meeting requirements of undergraduate degrees offered by the various divisions of the University. It is the responsibility of each student to consult their adviser and/or dean's office concerning independent study courses. A free catalog describing all courses is available from the Center for Independent Study, 400 Hitt St. P.O. Box 891, Columbia, Mo. 65205-0891.

### **COLLEGE-AT-HOME PROGRAM (Through Video)**

Through the use of television, videocassettes, audiocassettes, textbooks, study guides and other printed materials, the University of Missouri's College-At-Home Program (Through Video) provides individuals with an alternative to campus-based college courses.

**HOW THE PROGRAM WORKS:** Each course has been approved and is offered by an academic department at one or more of the four University of Missouri campuses: Columbia, Kansas City, Rolla or St. Louis.

Lessons for some of the courses are broadcast over television beginning each February and September. All courses are available for viewing on videocassettes at CAH Learning Centers across the state.

Mentors (instructors) are available one evening a week by phone (students call collect or on a toll-free number) to answer questions and discuss exams.

Students view the lessons, study the textbooks and talk with mentors. After completing the necessary work, exams are administered at CAH Learning Centers or other designated testing areas.

**COURSES AVAILABLE:** Courses are available in the following areas: accounting and management, computer science, criminology/sociology, economics, education, English, humanities, symphonic music, philosophy/religion, and psychology.

All courses offer credit, but their suitability to a particular degree program is subject to the regulations of the institution and department offering the degree. It is urged that students

pursuing a degree ascertain from their academic adviser the applicability of a course to the degree sought before enrolling in a CAH course. Grade reports will be issued and credit awarded by the University of Missouri as regular resident credit and is transferable to other colleges and universities (subject to the regulations of these colleges and universities). If you do not need or want college credit, you may enroll in any course on a non-credit basis.

**MORE INFORMATION:** If you would like more information about the College-At-Home Program (Through Video) write to: College-At-Home Program, 201 Lewis Hall, University of Missouri-Columbia, Columbia, Mo. 65211.

Students will be sent a free brochure describing the program in more detail and listing the courses available. Missouri residents may call toll-free 1 (800) 392-0536 for more information. This number is *only* for the College-At-Home Program (Through Video)—it is not for other University programs or departments.

## **STUDENT SERVICES**

The Office of the Vice Chancellor for Student, Personnel and Auxiliary Services in 211 Jesse Hall provides administrative support and supervision to 12 departments. Among these are residential life, student development, counseling services, student health services, Memorial Union/Brady Commons, financial aid, police department and the Hearnes Multipurpose Building. These departments exist as academic support units of the institution. They are dedicated to actively influencing the University environment and contributing to the total education of UMC students.

### **DISABLED STUDENTS**

The Access Office in 126 Gentry Hall coordinates special services available to disabled students. These include classroom accommodations and testing arrangements, reader and attendant referral, on-campus transportation, and equipment loan and repair. The office works with various services on campus to increase accessibility and enable disabled students to participate in all aspects of student life.

### **INTERNATIONAL STUDENTS**

The Office of International Student Programs in 114 Read Hall provides special services for international students, including advice about legal immigration status. The office coordinates cultural and educational programs and advises international student organizations.

### **MINORITY STUDENTS**

The Office of Minority Student Programs in 101A Read Hall provides academic and personal advisement for members of minority groups and sponsors a series of programs to encourage a sense of community with UMC. Staff members are available on a walk-in basis or by appointment.

The Black Culture Center is designed to promote cultural and cross-cultural learning among UMC students, faculty and staff and Columbia residents. The facility may be reserved for formal/informal meetings and receptions or social events. The center, located at 823 Virginia Ave., contains a library, art and photo exhibits, and piano and television for your convenience.

## **VETERANS**

The Office of Special Services in 221 Jesse Hall provides G.I. Bill information and certification for eligible veterans and dependents. The office also furnishes information on military service educational assistance programs.

## **HOUSING**

For additional information on any of the following, contact the Department of Residential Life, 123 Jesse Hall, UMC, Columbia, Mo. 65211.

### **RESIDENCE HALL**

Residence hall living plays an important part in campus life and helps students in establishing new friendships and lifestyles while they pursue their academic goals. It is the aim of the residence hall staff and student government to create an atmosphere which is conducive to intellectual, social, cultural and personal growth of the residents. Students enter into contracts for room and board in the residence halls for the entire academic year. The Department of Residential Life mails housing information and an application for residence halls accommodations to all applicants accepted for admission to UMC. Applications for residence halls are accepted independently of applications for admission to UMC.

### **FRATERNITY/SORORITY**

National college social fraternities and sororities have had chapters on the Columbia campus since 1869. They offer a variety of social, scholastic, cultural, athletic and leadership opportunities. Most fraternities and sororities also operate chapter houses which serve as the focus for organizational activities. Assistance in the management of Greek houses is provided by university-approved house directors.

### **FAMILY HOUSING**

The University of Missouri-Columbia operates 360 apartments for married students and single parents. Although floor plans vary, all apartments include living room, kitchen, bath and one or two bedrooms. All are unfurnished except for stoves and refrigerators. All utilities are paid by the residents.

### **OFF-CAMPUS**

The Department of Residential Life operates an off-campus housing referral service. Available rental properties in the Columbia area are listed with this Off-Campus Housing Center, as well as information concerning students who are seeking roommates. The Off-Campus Housing Center operates in 123 Jesse Hall during the fall and winter semesters and moves to the lower level of Read Hall during the summer.

The Off-Campus Students Association provides housing workshops, crime-prevention projects, information services, cooking seminars and a host of other programs throughout the year. The Off-Campus Students Association office is in Read Hall.

### **POLICE DEPARTMENT**

The University of Missouri Police Department located in the northwest corner of the General Services Building is open 24 hours a day, 365 days a year to provide students a safe and secure environment for study, learning, research and recreation. The operations division of the UMPD is composed of the uniformed police officers. Officers patrol the

campus in marked patrol vehicles and on foot. They answer calls and conduct police investigations. Officers respond when police assistance is needed whether it's investigating a theft or unlocking a vehicle.

## **HEALTH SERVICE**

Access to medical care is available at the Student Health Service outpatient clinic, staffed by eight physicians and located west of the Columns between Francis Quadrangle and South Sixth Street. Students may be seen without an appointment. Special clinics in gynecology, orthopedics, allergy, immunizations, ENT and psychiatry are by appointment. Laboratory, X-ray and pharmacy services also are available. Low-cost charges are made for services. Clinic hours are 8 a.m. to 5 p.m. Monday through Friday, and 8 a.m. to noon Saturday. After clinic hours, emergency care is available at the UMC Hospital and Clinics Emergency Room, where students are responsible for all costs of medical care.

## **WOMEN'S CENTER**

The Women's Center offers a variety of services and programs dealing with issues that affect the changing roles of women and men. Skill groups and discussion groups on assertion training, consciousness raising, sexuality and other topics of interest are conducted for organizations and living units. The Women's Center also maintains a resource library containing articles, books, and research relating to women's lives. The Women's Center is located at 1 Gentry Hall.

## **PERSONAL COUNSELING**

Counseling for individuals with personal, educational or vocational concerns is available from 8 a.m. to 5 p.m. Monday through Friday at the Counseling Center in 220 Parker Hall. No appointment is necessary for initial appointments.

## **CAREER PLANNING AND PLACEMENT**

The Career Planning and Placement Center in 110 Noyes Hall offers a number of services to help students clarify career plans. The center also assists students in identifying internships and in locating part-time employment. The various schools and colleges also provide specialized placement services for students.

## **TESTING**

The Testing Unit within Counseling Services offers placement interest, personality and aptitude tests, and the admission tests for graduate school.

## **UNIVERSITY BOOK STORE AND MEMORIAL UNION/BRADY COMMONS**

In addition to supplying textbooks and other school items, the bookstore in Brady Commons provides check cashing and postal services. Brady Commons also houses bowling lanes, pool tables, snack bar, a candy and newspaper shop and a craft studio darkroom. The Memorial Union serves as a meeting place for student organizations and conferences.

## **ORGANIZATIONS AND ACTIVITIES**

The Office of Student Development in 100 Read Hall offers students a number of programs and activities. Information on all campus student organizations and clubs is kept in 215 Read Hall. If you want to get involved in a particular organization, or start one of your own, stop by.



The Missouri Students Association is the undergraduate student government at UMC and every student is a member. If you would like to get involved in student government or student activities (which sponsors the films, concerts, speakers, etc., brought to campus) then drop by the MSA offices in 200 Read Hall.

## RECREATION

The Recreation/Intramural Office is located at 106 Rothwell Gymnasium. There are eight activity components of this University department. The components are designed to provide varying degrees of competitive, non-competitive, structured and unstructured activities, and services for participants. Included in the various areas are: intramurals (men's, women's and co-rec), open recreation, outdoor recreation, bike shop services, the natatorium, special events, sports clubs, and faculty/staff recreation. There are both indoor and outdoor facilities available. Within the indoor recreation facilities there are racquetball/handball courts, weight machines, a wrestling room, an indoor track, volleyball and basketball courts and table tennis tables. Tennis, racquetball and basketball courts are available in the outdoor setting as well as picnic shelters and play fields. For more information call (314) 882-2066.

## ADMISSION

Admission procedures are described in *Mizzou*, the catalog for prospective undergraduate students. A summary of the procedures: Complete the application form and send it, along with the \$20 application fee to the Director of Admissions, 130 Jesse Hall, University of Missouri-Columbia, Columbia, Mo. 65211. You also will need to have transcripts sent to the same address.

## FRESHMEN

Admission to the freshman class is determined by a combination of the applicant's high school class rank and a ACT, SAT, or SCAT test score. Out-of-state freshman applicants are expected to demonstrate appreciably higher probability of success than Missouri freshman applicants. Requirements change in 1987.

## TRANSFER STUDENTS

Transfer students must have attained an overall grade point average of 2.0 (4.0 system) in all courses which they attempted at previous institutions. In addition, they must be in good standing and have attained a minimal term grade point average of 2.0 during the last semester. Credit hours in the form of advanced standing may be allowed for work satisfactorily completed in another accredited college or university. Evaluation of course work applicable toward a degree is determined by the dean of the school or college in which the student enrolls. For further information see Transfer of Credit in the Academic Regulations section of this catalog and the individual college and school sections.

## INTERNATIONAL STUDENTS

More than 1,500 students from 100 countries currently are enrolled at UMC. All prospective students who are not U.S. citizens must write to the Office of International Student Programs, 114 Read Hall, UMC, Columbia, Mo. 65211. This office is responsible for answering all

initial inquiries about admission to UMC.

In addition to the English language requirement for admission, all undergraduate international students are required to take the UMC English Language Test prior to registering for courses and submit a \$50 non-refundable application fee.

## PREVIOUSLY ENROLLED STUDENTS

Students who have not been enrolled within the last semester should contact the Admissions Office in 130 Jesse Hall for a permit to re-enroll.

## COLLEGES/SCHOOLS TO WHICH FRESHMEN MAY BE ADMITTED

At the University of Missouri-Columbia, freshmen may enter the Colleges of Agriculture, Arts and Science, Education, Engineering, Home Economics, Public and Community Services, the School of Forestry, Fisheries and Wildlife or the School of Health Related Professions.

## COLLEGES/SCHOOLS TO WHICH SOPHOMORES MAY BE ADMITTED

Students may enter the School of Nursing as second semester sophomores.

## COLLEGES/SCHOOLS TO WHICH JUNIORS MAY BE ADMITTED

Students, having met their specific entrance requirements, may enter the College of Business and Public Administration, the School of Social Work, or the School of Journalism as juniors.

## RECIPROCAL AGREEMENTS

### KANSAS-MISSOURI AGREEMENT FOR EXCHANGE OF STUDENTS

By joint agreement of the Board of Regents of the State of Kansas and the Board of Curators of the University of Missouri, qualified students who are Missouri residents may enroll in certain programs at the University of Kansas in Lawrence or Kansas State University in Manhattan and be charged fees at the rate paid by Kansas residents.

The undergraduate programs available at the University of Kansas include: architecture, environmental design, architectural engineering, oriental languages and literature, and Slavic languages and literature (not Russian). The undergraduate programs available at Kansas State University are: architecture, architectural engineering, construction science, landscape architecture, bakery science and management, feed science and management, milling science and management, and horticulture therapy.

### NEBRASKA-MISSOURI AGREEMENT FOR EXCHANGE OF STUDENTS

By joint agreement of the Board of Regents of the University of Nebraska and the Board of Curators of the University of Missouri, qualified Missouri students may enroll at the University of Nebraska in certain educational programs and be charged fees at the rate paid by Nebraska residents. A qualified student is one who meets the residence requirements of the University of Missouri and who meets the minimum academic admission requirements of the University of Nebraska. Undergraduate programs available for Missouri students in-

clude: architecture, community and regional planning, construction management and actuarial science.

For further information, contact the director of admissions at the institution offering the specific program.

## UNDERGRADUATE DEGREES

The University of Missouri-Columbia offers the following undergraduate degree programs and emphasis areas (emphasis areas are shown in italic type):

### College of Agriculture

Agricultural Economics (BSAg)  
Agricultural Education (BSAg)  
Agricultural Journalism (BSAg)  
Agricultural Mechanization (BSAg)  
Agronomy (BSAg)  
Animal Science (BSAg)  
Atmospheric Science (BSAg)  
Biochemistry (BSAg)  
Dairy Science (BSAg)  
Food Science and Nutrition (BSAg)  
General Agriculture (BSAg)  
Horticulture (BSAg)  
Pest Management (BSAg)  
Poultry Science (BSAg)  
Rural Sociology (BSAg)

### College of Arts and Science

Anthropology (AB)  
Art (AB, BFA)  
Art History and Archaeology (AB)  
Biological Sciences (AB)  
Chemistry (AB, BS)  
Classics (AB), *Classical Civilization, Greek, Latin*  
Computer Science (AB, BS)  
Economics (AB) *Labor Studies*  
English (AB)  
French (AB)  
General Studies (BGS)  
Geography (AB)  
Geology (AB, BS)  
German (AB)  
History (AB)  
Interdisciplinary (AB)  
Italian (AB)  
Latin American Studies (AB)  
Library Science (AB)  
Linguistics (AB)  
Mathematics (AB)  
Microbiology (AB)  
Music (AB, BM)  
Philosophy (AB)  
Physics (AB, BS) *Health Physics (BS)*  
Political Science (AB)  
Psychology (AB)  
Russian (AB)  
Russian Area Studies (AB)  
Sociology (AB)  
South Asia Studies (AB)  
Spanish (AB)  
Speech and Dramatic Art (AB)  
Statistics (AB)

### College of Business and Public Administration

Accountancy (BSA)  
Business Administration (BSBA), *Administrative Management, Business Logistics, Economics, Finance and Banking, General Business, Marketing, Operations Management, Personnel Management, Real Estate, Risk and Insurance*  
Public Administration (BSPA)

### College of Education

Educational Studies (BES), *Counseling and Personnel Services, Curriculum and Instruction, Health and Physical Education, Interdepartmental, Practical Arts and Vocational-Technical Education and Special Education*  
Elementary Education (BSEd) *Early Childhood Education, Elementary School Art, Elementary School Music, Elementary School Physical Education*  
Secondary Education (BSEd), *Art Education, Behavioral Science, Biology, Business and Office Education, Chemistry, Distributive Education, Earth Science, French, General Science, German, Health, Home Economics Education, Industrial Arts, Italian, Language Arts, Latin, Mathematics Education, Music Education, Physical Education, Physics, Social Studies, Spanish, Speech, Technical Education, Trades and Industries*

Special Education (BS Ed), *Behavior Disorders, Educable Mentally Retarded, Learning Disabilities (BSEd), Orthopedically Handicapped, Trainable and Severely Handicapped*

**College of Engineering**

Agricultural Engineering (BS AgE)  
 Chemical Engineering (BSChE)  
 Civil Engineering (BSCiE)  
 Computer Engineering (BSCoE)  
 Electrical Engineering (BSEE) *Communications, Computer Engineering and Digital Systems, Discrete and Integrated Electronics, Electromagnetics and Acoustics, Energy Systems and Power Electronics, Networks, System Control*

Industrial Engineering (BSIE)  
 Mechanical Engineering (BSME) *Aerospace Engineering*  
 School of Forestry, Fisheries and Wildlife  
 Fisheries and Wildlife (BSFW)  
 Forestry (BSF)

Wood Products Management (BSF)  
**School of Health Related Professions**  
 Health Service Management (BHS)  
 Clinical Laboratory Sciences (BHS), *Medical Technology, Cytotechnology*

Occupational Therapy (BHS)  
 Physical Therapy (BHS)  
 Radiologic Sciences (BHS), *Radiography, Nuclear Medicine Technology, Radiation Therapy Technology*

Respiratory Therapy (BHS)  
 Speech Pathology/Audiology (BHS)  
**College of Home Economics**  
 Child and Family Development (BSHE)  
 Clothing and Textiles (BSHE)

Family Economics and Management (BSHE)  
 Food and Nutrition (BSHE), *Food Systems Management, Medical Dietetics*  
 Home Economics Journalism (BSHE)  
 Housing and Interior Design (BSHE)

Interdepartmental Studies in Home Economics (BSHE)  
**School of Journalism**  
 Journalism (BJ), *Advertising, Magazine, News Editorial, Newspaper Publishing, Photojournalism, Radio-Television-News*

**School of Nursing**  
 Nursing (BSN)  
**College of Public and Community Services**  
 Community Development (Diploma)  
 Recreation and Park Administration (BS)

**School of Social Work**  
 Social Work (BSW)  
**The Following Interdisciplinary Minors Are Offered:**  
 Black Studies                      Russian Area Studies  
 Comparative Literature              Women Studies  
 Film Studies                          Religious Studies  
 German Area Studies  
 Peace Studies

**FINANCIAL AID**

Financial aid information for the University of Missouri-Columbia is described in the brochure *All About Financial Aid at UMC*, available from the Financial Aids office in 11 Jesse Hall. Students are advised to obtain this brochure for specific information. For scholarship information, students should refer to the various college, school or general scholarship sections of this catalog.

UMC assists approximately 12,000 eligible students from low and medium income families, whose personal and family resources do not meet the minimum cost of an education. The amount of financial aid available depends on Congress appropriating necessary funds. Upon request, the Financial Aids office also provides financial counseling and budget planning services for UMC students.

High school students are advised to obtain financial aid forms from their school counselor or principal.

Non-high school students should contact the Student Financial Aids Office, 11 Jesse Hall, UMC, Columbia, Mo. 65211.

The form to be completed is: Family Financial Statement, sent to American College Testing or Financial Aid Form, sent to College Scholarship Service.

In order to receive full consideration for the following school year, students should complete all forms in time for the Financial Aids office to receive them by April 1. For students who apply at any other time during the year, UMC will process financial aid applications according to the date forms are received and if aid money is available.

The types of financial aid fall into three basic categories: grants, loans and work-study employment. Only the Guaranteed Student Loans and military scholarships are not applied for using the Family Financial Statement or Financial Aid Form. Many of the financial aid programs require that students be enrolled for 12 credit hours or more.

**FEES AND EXPENSES 1983-84**

**INCIDENTAL FEE**

All students enrolled in the University are required to pay the incidental fee. Courses taken as a hearer (auditing) and courses taken for reduced credit will be counted at their normal credit value in computing the amount of fees to be paid.

**STUDENT ACTIVITIES FEE**

Each student registered for resident work on the Columbia campus is required to pay a student activities fee of \$33.50 for one semester of 16

weeks. This fee is allocated to the following:

Memorial Union Bond Retirement .....	11.50
Warren E. Hearnes Multipurpose Bond Retirement .....	4.00
Missouri Students Association Student Activities.....	9.00
Divisional Student Council Programs .....	1.00
Student Activities Capital Improvements.....	4.00
Associated Students of the University.....	1.00
Intramural Program .....	3.00
<b>Total .....</b>	<b>33.50</b>

For a partial enrollment, the student activities fee will be calculated at a per credit hour or any fraction thereof rate.

For one term of four, six or eight weeks, each student pays a student activities fee of \$16.75 for six or more hours of credit.

No additional student activities fee shall be charged if the student is enrolled simultaneously in a session or semester and in a special intercession.

No student activities fee shall be charged during the period beginning with the close of regular summer session and ending with the beginning of the fall registration.

No student activities fee shall be charged if the student is enrolled for courses which are offered off-campus.

**NON-RESIDENT TUITION**

In addition to incidental fees, tuition will be charged any student who has not been a Missouri resident for at least one year on Sept.

	16-week semester	8-week semester	
	1-13 hours	14 or more hours	7 or more hours
<b>Incidental Fee</b> (All students pay an incidental fee)			
Undergraduate	\$46.00 per hour	\$644	\$46.00 per hour
<b>Non-resident Tuition</b> (Non-resident students must pay non-resident tuition)			
Undergraduate	\$92.00 per hour	\$1288	\$92.00 per hour

**Housing**

Includes double room in an UMC residence hall, 20 meals per week (no Sunday evening meal) and a \$15 social fee. Students are not required to live in residence halls. Housing fees are refunded according to the housing contract. Summer housing includes 15 meals per week and no social fee.

Academic Year: \$2004                      8-week session: \$476                      4-week session: \$238.00

**Refund of fees**

Students who leave the University or drop a course for which they paid, must file a written request with the manager of cashiering for a refund. Refunds will, with some exceptions, be paid according to the following schedule. For any session other than these the refund will be calculated in the same way. Deductions may be made from the refund for any money owed the University.

	Full Refund	90%	70%	50%
16-week semester	Before classes begin (less \$20 for the cost of handling registration)	Within 5 days from day classes begin	Between 6th and 10th day after classes begin	Between 11th and 25th day after classes begin
8-week session	Before classes begin (less \$20 for the cost of handling registration)	Between 1st through 3rd day	Between 4th through 5th day	Between 6th through 13th day

An \$11 per credit hour fee is charged all students enrolled in courses offered by the College of Engineering.

All fees statements are announcements only and are not to be regarded as offers to contract. The University of Missouri-Columbia reserves the right to change any and all fees at any time.

15 for the fall semester, Feb. 15 for the winter semester, and the first day of classes for the summer session. Aliens who are Missouri residents and who fulfill other requirements in the detailed *Tuition and Residence Rules* brochure may be exempted from paying tuition.

No tuition is charged to a non-resident student who is a 75 percent or more full-time academic or administrative staff member of this University, or is the unmarried minor child or spouse of such staff member.

No tuition is charged to a non-resident student, spouse, and unemancipated minor children when the student is a member of the armed forces and stationed in Missouri pursuant to military orders. This privilege is not extended to armed forces personnel or their families when the principal wage earner is specifically assigned, under orders, as a student to the University.

It is the duty of each student to register under the proper residence and pay proper tuition fees; consequently, each student who may be subject to such fees must raise the question. Additional information is available in the *Tuition and Residence Rules* brochure available from the Cashier, 123 Jesse Hall, or the Admissions Office, 130 Jesse Hall, UMC, Columbia, Mo. 65211.

#### TIME AND METHOD OF PAYMENT

All University fees must be paid at the time of registration as a condition of admission to classes. Students who preregister must pay fees by the announced deadline or the advance registration will be cancelled and the student will be required to register again and pay fees during the regular registration period. Registration is not complete until all fees are paid.

Fees for room and board may be paid in one

of the following ways: one payment for the entire year, one payment each semester or four payments each semester.

**Personal Checks.** Personal checks in payment of fees or obligations to the University will be accepted only when the amount of the check does not exceed the amount due from the student. Students whose checks remain unpaid after the student has been notified, will be reported to the Office of the Assistant Vice Chancellor and Director of Student Development for disciplinary action. A service charge of \$5 will be assessed on each check.

A student presenting a check to the University in payment of student fees which is returned unpaid and remains unpaid after the close of the regular registration period, shall be considered a late registrant, and shall be subject to the late registration fee.

**Credit Cards.** MasterCard and VISA are acceptable toward payment of fees to the credit limit of the cardholder.

#### SUPPLEMENTARY FEES

**Automobile Registration and Parking Fees.** Motor vehicle registration is required (at no charge) if parking is desired at the Livestock Center or south of the Hearnes Multipurpose Building. Motorcycle registration (at no charge) is mandatory. Other parking is available in UMC lots at a cost of \$36 for the academic year. UMC residence hall residents may apply for reserved parking in the lots adjacent to the residence hall for a non-refundable fee of \$21 per semester.

**Laboratory Breakages.** Breakage or loss of laboratory equipment due to personal negligence on the part of the student shall be assessed against the student when the actual value of the supplies exceeds \$1. The amount

of this charge shall be determined by the department.

**Late Registration Fee.** Any student registering after the close of the regular registration period shall pay a non-refundable late registration fee of \$46 in addition to all other fees. A student presenting a check to the University in payment of student fees which is returned unpaid and remains unpaid after the close of the regular registration period, shall be considered a late registrant, and shall be subject to the late registration fee.

#### Special Field Trips at UMC.

Field trip fee for geology (8 weeks)...\$87.50

In addition to the above, students enrolled for such field trips will pay the regular incidental fee.

For various summer camps and field trips other than trips during a regular term, an incidental fee of \$43 for undergraduates and \$54 for graduates/first professional per credit hour or fraction thereof is charged. Students who have not been Missouri residents for one year as outlined in the pamphlet *Tuition and Residence Rules*, are required to pay the additional non-resident tuition.

The cost of transportation—if furnished by UMC—may be charged for any field trip.

**Cooperative Work-Study Program.** A processing fee of \$10 is charged for students registered in the School of Engineering for work experience required as part of the degree program. No credit is awarded.

**Savitar.** The charge for the yearbook is \$12 (including tax) and may be ordered at the Savitar Office, 308 Read Hall, or as an optional charge if the student pre-enrolls by paying the figure designated as Total Term Fees plus \$12. (A full refund is made until the book is issued.)



# ACADEMIC REGULATIONS

## RULES AND REGULATIONS SUMMARY

The academic rules and regulations of the University of Missouri-Columbia are published in the *Rules and Regulations of the University of Missouri* and the UMC Faculty Council *Academic Regulations*. The following summaries are intended as a guide for students. Students needing additional information on academic regulations in specific colleges and schools may obtain this information from their dean's offices.

### ABSENCES

Students are expected to attend all scheduled class sessions. A student who does not complete assigned academic work because of absence from class is responsible for making up that work in accordance with instructions pro-

vided by the faculty member consistent with any policy established by the faculty of the respective department or division. A divisional faculty, a department faculty, a course director or an individual instructor may establish attendance standards and will determine whether a student will be permitted to make up work missed as a result of absence(s). There will be no "Dean's Excuse" or "Official Absence."

### ACADEMIC DISHONESTY

Academic honesty is essential to the intellectual life of the University. Thus, academic dishonesty, such as cheating and plagiarism, is a basis for disciplinary action. In all cases of academic dishonesty, the faculty member makes an academic judgment about the student's grade on that work and in that course, and reports all incidents to the provost for disciplinary action.

## ACADEMIC STANDING AND SATISFACTORY ACADEMIC PROGRESS OF UNDERGRADUATE STUDENTS

### A. Definitions

1. *Term*—The word *term* as used in these Regulations applies to any semester or summer session.
2. *Academic standing*—Academic standing refers to the level of the student's academic performance. There are three levels of academic standing: regular standing, academic probation, and ineligible to re-enroll.
3. *Satisfactory progress*—Satisfactory progress refers to the time progression in meeting the requirements of the student's established educational objective. Typically, the student's educational objective

is the completion of a degree program.

4. *Graded course*—Graded course is a course in which a student receives credit if successfully completed. A course in which the student is enrolled as a Hearer is not regarded as a graded course for that student.
5. *Completion of a course*—A course is completed if the student earns a grade of A, B, C, D, or S for the course. For the purposes of this Article, a course in which the student receives a grade of W, F, WF, or I is not considered a completed course. However, in certain instances a course in which a graduate student receives a grade of I will be considered a completed course as specified below.

#### **B. Academic Standing and Progress—General**

1. Any beginning student admitted to the University of Missouri-Columbia who does not meet the minimum admission standards as specified in Article II: (Admissions, Advanced Standing, and Classification) will be entered on academic probation.
2. In the application of the regulations in this Article, the faculty of the division concerned will determine how the grade of Incomplete in a course and a grade in a repeated course will be considered in determining a student's academic standing.
3. Regulations in this Article are the prescribed minimum standards but do not limit the authority of the faculty of any division to adopt and enforce additional regulations affecting students enrolled therein. In the event that a division adopts standards higher than set forth in this Article, the divisional standards will take precedence over the relevant portions of this Article.
4. The dean of the relevant division may, after consulting with relevant faculty, waive any of the regulations in this Article governing a student's eligibility to re-enroll and in determining if the student is making satisfactory progress toward his/her educational objective.

(Note: Satisfactory progress is based on three concepts: (a) minimum number of hours of enrollment each term that are applicable toward the student's degree program, (b) minimum number of hours completed in a 12-month period of enrollment, and (c) maximum time to complete the degree).

#### **C. Academic Standing—Undergraduate Students**

1. A student whose term and cumulative grade point average are 2.0 or higher is in regular academic standing.
2. A student in regular standing whose term grade point average subsequently falls below 2.0 but is 1.0 or above is placed on academic probation.
3. A student whose term grade point average falls below 1.0 is ineligible to re-enroll.
4. A student on academic probation must establish a 2.0 cumulative grade point average within two successive terms of

enrollment; otherwise, he/she is ineligible to re-enroll.

5. A student who has been ineligible to re-enroll for a period of one year may be readmitted only upon the approval of the dean of the division in which the student desires to enroll. As a condition of readmission, the dean may set forth stipulations with regard to minimum standards of academic work which must be maintained by the student. If the student after readmission again becomes ineligible to enroll, his/her ineligibility to re-enroll is normally considered permanent.

#### **D. Satisfactory Academic Progress—Undergraduate Students**

Each student is expected to make satisfactory progress toward achieving his/her educational objective.

Standards for satisfactory academic progress are as follows:

1. *Full-time student.* A full-time undergraduate student is considered to be making satisfactory academic progress if he/she
  - (a) is enrolled in at least 12 semester hours of graded course work each semester applicable to the student's degree program, and
  - (b) completes 24 semester hours of graded course work applicable to the student's degree program in each 12-month period of enrollment.

The time limit for completion of a baccalaureate degree is five (5) years of enrollment as a full-time student.

2. *3/4-time student.* A 3/4-time undergraduate student is considered to be making satisfactory progress if he/she
  - (a) is enrolled in at least 9 semester hours of graded course work each semester applicable to the student's degree and
  - (b) satisfactorily completes 18 semester hours of graded course work applicable to the student's degree program in each 12-month period of enrollment.

The time limit for completion of the baccalaureate degree is seven (7) years of enrollment as a 3/4-time student.

3. *1/2-time student.* A 1/2-time undergraduate student is considered to be making satisfactory academic progress if he/she
  - (a) is enrolled in at least six (6) semester hours of graded course work each semester applicable to the student's degree program, and
  - (b) satisfactorily completes 12 semester hours of graded course work applicable to the student's degree program in each 12-month period of enrollment.

The time limit for completion of the baccalaureate degree is ten (10) years of enrollment as a 1/2-time student.

4. During the student's freshman year only, the dean of the division in which the student is enrolled may authorize a student to engage in credit or non-credit prerequisite or remedial programs or courses and apply the time spent on remedial work to the minimum semester

hour requirement specified in F.1, F.2 and F.3 above.

(Note: The minimum number of semester hours of enrollment per semester in F.1, F.2 and F.3 above are to be adjusted proportionally for terms of enrollment other than a semester.)

The regulations in this Article represent the internal policies of the University. In addition, these regulations are to be used as standards for making certifications to external agencies regarding a student's academic standing and progress toward his/her educational objective. Typically, such certifications to external agencies have to do with the student's eligibility for financial aid.

For the purpose of determining eligibility for financial aid, a student will be certified as being in satisfactory academic standing if that student is eligible to re-enroll. A student will be certified as making satisfactory progress toward his/her educational objective if the student meets the standards expressed in Section F above in accordance with the appropriate classification of the student at that time.

Ordinarily, the "12-month period of enrollment" referred to in D.1, D.2, and D.3 above begins at the beginning of the Fall Semester. However, if the nature of the financial aid in question suggests a more appropriate starting time for the "12-month period of enrollment," that more appropriate starting time will prevail.

For purposes of determining eligibility for financial aid, the time limit for completion of degree determines the total amount of financial aid that a student is eligible to receive while pursuing a given degree.

#### **ADDING COURSES OR CHANGING SECTIONS (PETITIONING)**

The petitioning procedure (changing classes) is initiated by the student and requires the approval of the student's adviser and dean. Add and drop forms (petitions) are available in the deans' offices. In a regular semester, a student may not enter a course after the second week of class. An approved petition is the only way a student's academic record will reflect either a withdrawal from a course or the addition of a course for credit.

#### **AUDITORS (HEARERS)**

With the consent of the dean of the school or college in which the student is registered and of the instructor concerned, a student may enroll in a course as a hearer. Normally, a hearer will attend the course on a regular basis; either the department or an individual instructor will stipulate the requirements for enrollment in a course as a hearer. At the request of the instructor, a hearer may be dropped from a course for failure to comply with stipulated requirements. An instructor may request the registrar to backdate a hearer's disenrollment for a course, so that no notation of the student's enrollment will appear on the student's permanent record. A hearer will receive no credit toward a degree. Once a student has elected to enroll in a course as a hearer, he/she may not change his/her status to that of a regular student after the fifth day of class. Nor can a student

who is enrolled for credit change his/her status to hearer after the fifth day of class.

### CHANGE OF GRADE

If you believe you have been graded unfairly you should:

1. See your instructor.
2. If still dissatisfied, you may appeal to the chairperson of the department. (If the course has a large number of sections, such as Math 10, it may have a course director. If so, you should see the director before appealing the grade to the department chairperson.)

3. The chairperson will conduct an investigation. The chairperson, however, is not allowed to substitute his or her judgment for that of the instructor in regard to the quality of your work.

4. If the instructor of the course also is the department chairperson, the dean of the school or college will handle grade appeals.

5. No one may substitute personal judgment for that of the instructor in regard to the quality of your work. However, mathematical or mechanical errors that may have been made in scoring your examinations may be corrected.

No grade shall be otherwise changed unless there is clear, convincing and unequivocal evidence that it was a direct result of arbitrary and capricious conduct on the part of the instructor.

### CHANGE OF COLLEGE/SCHOOL

Students may transfer from one UMC division to another in accordance with college and school policies as noted below and in the college and school sections of the catalog. Because of limited enrollment and/or higher minimum standards, general acceptance as a student at the University of Missouri-Columbia does not guarantee acceptance to specialized or professional programs. Currently enrolled students may obtain a transfer of division form from their dean's office. Signatures are needed from the deans of the colleges or schools the student is entering and leaving. The signed transfer of division form is returned to the Registration Office in 225 Jesse Hall.

### COLLEGE AND SCHOOL REGULATIONS FOR TRANSFERRING DIVISIONS

**Arts and Science:** A student in Arts and Science who has declared the intention to transfer to another division of UMC, but who is denied admission to the other division, is not permitted to continue in the College of Arts and Science more than one full semester following the declaration of intent to transfer unless the student declares intent to pursue a degree program.

**Business and Public Administration:** Second-semester sophomores in the College of Arts and Science should submit a transfer application to the College of Business and Public Administration as soon as they have started classes in their final pre-B&PA semester. Only those students whose grade point average is 3.0 or higher may preregister for their first semester in the College of Business and Public Administration. The deadline for such applications precedes the preregistration periods by approximately two weeks.

**Journalism:** Second-semester sophomores in the College of Arts and Science should apply to the admissions office for a change in division

as soon as they have started classes in their final prejournalism semester. Only those students whose grade point average is 3.0 or higher may preregister for their first term in the School of Journalism. The deadline for such applications precedes the preregistration periods by approximately two weeks.

### CLASSIFICATION OF STUDENTS

Students are assigned to a particular class on the basis of the following credit hour requirements:

Freshman: 0 to 29 semester hours of credit  
Sophomore: 30 to 59 semester hours of credit  
Junior: 60 to 89 semester hours of credit  
Senior: 90 or more semester hours of credit  
Non-degree: a student advised and enrolled in a school or college, but not pursuing any degree

A student may change from non-degree to degree status upon the approval of the dean of the school or college offering the desired degree.

An undergraduate student pursuing a degree program in an institution other than UMC who enrolls at UMC is a visiting student and will be advised in the UMC school or college in which assigned. This applies to students who enroll under agreements with the Mid-Missouri Associated Colleges and Universities as well as those from other colleges and universities.

### COMBINED UNDERGRADUATE AND GRADUATE ENROLLMENT

With the approval of the divisional and graduate deans, final semester seniors in the upper half of their classes and within 15 hours of completing graduation requirements may enroll dually in their undergraduate division and the Graduate School for courses sufficient to make a full program. Specific circumstances exist in which exceptions to this rule are made: college and school rules should be consulted. Dual enrollment must be completed in the Graduate Office within one month after the start of the fall and winter semesters and within three weeks of the start of the summer session.

Students who graduate with excess credit without registering in the Graduate School will not receive graduate credit for that work.

This program also is available to seniors in other Missouri colleges. Additional information may be obtained from the Graduate School dean's office.

### CREDIT BY EXAMINATION

UMC offers the opportunity for advanced credit by examination to any student with less than 90 semester hours of college credit. (CLEP General Examination is limited to students who have less than 30 semester hours of college work.) Credit may be awarded, but no grades or honor points are recorded. General eligibility to receive advanced standing at UMC does not guarantee its applicability to a degree program. The official credit-by-examination policy of each UMC school and college is available from the appropriate dean's office. The following four programs are used to award credit by examination:

**Advanced Placement Program.** The Advanced Placement Program of the College Entrance Board is accepted by UMC in 12 areas. The English examination is not accepted because a similar test is required through Freshman Placement Tests. Those students who receive a score

of three or higher (out of a possible five) are eligible for college credit, with a maximum of five semester hours for each examination completed.

**Freshman Placement Tests.** Freshman Placement Tests are required of all entering students who have completed less than seven semester hours of college credit. They are composed of the Missouri College English Test, the Missouri Mathematics Placement Test, and Series 2, Form 1 of the School and College Ability Test. Entering freshmen who score in the lowest range on the MCET must pass English 1, Composition, in the freshman year and also English 60, Exposition, after the freshman year. Students scoring in the middle range must pass English 60, Exposition, after the freshman year. Those scoring in the upper range may fulfill requirements by passing English 65GH, Honors Exposition. Entering freshmen who qualify on the MMPT may obtain advanced placement in mathematics and may be awarded advanced credit (3 hours) as well.

**College-Level Examination Program.** The College-Level Examination Program of the College Entrance Examination Board provides General Examinations and Subject Examinations. Credit may be awarded for either or both. However, the credit must be applicable in a student's program of study, and if results of both tests are submitted, duplicate credit will not be awarded in the same subject. (Refer to the appropriate section in this catalog for the school or college, or contact the dean's office to ascertain the specific divisional limitations for CLEP examinations.)

General Examinations are limited to students who have less than 30 semester hours of college credit. Advanced standing is applied to the student's degree program in a manner determined by the dean of the student's school or college and may be awarded for six general credits (standard score cut-offs in parentheses) in each of the following areas: Humanities-Fine Arts (49), Literature (49), History (49), and English (498). Credit from General Examinations are not accepted by the College of Arts and Science, the College of Business and Public Administration or the School of Journalism.

Subject Examinations cover 36 specific subjects and are generally accepted by all UMC schools and colleges. Credit from three to six semester hours is granted for each semester for which the examination is designed.

**Departmental Examinations.** Departmental Examinations are comparable to final examinations given in the various courses offered on the campus. The examinations are objective or essay formats, and are prepared and graded by the faculty of the department concerned and UMC Counseling Services. Arrangements for Departmental Examination should be made through University Counseling Services.

A brochure, *Credit by Examination*, available from the testing coordinator's office in Counseling Services, provides additional information.

### CREDIT FOR COURSES IN OTHER UMC COLLEGES

**College of Arts and Science:** A maximum of 18 semester hours of credit for courses

completed in all other UMC divisions may be included in the hours required for graduation.

*Note:* Other UMC colleges and schools enforce similar limitations, but they do so by prescribing the number of credits that must be completed within their division.

### **DROPPING A COURSE**

(See Withdrawal from a Course)

### **EMPHASIS AREA OR AREA OF CONCENTRATION**

At UMC a student's degree program is comparable to a major at other institutions. The degree programs and emphasis areas offered at UMC are listed in the General Information section of this catalog.

### **EXAMINATIONS**

Semester and final examinations may be held only during the date and time printed in the Examination Schedule and approved by the Director of admissions and registrar.

Examinations in courses numbered 400 and above may be conducted at any time agreeable to both the teacher and students. Examination of individual students may be held at the discretion of the instructor. This particular regulation cannot be interpreted to mean that "individual students" constitute an entire class. No student may be re-examined for the purpose of changing a grade after a final grade has been reported to the registrar.

### **INCOMPLETE GRADES**

Whenever students cannot be assigned a grade at the end of a course in which they have been enrolled because their work is for good reason incomplete, the instructor will postpone the grade of the students, reporting to the registrar the fact that such students' grade is I. An I grade may be assigned only when (1) the completed portion of the student's work in the course is of passing quality and, (2) there is such evidence of hardship as to make it unjust to hold the student to the time limits previously fixed for the completion of his work.

The time allowed for the removal of an I grade is normally one calendar year from the date of its recording (assuming that that student is in continuous enrollment during the time period). When the incomplete work is accomplished, proper notification of the grade to be assigned will be provided to the registrar and to the student.

### **MAXIMUM AND MINIMUM ENROLLMENT**

The UMC Faculty Council has established 12 semester hours as the minimum number of hours in which a full-time undergraduate student may be enrolled during a regular semester. Normal course load is 15 to 16 hours. Part-time enrollment (less than 12 hours) requires the permission of the dean of the college or school in which the student is enrolled. Students wishing to drop below 12 hours after enrollment must submit a written request justifying the reason(s) to the dean of the college.

*College and School Regulations on Maximum and Minimum Enrollment are as follows:*

**Arts and Science:** With the consent of the dean, students with superior scholastic records may be permitted to register for more than 16 hours. Normally, during a regular session, students whose grade point average is 2.75 may

enroll for 17 hours; those with 3.0, for 18 hours; and those with 3.5, for 19 hours. During the summer sessions a student may not be enrolled for more than nine hours during the combined two four-week sessions and/or the eight-week session.

**Business and Public Administration:** A student with a cumulative GPA of 3.0 or higher may register for up to 18 hours with the permission of the dean.

**Education:** A student new to UMC may enroll for a maximum of 16 hours. Depending on GPA, and with permission from a representative of the dean's office, students previously enrolled at UMC may register for a maximum of 20 hours.

**Health Related Professions:** A student may enroll for more than 17 hours only with permission from adviser and associate dean.

**Home Economics:** A student with a cumulative GPA below 3.0 must obtain permission from the adviser and the assistant dean to enroll in more than 17 hours.

**Journalism:** A student who has established a 3.0 GPA the year before may carry 17 or 18 hours, and one who has established a 4.0 GPA may carry 19 hours. In both instances, special permission of the dean is required.

**Nursing:** A student with a cumulative GPA below 3.0 must obtain permission from the assistant dean to enroll in more than 16 hours.

**Public and Community Services:** A student may enroll for more than 18 hours only with permission from the dean's office.

### **PROBATION**

(See Academic Standing of Undergraduate Students)

### **REQUIRED WORK FOR GRADUATION WITH A BACHELOR'S DEGREE**

The requirements for an approved degree are established and monitored by the faculty of the school or college responsible for recommending candidates for the degree. A student may be granted two baccalaureate degrees if all requirements for both degrees have been met and the student has completed at least 12 semester hours of course work beyond that required for the first degree.

### **REQUIRED WORK IN RESIDENCY**

Candidates seeking undergraduate degrees from the University of Missouri must be in residence on the Columbia campus during the senior year as defined by the academic division involved. The specific residency requirements by colleges are as follows:

**Agriculture:** The last 30 hours must be completed in residence.

**Arts and Science:** Students must complete six semesters of resident college work. Credit is given for work completed in other institutions and for correspondence or extension course work completed in the University Extension Division. The last two semester (30 hours) must be completed in residence at UMC. Students who are candidates for dual degrees in the Schools of Law or Medicine must complete their junior year in residence at UMC. Students who transfer with senior standing are advised that attendance for two semesters and a summer session may be required to fulfill all specific course requirements for graduation.

**Business and Public Administration:** The last 30 hours must be completed in residence. Students lacking three hours or less may, with the permission of the dean, complete the requirement by correspondence or transfer credit.

**Education:** Students must spend senior year on campus.

**Engineering:** A student transferring from an accredited institution other than the University of Missouri must complete at least 30 upper-level credit hours, 200 and above or equivalent, in the degree program at University of Missouri campuses. At least 21 of the 30 credit hours must be upper-level engineering courses approved by the department awarding the degree. However, for a student transferring with senior standing from another University of Missouri campus, the last 15 hours must be completed in residence on the campus where the degree program is located; 12 of these 15 hours must be in engineering and approved by the department awarding the degree.

**Forestry, Fisheries and Wildlife:** For all curricula in Forestry, Fisheries and Wildlife, the last 60 hours must be completed in residence. The faculty may grant an exception under unusual circumstances.

**Health Related Professions:** Students must take a minimum of 24 hours in residence the last year.

**Home Economics:** Students must complete a minimum of 45 hours in residence.

**Journalism:** Students must complete 30 credit hours in professional journalism courses on this campus.

**Nursing:** Students must complete the last 24 hours in residence.

**Public and Community Services:** The last two semesters must be completed in residence.

### **STUDENT ACADEMIC RECORDS**

Official academic records including credit, grades and degrees granted by the University of Missouri-Columbia are maintained in the Office of the Registrar. The University does not permit access to, or release of, educational records or personally identifiable information contained in such records (other than directory information) without the written consent of the student.

### **STUDENT RESPONSIBILITY**

Faculty advisers and counselors are available to provide guidance, but students are responsible for checking with their dean's office to ascertain if they are progressing satisfactorily toward a degree. Upperclassmen, who are candidates for degrees, should check with the dean's office no later than the end of the junior year to ascertain if their records are in accord with those maintained in the dean's office.

### **SATISFACTORY/UNSATISFACTORY GRADING SYSTEM**

Students may elect to take courses under the S/U (pass/fail) grading system in several of the UMC colleges and schools. Before electing to take a course on a pass/fail basis the student should evaluate the advantages and disadvantages of the S/U grading system. S/U status is indicated in the appropriate column on the Course Request Card. Students may change to or from the S/U status only through the sixth day of classes in a semester.

In general, the teacher of a course does not know which students, if any, are enrolled on the S/U system, and a grade of A, B, C, D or F for each student is reported to the registrar. The registrar ascertains which students are enrolled on the S/U system and assigns a grade of U to those reported for grades of D or F, and a grade of S for those reported for A, B or C. Grades of S and U are not included in the computing of grade point averages. Enrollment in courses under the S/U system is subject to the University faculty's restrictions, which are:

1. Beginning students (students who have completed fewer than 12 semester hours) are not eligible.

2. Students on scholastic probation are not eligible.

3. Only one course per semester or summer session may be elected under the S/U grading system.

4. Courses completed with a grade of S may constitute no more than 20 percent of the total hours for the baccalaureate degree.

5. Courses completed with a grade of S may be accepted on an area of concentration only with the prior approval of the area adviser.

*Additional College and School Regulations on S/U Grading System*

**Business and Public Administration:** The S/U grading system is limited to unrestricted elective courses.

**Health Related Professions:** A student may select one course outside an emphasis area as S/U per semester in addition to any course so designated by a department.

**Journalism:** A student may present a maximum of 12 hours of S/U credit for admission to the School of Journalism. After admission to journalism, a student may take, on an S/U basis, up to 12 of the 60 hours required for the BJ degree. No student may take a course on an S/U basis that is specified as a requirement in an emphasis area.

## TRANSFER OF CREDIT

Each fall, approximately 25 to 30 percent of the new undergraduates enrolled at UMC are students who have transferred from other colleges and universities. Because requirements for degrees vary from institution to institution and since each UMC college determines which transfer credits meet the requirements for its degree, a student planning to transfer to UMC should contact the dean's office of the school or college offering study in the student's area of interest.

Course work completed at an accredited institution of higher education and oriented toward a baccalaureate degree will be accepted at UMC if the grade was C or better. However, not all credits transferred to UMC fulfill specific requirements for a particular degree.

Official transcripts from each college attended must be mailed to the Director of Admissions, 130 Jesse Hall, UMC, Columbia, Mo. 65211. Students seeking admission to the College of Arts and Science or the School of Journalism also must submit a high school transcript. All credentials submitted for admission will be retained by UMC.

**Transfer from a Junior/Community College.** An Associate of Arts degree (AA) is a two-year degree which indicates the completion of a student's lower division education. It also is a specific transfer degree for entry, at the junior level, into the general range of baccalaureate degree programs offered by a four-year institution. Students transferring to UMC from an accredited Missouri Community/Junior College with an Associate of Arts degree and a certified C average will be accepted as: (1) having junior standing, and (2) having completed General Education Requirements if the AA degree consisted of at least 60 semester hours of college level work. These 60 hours must include no less than 36 semester hours distributed as follows:

Communication Skills (6 hours)

Mathematics (3 hours)

Science—Biological and Physical (9 hours)

Humanities or Fine Arts (9 hours)

Social-Behavioral Science (9 hours)

Exceptions to this UMC Faculty Council policy are the College of Business and Public Administration and the Schools of Journalism, Nursing and Health Related Professions. The transfer requirements for these schools may be found in their respective sections of this catalog.

An Associate of Science degree (AS) is a specialized degree and should result from careful planning and agreement between specific two-year and four-year institutions. Students planning to transfer to UMC with an AS degree should consult with the dean's office of the school or college offering study in the student's area of interest as they plan their AS course of study.

**Transfer Within the UM System.** For students transferring between campuses within the University of Missouri system, the following University of Missouri policy is applicable:

"Any course that leads to an undergraduate degree on any campus of the University of Missouri shall be accepted in transfer toward the same degree on each campus of the University offering said degree."

**Appeal.** The University of Missouri provides an appeal process for transfer students who wish to appeal decisions on admissions, transfer to credits and grades. Appeals are heard by a faculty committee, the Committee on Entrance and Revision of Records. Appeals may be initiated by writing to the Director of Admissions, 130 Jesse Hall, UMC, Columbia, Mo. 65211.

## WITHDRAWAL FROM A COURSE

Students who wish to withdraw from any course in which they are officially enrolled must declare their intentions by processing the petitioning form no later than two weeks before the last scheduled day of class. A student may withdraw from courses as long as the total enrollment does not fall below the 12 hours minimum requirement. The faculty of the student's school or college may establish an earlier deadline. The date for withdrawal from courses is posted in the deans' offices. Withdrawal from a course requires the approval of the student's adviser and dean. Petitioning forms are available in the dean's office.

Before the sixth week of the semester, a student may withdraw from a course with a grade of Withdrawn and have no notation of enrollment in that course on the transcript. A student who withdraws from a course after the six-week period receives a grade of W if making a grade of D or higher in the course. If the grade is F, a grade of WF is recorded and is counted as an F in the term grade point average.

## ADDITIONAL COLLEGE AND SCHOOL REGULATIONS

**Arts and Science:** Upper-class degree candidates may not drop a foreign language nor may a student who has completed a foreign language course at UMC interrupt the sequence until the requirement has been satisfied.

**Business and Public Administration:** Any general education or basic skills requirements not completed at the time of admission to B&PA must be completed as soon as possible. These courses may not be delayed or dropped.

## WITHDRAWAL FROM THE UNIVERSITY

Students who wish to withdraw from the University of Missouri-Columbia initiate the withdrawal in the office of the dean of the school or college in which they are enrolled. A withdrawal may not be dated after the last scheduled day of course work.



# COLLEGE OF AGRICULTURE

The College of Agriculture was established at the University of Missouri in 1870 in response to the need for agricultural research and teaching in the state. The three major divisions of the College, the Agricultural Experiment Station, the Resident Instruction Program and the Agricultural Extension Service, have had great influence on Missouri agriculture. Agriculture, a basic industry concerned with food and fiber, has even more need in today's world for highly trained personnel. The objective of the College of Agriculture is to provide students with the best education possible for service in agricultural business, technology and science.

The UMC College of Agriculture, the eighth largest in the country, has excellent and extensive facilities for instruction, from research farms to highly specialized laboratories. The College is a leader on the UMC campus in providing quality student advisement.

The College is organized into 16 academic departments and the School of Forestry, Fisheries and Wildlife. The main objective of the School of Forestry, Fisheries and Wildlife is to provide a broad range of opportunities for the student who wishes to attain competence in the professional and scientific aspects of resource management.

In the College of Agriculture are the Departments of Agricultural Economics, Agricultural Education, Agricultural Journalism, Agricultural Engineering, Agronomy, Animal Science, Atmospheric Science, Biochemistry, Dairy Science, Entomology, Extension Education, Food Science and Nutrition, Horticulture, Plant Pathology, Poultry Science and Rural Sociology.

## ADMISSION

Students who have been admitted to the University of Missouri-Columbia may enter the College of Agriculture and the School of Forestry, Fisheries and Wildlife as freshmen. Preprofessional study for veterinary medicine may be completed either in the College of Agriculture or the College of Arts and Science.

## TRANSFER STUDENTS

Students transferring to UMC from another accredited college or university are subject to the regulations established by the UMC Faculty Council concerning transfer of credit. Transfer of credit is described in the Academic Regulations section of this catalog.

## STUDENT SERVICES

### ADVISEMENT

Each student in the College is assigned a faculty adviser to assist in planning courses, establishing career goals and in fulfilling a study program that leads to graduation.

The academic adviser also serves as a resource person for the student in dealing with

personal or other problems. One of a student's first priorities is to meet and become acquainted with the academic adviser early in the semester. The student should consult with the adviser when planning or changing the academic program because the adviser must approve and sign the study program for graduation.

Advisement for undergraduates in the School of Forestry, Fisheries and Wildlife is concentrated primarily with two academic advisers and four or five faculty members who deal with all aspects of the program. Other faculty members assist as needed or with specific questions related to their areas.

### PLACEMENT

The College of Agriculture provides a placement service for graduating seniors, alumni seeking employment and undergraduates wanting part-time and summer employment. The placement office maintains employment opportunity lists, distributes information concerning jobs and schedules interviews. For additional information, contact the Placement Office, 2-64 Agriculture Bldg., UMC, Columbia, Mo. 65211.

Students in the School of Forestry, Fisheries and Wildlife are counseled on employment opportunities. Available positions are called to their attention and arrangements are made for interviews with employers. Students receive instructions regarding Civil Service procedures and are assisted in preparation of resumé and applications for employment. Employment assistance also is given to alumni of the School when requested. They are advised of employment opportunities by letter when appropriate opportunities come to the School's attention. For additional information on Forestry, contact Lee K. Paulsell, 1-30 Agriculture Bldg. For additional information on Fisheries and Wildlife, contact the faculty at 112 Stephens Hall.

## STUDENT ACTIVITIES

The College of Agriculture offers a wide variety of extracurricular student activities. Departmental clubs sponsor activities related to major interests, such as field trips and speakers as well as social events. Students with special interests have formed clubs such as Married Aggies, 4-H and Rodeo Club. Each class and departmental club elects representatives to the Agricultural Divisional Student Council, which sponsors activities such as a leadership conference, a senior yearbook and an Ag student newspaper. Honorary organizations such as Alpha Zeta and Gamma Sigma Delta promote the ideals of scholarship and leadership, and recognize outstanding achievements by students in the College.

### SCHOOL OF FORESTRY, FISHERIES AND WILDLIFE STUDENT ACTIVITIES

Extracurricular activities of forestry students center in the Forestry Club which has regular meetings on alternate weeks. In addition to

educational meetings, the club sponsors several social events—initiation, beanfeed, spring banquet and spring barbecue. Prominent people in various lines of forestry work appear on the programs of the Forestry Club. The club sponsors a fourth grade educational program on forestry at schools in the Columbia area, scholarships for deserving students at the forestry summer camp, and an Arbor Day program, including free tree seedlings for fourth graders. It has been very active in the Midwestern Forester's Conclave which is attended by forestry students from 12 area universities.

The University of Missouri-Columbia Student Chapter of the Wildlife Society sponsors social, educational and service activities. One outdoor picnic, encompassing a variety of activities, is held each semester. Numerous field trips to state and federal wildlife areas and biweekly meetings with professional speakers provide sound learning opportunities. Members volunteer their services to the Missouri Department of Conservation and other groups for work projects, such as building and maintaining goose nesting tubs, and operating deer hunter check stations. In return, students gain valuable experience and future job contacts. Members donate both time and money to non-profit conservation groups. The chapter annually attends the Midwest Student Wildlife Conclave, a weekend meeting with fisheries and wildlife students from other midwestern universities.

The official publication of student clubs, *Environs*, gives students an opportunity to develop their talents in writing, editorial work, business management, art and related fields.

Xi Sigma Pi is the national honorary forestry society. Juniors and seniors with high scholastic achievement and leadership qualities are eligible for the society. Xi Sigma Pi encourages good scholarship by sponsoring the outstanding freshman and senior awards given annually in recognition of scholastic achievement.

The Student Council provides opportunity for participation in both school and campus student government activities. The Council, supported by student fees, provides improved communications between students and faculty and opportunities for implementation of student programming ideas. The Council also organizes the School's graduation ceremonies, sponsors field trips, provides free camping equipment to School students and selects outstanding students and faculty.

## SCHOLARSHIPS IN THE COLLEGE OF AGRICULTURE

Application should be made at 2-64 Agriculture Building. For other and special scholarship information, contact the dean's office.

**Lloyd E. Adams Scholarship in Entomology:** Award of \$500 annually to a doctoral student in entomology. Selection



of recipients shall be recommended by the chairman of the department. The fund was established by Mrs. Adams in memory of her husband who earned his bachelor's and master's degrees at UMC.

**Ag Club Scholarships:** Two scholarships of \$250 each for incoming freshman and upperclass students in agriculture. Freshman selection is based on high school rank, test scores, extracurricular activities and leadership potential. Upperclass selection is based on a 3.2 or better GPA and extracurricular activities.

**Agricultural Engineering Alumni Scholarship:** Stipend paid to graduates of a Missouri high school who want to prepare for a career in professional agricultural engineering. Recipients are selected by the Department of Agricultural Engineering on the basis of grades, aptitude for college work, character, need and interest in field; may be considered for renewal of scholarship along with new applicants. Established by UMC agricultural engineering alumni.

**Agricultural Scholars:** The College of Agriculture offers scholarships based on need and scholastic achievement to entering freshmen. Students selected from top percentage of their graduating classes.

**College of Agriculture Foundation Scholarships:** Alumni and friends of the College of Agriculture in some Missouri counties provide awards. Apply to the University extension director in each county; selection is based upon academic excellence, agriculture and community activities, and sincere interest in agriculture and home economics.

**Alpha Tau Alpha Award:** Stipend awarded to student majoring in agricultural education. Established by Alpha Tau Alpha, agricultural education honor society.

**American Society of Agronomy Senior Recognition Award:** A plaque is awarded to an outstanding student selected from the Agronomy Club on the basis of scholarship and contribution to the club.

**R. P. Beasley Memorial Scholarship:** One or more awards of \$400 to sophomore students majoring in agricultural engineering or agricultural mechanization. This award is paid from a fund established in memory of Professor Beasley, a UMC agriculture engineering faculty member for 36 years. Recipients are selected by the Department of Agricultural Engineering on the basis of academic performance during the freshman year, character, participation in student activities and financial need.

**Paul H. Bebermeyer Scholarship Fund:** Awarded to third- or fourth-year undergraduate agricultural economics student. Recipient is selected by chairman of the Department of Agricultural Economics or by committee or representative authorized to act in his behalf.

**Mom Beger Scholarship-Award:** Annual stipend from a memorial endowment established by Alpha Gamma Sigma fraternity and friends and family of Mrs. Jean Beger. Nominations are made by the fraternity, with final selection by the College of Agriculture Scholarship and Awards Committee.

**Richard A. Bloomfield Scholarship Fund:** Recipient, selected by the College of Agriculture Scholarship and Awards Committee, must be an undergraduate student majoring in an area which relates chemistry to agriculture.

**Bluestem Scholarships:** Two \$500 scholarships to students in agronomy and animal science who complete a research project related to native warm season grasses of Missouri. A stipend of \$200 is available to cover research expenses. Funding is provided by Dr. George A. Gates of Prairie Village, Kan.

**Mary E. Blythe Scholarship:** Awarded to a worthy undergraduate from Audrain County, Mo. Recommendations are made by the Scholarship and Awards Committee of the College of Agriculture.

**Durward Brewer Memorial Award in Rural Real Estate Appraisal:** Awarded to an outstanding student enrolled in and completing Agricultural Economics 338, Rural Real Estate Appraisal. Recipients are selected by agricultural economics faculty members.

**Clyde Brown Memorial Scholarship Fund:** Awarded to fourth-year students. Preference is given to applicants who have majored in agronomy or agricultural economics and have financial need. Selection is made by the College of Agriculture Scholarship and Awards Committee.

**John E. Brown Scholars:** Seniors in agriculture with interest in agribusiness management and possessing scholarship placing students in good academic standing. Stipend will cover expenses incurred for 16 or more students during a five-day internship with a leading agribusiness in the St. Louis area. Selection committee is appointed by the director of resident instruction.

**John K. Bryan Scholarship:** This scholarship, \$600 maximum, was initiated in 1974 in memory of the late John K. Bryan who, for many years, directed the Missouri Hotel and Motel Association. Scholarships, for students majoring in food service and lodging management, are awarded to

students who can show personal merit, intellectual capacity, a need for financial aid and a demonstrated interest in a career in the lodging industry. The decision on the number and the amount of the scholarship falls under the purview of the Missouri Hotel and Motel Association.

**George Washington Carver Graduate Fellowship:** A \$1,000 stipend in addition to a MS or PhD assistantship stipend for a graduate student in the College of Agriculture. Consideration is given to a promising minority student (U.S. citizenship required). Award is for two-year period.

**Damon V. Catron Scholarship:** Awarded to an outstanding senior scholar majoring in Food Science and Nutrition. Recipient is selected by the Food Science and Nutrition Scholarship Committee.

**Chicago Farmers Board of Directors Scholarship:** Provides annual award of \$250 to a senior in the College of Agriculture on the basis of scholarship, leadership, service, character and need. Selection is made by the College of Agriculture Scholarship and Awards Committee.

**Henry I. Cohn Memorial Agricultural Scholarship:** Income from an endowment to provide scholarships for students enrolled in the College of Agriculture. Selected by College of Agriculture Scholarship and Awards Committee.

**Curators Interscholastic Events Scholars:** Partial waiver of fees for two semesters awarded to winners of a high rating in state FFA contests. Special applications are made to and recipients must be recommended by the Department of Agricultural Education.

**Anselma DeGuzman Memorial Award:** An award of \$25 is given to a Food Science Association-UMC student member. Application is made by writing a paper to the Food Science Association stating why the individual should receive the award. Selection is made by Association members.

**DeKalb Ag Research Foundation Scholarship:** This grant is used to benefit undergraduate students in agriculture who might not be able to continue their education without such funds. Selection is made by the College of Agriculture Scholarship and Awards Committee.

**John W. Dickey Jr. Memorial Fund:** The income from an endowment by Ernest M. and Flo Dickey Funk provides loans, jobs or scholarships for students in the College of Agriculture. Dickey, nephew of Mrs. Funk, graduated from the College of Agriculture in 1941. Before his death in 1965, Dickey was a field agent for the Agricultural Stabilization and Conservation Service. Selection is made by the College of Agriculture Scholarship and Awards Committee.

**Paul N. Doll Scholarship:** One or more awards of \$400 to sophomore students majoring in agricultural engineering or agricultural mechanization. Recipients are selected by the Department of Agricultural Engineering.

**Harold P. Dugdale Scholarship:** Scholarship to deserving graduate students majoring in food science with an interest in meat technology. Selection is made by the Food Science and Nutrition Scholarship Committee.

**A. J. Dyer Achievement Awards:** A fund established by friends and relatives of Dr. Dyer provides annual awards for members of the senior livestock judging team. Awards for other undergraduate activities also may be made.

**Mr. and Mrs. Jacob Ensminger Scholarship Fund:** For a junior, senior or graduate student majoring in agriculture. Consideration is given to academic achievement, leadership, extracurricular activities, character and financial need. Selection is made by the College of Agriculture Scholarship and Awards Committee.

**Farmland Industries Inc. Scholarships:** UMC is one of several land-grant colleges and universities in which this Kansas City firm established scholarships for students in the College of Agriculture. Recipients' backgrounds must be predominantly agricultural and their parents must be members of an agricultural cooperative. Awarded to a junior and senior of high scholastic standing. Selection is made by the College of Agriculture Scholarship and Awards Committee.

**Federal Land Bank Scholarships:** Available to four high school graduates. Recipients are selected on the basis of scholarship, participation in farm and high school activities, community responsibilities and good character. Continuance of award for second semester is contingent on a satisfactory record for first semester. Established by the Federal Land Bank of St. Louis. Selection is made by the College of Agriculture Scholarship and Awards Committee.

**Federated Garden Clubs Scholarships in Floriculture:** Available to students studying floriculture. Recipients must have minimum scholastic averages of 2.0 and must show leadership qualities. Selection is made by the scholarship committee of the Federated Garden Clubs of Missouri from recommendations of the floriculture scholarship committee. Scholarship may be held more than once. Apply through the Department of Horticulture.

**John A. Ficken Memorial Scholarship:** Awarded to junior or senior students in the College of Agriculture

majoring in animal science with an interest in swine production. Recommendations from the Department of Animal Science in consultation with the Missouri Pork Producers Association with final approval by the College of Agriculture Scholarship and Awards Committee.

**Food Science Freshman Scholarships:** Three scholarships of \$500 each to outstanding freshmen majoring in Food Science and Nutrition. Provided by Meyer Dairy, Inc.

**Gamma Sigma Delta Sophomore Award:** \$100 presented to the highest ranking sophomore in the College of Agriculture.

**Gares Brothers Memorial Scholarship:** Provides a scholarship for one or more juniors enrolled in the College of Agriculture majoring in agricultural economics with a special interest in agribusiness. Preference is given to students planning for a career in agricultural credit and students who are members of Farmhouse Fraternity. Selection of recipient is made by a committee composed of: a member of Missouri Farmhouse Foundation board, a member of the agricultural economics faculty and a representative of the Farm Credit Administration.

**Ernest L. Garner Memorial Scholarship Fund:** Family and friends established a fund in memory of Garner, who spent most of his professional life as a vocational agriculture teacher and FFA adviser at the Carl Junction, Mo., high school. Awarded annually to Missouri residents from Carl Junction and enrolled in first, agriculture; secondly, veterinary medicine; or thirdly, home economics. If no suitable applicant from Carl Junction, the scholarship is available to any student from Jasper County, Mo. Preference should be given to a student from a large family and/or a veteran.

**Gateway NAMA Scholarship in Agricultural Communications/Agmarketing:** Priority given to freshmen, but may be given to students in other classes to fulfill the purpose of the scholarship. Based upon academic excellence and interest in and a potential for a career in agricultural communications/agmarketing. Second priority would be for scholarships for travel to attend NAMA chapter or national events. Recipients are selected by the agricultural journalism faculty in consultation with the agricultural economics faculty and recommended by the dean of the College of Agriculture.

**David S. Geddis Jr. Memorial Scholarship Fund:** Provides one scholarship annually to a deserving sophomore, junior or senior student enrolled in the College of Agriculture and majoring in horticulture with an emphasis on floriculture. Recipient is selected on the basis of merit, character and financial need by the College of Agriculture Scholarship and Awards Committee. The recipient must have a 2.75 (C plus average) or better, based on a 4.0 scale.

**Dr. Charles W. Gehrke Jr. Memorial Scholarship:** Scholarship of \$500 for senior or graduate student in biochemistry with interest in analytical biochemistry. High scholastic standing, character, leadership potential and research-orientation are selection traits.

**Ben F. Geisert Memorial Scholarship:** \$800 annual scholarship, which can be received for four years, for students from Gasconade, Franklin, Warren or St. Charles, Mo., counties, the area served by the Mercantile Bank of Washington, Mo. Selection is made by the College of Agriculture Scholarship and Awards Committee.

**Gilbreath-McLorn Fund in Entomology:** Fund established by Olive Gilbreath McLorn to assist undergraduates or graduates by means of scholarships, fellowships, or aid to research in the field of entomology, with particular interest in the control of insects detrimental to shade trees, ornamental shrubs and plants.

**Gregory Scholarship Fund:** Awarded to students who most exemplify the professional characteristics of the Gregorys, who are in the fields of sociology, extension service, home economics, and communication or a combination of these or any other in these areas of study. Priorities shall be to professional potential of the student with the preference to graduate students and consideration shall be determined by the Department of Rural Sociology. The second year is determined by the Scholarship Award Committee of the College of Home Economics or other committees given this responsibility.

**J.W. Hackmack Scholarship:** Awarded to students enrolled in the College of Agriculture with preference given to: students who have been members of FFA while in high school, students who have taken courses in communication skills in addition to those normally required by the College of Agriculture, and students who plan to return to the farm, or go into farm management. Selection is made by the College of Agriculture Scholarship and Awards Committee.

**Howard R. Hackler Memorial Scholarship:** Family and friends of Hackler established an endowment to provide one or more annual scholarships. Preference is given to recipients enrolled in the College of Agriculture or College of Veterinary Medicine who have a farm background and an interest in

Aberdeen Angus cattle. Students from other divisions also are considered. Hackler was a recognized farm leader in Marion County, Mo., president of the Missouri Aberdeen Angus Association, and first president of the Missouri Livestock Council. Selection is made by the College of Agriculture Scholarship and Awards Committee.

**Albert R. Hagan Award:** The purpose of this award is to recognize notable achievements and contributions in the fields of farm management and/or agricultural finance. Persons to be considered for the award include either: (a) undergraduates who have distinguished themselves both in the classroom and in extracurricular or field training/problems courses; (b) graduate students involved in an outstanding research effort; or (c) professionals in the area who return to the University for further study. Selection is made by the Department of Agricultural Economics.

**Ralston-Purina Scholarship:** Stipend given an upperclassman recommended by the College of Agriculture faculty. Recipient must be in need of financial assistance, rank in the upper 25 percent of the class, and have demonstrated qualities of leadership, character, performance in extracurricular activities, and sincerity of purpose in agriculture as a chosen field. Established as one of a group of scholarships for students enrolled in the agriculture division of land-grant colleges. Selection is made by the College of Agriculture Scholarship and Awards Committee.

**W.H.E. Reid Scholarship in Dairy Technology:** A memorial scholarship fund established by family and friends for students majoring in food science and nutrition. Recommended by that department.

**R.J. Reynolds "Pride in Tobacco" Scholarship:** Scholarship of \$1,000 given to seniors to encourage and recognize outstanding ability and leadership and to provide a pool of talented undergraduates for tobacco research, extension or agribusiness.

**Dwight F. Richards Agricultural Scholarship Award:** Stipend available to an outstanding agricultural student from West Plains (Mo.) High School.

**Robertson's Farm Supply 4-H Scholarship:** A \$300 scholarship for a 4-H member who is a freshman in agriculture, home economics, forestry, engineering (agricultural), or education (vocational home economics).

**James S. Rollins Scholarships:** Given annually in recognition of merit and character to students in various UMC divisions; one awarded to a junior in the College of Agriculture. Selection is made by the College of Agriculture Scholarship and Awards Committee.

**Santa Fe Scholarships:** Two scholarships, established by Santa Fe Railway, are available to FFA members who plan to attend UMC the fall semester following high school graduation. Recipients selected in manner designated by the state supervisor of agricultural education, on basis of their outstanding leadership, scholarship and supervised farming programs.

**Elizabeth H. Schell Scholarships:** Stipend of \$1,000 per year awarded to students in the College of Agriculture who are sons or daughters of Missouri landowning farmers or stockmen. Selection is made by the College of Agriculture Scholarship and Awards Committee.

**Sam B. Shirky Centennial Scholarship:** Stipend of \$400 awarded annually to a student selected on the basis of high school and college academic performance. Selection is made by the College of Agriculture Scholarship and Awards Committee.

**George E. Smith Scholarship:** Scholarship of \$500 for a senior or graduate student in agronomy with interest in soil conservation and/or fertility. Recipient is to be a U.S. citizen and preferably a Missouri resident. Selection is made by the Scholarship and Awards Committee from nominees provided by the Department of Agronomy.

**Granville M. Smith Jr. Trust:** The will of Evelyn D. Smith established an endowment in memory of her husband. Investment income assists worthy undergraduate or graduate students. Preference is given those from Adair and Sullivan, Mo., counties; assistance is in the form of a grant or loan as determined by UMC. Smith was a well-known farmer in Adair and Sullivan counties. Selection made by the College of Agriculture Scholarship and Awards Committee.

**Stamper-Kempster Memorial Awards in Poultry:** Available each semester for poultry husbandry students employed by the department. Recipients may be freshmen or other undergraduates who maintain a grade point average of 2.5 or better. The Moberly, Mo., firm provides these awards.

**Philip C. Stone Scholarship in Entomology:** Stipend for upperclass and graduate students majoring in entomology awarded on basis of scholarship as determined by the chairman, with concurrence of the Department of Entomology faculty. Any individual is eligible only once. Dr. Stone was chairman of the Department of Entomology from 1954 to 1968.

**William L. and Cleo Y. Tayloe Memorial Fund:** A

portion of the Tayloe estate was left to the College of Agriculture, the income therefrom to aid worthy students. Selection is made by the College of Agriculture Scholarship and Awards Committee.

**Cordell W. Tindall Agricultural Journalism Scholarships:** Two \$500 scholarships are awarded to upperclass students from Missouri majoring in agricultural journalism. Leadership potential, scholarship and promise for an agricultural journalism career are considerations for selection. Selection is made by the Department of Agricultural Journalism.

**David M. Hardy Scholarship in Cooperative Management:** Annual scholarship awarded to a male upperclass or graduate student interested in possible employment by a farmers' cooperative marketing, purchasing or credit association. Recipient must be enrolled in agriculture or business and public administration, pursuing a degree in the field of agribusiness. Selection is based on academic excellence and active interest in the field of cooperative management. Recipient also may be given an opportunity for summer employment by a farmers' marketing, purchasing or credit association. The Farm Credit Board of St. Louis authorized the St. Louis Bank for Cooperatives to establish this scholarship in honor of Hardy, who retired after 30 years of service as president of the bank. Selection is made by the College of Agriculture Scholarship and Awards Committee.

**Charles M. Harrold IFT Award:** An award of \$350 is given to a junior majoring in food science and nutrition and who exhibits a sincere professional interest in food science. Selection is made by the Food Science and Nutrition Scholarship Committee.

**Leonard Haseman Scholarship in Entomology:** Awarded to an undergraduate or graduate student in entomology. Selection is based on high scholarship and contributions to entomology. The recipient, who is recommended by the faculty of the Department of Entomology, may hold the scholarship more than one year if the faculty recommends. Established by the Missouri Pest Control Association Inc.

**William Henry Hatch Research Fellowship:** Established by the College of Agriculture to honor the former Missouri congressman who wrote and sponsored the Agricultural Experiment Station Act of 1887 (the Hatch Act). Awarded annually to students undertaking work toward a PhD in agriculture. Recipients are selected by the dean and the chairman of the department in which the degree will be earned.

**Robert L. Hawkins Scholarship:** Gifts from Mrs. Robert L. Hawkins, friends and family members established an endowment in memory of Hawkins. The income will provide scholarships for students in the College of Agriculture with preference given to students from southwest Missouri studying to be vocational agriculture teachers. Recipients are chosen by the College of Agriculture Scholarship and Awards Committee.

**Hechler Memorial Scholarships:** Two or more annual scholarships are granted to seniors majoring in agriculture, engineering, home economics, or in closely related areas such as forestry, fisheries and wildlife, and veterinary medicine, etc. Seniors preparing as vocational teachers in any of the above-mentioned colleges or schools and majoring in the same are eligible—even though enrolled in the College of Education. They must be graduates of a Chariton County, Mo., high school or have been Chariton County residents at the time of graduation from a high school located in any other Missouri county; rank in the upper one-half of their class; have high potential leadership qualifications; and be of good moral character and deportment. Financial need is not considered in determining eligibility. Recipients are chosen by a faculty committee. Students transferring from other institutions of higher education must have had at least two semesters of resident study at UMC to be eligible. Established with gifts from W.R. Hechler, Agr '11; C.H. Hechler, Agr '05; and F.G. Hechler, Engr '08, in memory of their parents, George and Eliza Hechler, lifelong residents of Chariton County. The original fund was increased by Catherine Hechler in memory of her husband, Charles.

**W.R. Hechler Scholarships:** Two or more annual scholarships are granted to juniors majoring in agriculture, engineering, home economics, or in closely related areas such as forestry, fisheries and wildlife, and veterinary medicine, etc. Juniors preparing as vocational teachers in any of the above-mentioned colleges or schools and majoring in the same are eligible—even though enrolled in the College of Education. They must be graduates of a Chariton County, Mo., high school or have been Chariton County residents at the time of graduation from a high school located in any other Missouri county; rank in the upper one-half of the class; have high potential leadership qualifications; and be of good moral character and deportment. Financial need is not considered in determining eligibility. Students transferring from other institutions of higher education must have had at least two

semesters of resident study at UMC to be eligible. Established by a gift from W.R. Hechler, Agr '11.

**Carl M. Humphrey Recognition Scholarship:** This fund was established by a group of past state officers of the Missouri Association of FFA to honor Humphrey for his 44 years of service to agricultural education. The income will provide scholarships to students actively participating in the agricultural education program with the intent to become a vocational agriculture teacher in the secondary schools. Recipients are chosen by the Agricultural Education Scholarship Committee.

**Institute of Food Technology Awards:** Awards are available nationwide for food science and nutrition freshmen, sophomores, juniors and seniors in the College of Agriculture.

**Wes Isaacs Memorial Scholarship:** Scholarships for sophomore students in the College of Agriculture from Stet High School. Selection by Scholarship and Awards Committee, Stet R-15 Vo-Ag teacher with approval of donors.

**St. Louis Section, IFT Sophomore Awards:** This award of \$300 is designed to honor and recognize a sophomore demonstrating superior scholarship and exceptional interest in professional employment in the food industry. A purpose of this award is to stimulate early interest in student organizations at the University of Missouri-Columbia and in the St. Louis section of IFT, as well as the National IFT.

**Jefferson City Production Credit Association Scholarships:** Offered annually to a student residing in the 13-county area served by donor association. Selection is based on scholastic excellence; financial need; achievement in FFA, FHA, 4-H, school, church and community activities. Recipients must enroll in the College of Agriculture. Established by the Jefferson City Production Credit Association, selection is made by the College of Agriculture Scholarship and Awards Committee.

**M.M. Jones Freshman Scholarship:** One or more \$400 awards to entering freshmen majoring in agricultural engineering or agricultural mechanization. Selection is made by the Department of Agricultural Engineering.

**Robert L. Keeney Scholarship:** Presently, three awards ranging from \$500 to \$1,000 are given to any third-year student (junior) or first-semester senior majoring in food service and lodging management. The scholarship, initiated in 1975, is in honor of the late Robert L. Keeney, president of Putsch Inc. of Kansas City, who was instrumental in establishing the University's food service and lodging management program.

**Harry L. and Essie Heyle Kempster Memorial Scholarships:** The income from this fund, contributed by friends and family, provides scholarships or jobs for undergraduate or graduate students. Selected by the staff of the Department of Poultry Science on the basis of scholastic excellence and financial need.

**Charles Kiepe Scholarship:** For undergraduate students in the College of Agriculture. Selection is made by the College of Agriculture Scholarship and Awards Committee.

**Arnold W. and Lois McCance Klemme Scholarship:** An endowment from the estate of Klemme, a retired professor of agriculture, provides scholarships for students in the College. Preference is given to applicants from Lawrence and Franklin, Mo., counties. Recipients are selected by College of Agriculture Scholarship and Awards Committee.

**Mr. and Mrs. Rudolph Kruse Sr.—Carroll County Scholarship:** Awarded annually to a male and female who enroll in the College of Agriculture or the College of Home Economics. Recipient must be a Carroll County, Mo., high school graduate and is chosen on the basis of scholastic excellence, high moral character, financial need and a sincere interest in the field of agriculture. Apply at the University Extension Center in Carrollton, Mo. Final selection is made by UMC scholarship committee. Established by Mr. and Mrs. Kruse.

**H.H. Krusekopf Alpha Zeta Scholarship:** Awarded to an outstanding member of Alpha Zeta fraternity. Selection is made by a committee of Alpha Zeta members and advisers.

**Jerry L. Litton Memorial Fund:** This fund provides four to eight scholarships annually for College of Agriculture students with leadership potential and/or an interest in agricultural journalism. Recommendations are made by the Departments of Agricultural Education and Agricultural Journalism with final approval by the College of Agriculture Scholarship and Awards Committee.

**Longwell Leadership Award:** Given in honor of the late John H. Longwell, a former dean, to an outstanding second-semester sophomore in agriculture. Selection is made by the associate dean's office and a special committee of four students. Recipient's name is engraved on the Longwell Leadership Award Trophy.

**Richard V. Lott Undergraduate Student-Aid Fund in Horticulture:** Income is to pay salary or scholarship for horticulture students who have financial need. Recipient

selection and decision on use of income are determined by chairman of horticulture or his designee(s) with approval by the dean of agriculture.

**William Leslie Magruder Memorial Fund for Agriculture:** Earnings from this fund are used as scholarships, prizes or awards for worthy students studying to become vocational agriculture teachers. Recipients are to be evaluated on the basis of academic excellence, leadership, dedication and professional promise in the field. Recommendations are made by the Department of Agricultural Education with final approval by the College of Agriculture Scholarship and Awards Committee.

**E.P. Meiners Memorial Scholarship in Entomology:** Endowment established by Mrs. Meiners in memory of her husband, whose chief interest outside the field of medicine was entomology. The endowment income may be used annually for scholarships for either undergraduate or graduate students majoring in entomology. Provision also is made that funds may be used for travel to entomology museums or for procuring specimens, collections or museum equipment needed to further entomological study and research.

**Merchants Exchange of St. Louis Agricultural Communications Scholarship:** A stipend of \$500 plus an expense-paid trip to St. Louis and Merchants Exchange for an upperclass student in agricultural journalism. GPA, extracurricular activities and leadership potential are selection criteria.

**M.F. Miller Alpha Zeta Alumni Award:** The \$100 annual award is given on the basis of scholastic excellence of a freshman in agriculture. Agriculture dean's office determines the recipient.

**Missouri Ice Cream and Milk Institute Scholarship:** Awarded to students majoring in food science and nutrition who have completed at least 30 semester hours' credit and have an interest in a career in dairy food technology. Applications can be obtained from the Food Science and Nutrition Scholarship Committee.

**Missouri Milk, Food and Environmental Health Association Scholarship:** Awarded to an outstanding student enrolled in fields related to food science. Applications can be obtained from the Food Science and Nutrition Scholarship Committee.

**Missouri Poll-Ettes Awards:** Award of \$200 is provided by the Missouri Poll-Ettes and the Missouri Polled Hereford Association. Recipients to be worthy upperclassmen in the College of Agriculture or College of Home Economics or in the first two years of the College of Veterinary Medicine, who have demonstrated their interest in agriculture and in the Polled Hereford breed. Selection is made by the College of Agriculture Scholarship and Awards Committee.

**Missouri Restaurant Association Grant-in-Aid Program:** Scholarship available to students majoring in food service and lodging management. Application can be made to the Food Science and Nutrition Scholarship Committee with selection being made by the Board of Directors of the Missouri Restaurant Association.

**Missouri Seedmen's Association Achievement Award:** Given annually to an upperclassman majoring in field crops. Recipient is recommended by the Achievement Awards Committee of the Department of Agronomy. Selection based on scholastic record and college activities. Established by the Missouri Seedmen's Association. Recipient is named at the annual meeting.

**Missouri Society of Farm Managers and Rural Agronomists Professional Advancement Scholarship Award:** \$350 is awarded to a junior or senior in the College of Agriculture majoring in agricultural economics. Application and selection is made through the Department of Agricultural Economics.

**Monsanto Aid To Education Award:** Award of \$750 to sophomore or junior student in agronomy or agricultural economics. Scholarship and leadership potential are considered in the selection process.

**MoorMan Manufacturing Co. Scholarships in Agriculture:** Established by the Quincy, Ill. firm, \$3,000 is used for scholarships. Recipients and amount are recommended by the College of Agriculture Scholarship and Awards Committee. Students with good scholarship, financial need and a sincere interest in agriculture receive first consideration. Since the donor primarily is interested in animal agriculture, the selection committee considers the student's interests in this area; however, students in any phase of agriculture are eligible for consideration.

**Stanley A. Morrow Memorial Endowment Fund Scholarship:** Annual income from this endowment is awarded to a freshman or sophomore on the basis of scholastic excellence, moral character, financial need and an interest in agriculture or agribusiness. Recipients recommended by the dean or the College of Agriculture Scholarship and Awards Committee.

**Eugene V. Nay Scholarship:** One \$1,000 or two \$500 scholarships awarded to students who have a sincere profes-

sional interest in food science. Selection is made by the Food Science and Nutrition Scholarship Committee.

**J. Leonard Peerman Scholarship:** Awarded to a deserving, ambitious student making good grades with preference being given to students in agricultural journalism. Selection is made by the College of Agriculture Scholarship and Awards Committee.

**William A. Powell Scholarship:** Scholarship of \$800 is awarded to sophomores, juniors or seniors majoring in dairy science. The recipient is to be a son or daughter of a member or employee of Mid-America Dairymen Inc., and shall be nominated by the Dairy Science Department with approval by the College of Agriculture Scholarship and Awards Committee.

**Production Credit Association of Missouri Scholarships:** Stipends available to three rural Missouri students who graduate from accredited high schools. Awards are based on need, high school scholastic and community activities, and sincere interest in agriculture. Selection is made by the College of Agriculture Scholarship and Awards Committee with final approval by PCA.

**Vincent A. Raaf Memorial Scholarship Fund:** Selection is based on personal and intellectual characteristics, including the ability to recognize and define personal and professional goals, accept new challenges, experiment with new ideas and defend individual rights. Recipients shall be deserving sophomore, junior or senior students majoring in animal science or agronomy who are residents of Osage, Callaway, Cole or Moniteau, Mo., counties. Selection is made by a committee consisting of an extension area agronomist, an extension area livestock specialist and a representative of the Department of Animal Science.

**A.C. Ragsdale Scholarship in Dairy Science:** Annual stipend is given a senior in dairy science. The recipient, whose name also is engraved on a plaque in the department, is selected by the College of Agriculture Dairy Science Department on the basis of scholarship, leadership and participation in dairy science.

**Rochester Cheese Sales Inc. Freshman Scholarship:** Scholarship of \$500 for Missouri resident with interest in food/dairy field.

**Dr. C.W. Turner Graduate Scholarship in Lactation Endocrinology:** Income from an endowment provides scholarships for graduate students in lactation endocrinology in the Dairy Science Department.

**Charles L. and Thelma F. van Buren Scholarships:** Five scholarships of \$1,000 are awarded to juniors or seniors with special interest in farm management, agronomy, soil conservation, livestock production or home economics. Financial need is the primary determinant in the selection of this recipient, although character, leadership and scholarship are considered.

**Eric D. Vandeloelt Scholarship:** Stipend of \$500 awarded to an outstanding student in agricultural mechanization. Student must be a U.S. citizen, a Missouri resident, and have a 3.2 or better GPA. Recipient may be an incoming freshman or a sophomore, junior or senior. Financial need is an important selection factor. Recipient shall be selected by the Agricultural Engineering Department faculty.

**Lee C. Warth Beekeeping Fund:** Awarded to an entomology student. Selection is made by the Department of Entomology.

**Henry Jackson Waters Scholarship:** Endowment income awarded annually to a junior majoring in animal nutrition. Recipient is chosen by the College of Agriculture Scholarship and Awards Committee on the basis of scholarship, interest in research and nutrition. Established through the will of Margaret Watson Waters in memory of her husband, a former dean of the College of Agriculture and director of the Agricultural Experiment Station.

**Floyd A. Watkins Memorial Scholarship:** An endowment established by family and friends, the income to provide scholarships for students enrolled in the College of Agriculture who are residents of Polk County, Mo. Recommendations are made by the College of Agriculture Scholarship and Awards Committee.

**Prudy Weidenheimer Memorial Scholarship:** Stipend of \$500 awarded to a senior majoring in animal science with primary interest in horses. Selection is based on academic performance, outstanding character, leadership potential and demonstrated service to fellow citizens.

**Western Seedmen's Association Student Achievement Awards:** Awards for outstanding scholarship and service to students studying agronomy.

**Stephen F. Whitted Scholarship:** An endowment established by friends for junior or senior students majoring in agricultural economics. Recipients designated by the chairman of that department.

**Randy Williams Memorial Scholarship:** A gift from Mr. and Mrs. Eldon Williams, the parents of Randy Williams, established as endowment. The income will provide scholar-

ships for deserving freshman or sophomore students in the College of Agriculture. To qualify, the students must have been a member of FFA, have financial need, be Missouri residents and have an interest in animal science. Recipients are selected by the Agriculture Scholarship and Awards Committee.

**John Sam Williamson Family Scholarship:** Scholarship awarded to two upperclass students majoring in agronomy and animal science. Recommendations are made by the Department of Agronomy and Department of Animal Science with final approval by the College of Agriculture Scholarship and Awards Committee.

**Maurice N. Witt Scholarship in Agriculture:** Awarded to a junior or senior in the College of Agriculture for academic excellence. Established through contributions from various donors. Selection is made by the College of Agriculture Scholarship and Awards Committee.

**J.C. Wooley Freshman Scholarship:** One or more \$400 awards to entering freshmen majoring in agricultural engineering or agricultural mechanization. Selection is made by the Department of Agricultural Engineering.

**Ernest M. Woods and Marie M. Woods Scholarship in Memory of E.A. Trowbridge:** The recipient a sophomore, junior or senior in the College of Agriculture, or a graduate student majoring in animal science, is selected on the basis of merit and financial need. Recommendations are made by the Department of Animal Science with final approval by the College of Agriculture Scholarship and Awards Committee.

**Wurdack Scholarship Fund:** Scholarships awarded to students enrolled in the College of Agriculture. Selection is made by the College of Agriculture Scholarship and Awards Committee.

**Homer Young's Farmland Industries Scholarship:** Stipend of \$1,000 is awarded to outstanding freshman, sophomore and junior students in the College of Agriculture for use in their sophomore, junior and senior years, respectively. Recipients shall be enrolled in a four-year agriculture curriculum, and their parents shall be members of a farmer-owned cooperative. Scholarships are in honor of Homer Young, former president of Farmland Industries.

## SCHOLARSHIPS IN THE SCHOOL OF FORESTRY, FISHERIES AND WILDLIFE

Scholarships listed are awarded on the basis of scholastic attainment, financial need, character and leadership. Applications should be submitted to the Undergraduate Office, I-74 Agriculture.

**Charles H. Kirk Memorial Scholarship:** Provided by an endowment fund established by friends of the former forest manager of Pioneer Forest, these awards of varying amounts are made annually to forest management majors.

**David and Gertrude Gwinner Scholarships:** These forestry scholarships are provided by an endowment fund established by Mr. and Mrs. G. Myron Gwinner in memory of his parents and vary in number and amount.

**Ed Woods Memorial Scholarship:** Established by friends of the former forest manager of Pioneer Forest, the earned income from a perpetual fund is awarded annually to forestry students who have a satisfactory academic record and a substantial financial need.

**Home Builders Association of Greater Kansas City Scholarships:** Scholarships are available annually to students residing in Platte, Jackson, Clay and Cass, Mo., counties, and Johnson and Wyandotte, Kan., counties who are interested in the home building industry.

**Ladies Auxiliary of the Missouri Association of Soil and Water Districts Conservation Scholarship:** This award of \$200 is alternately awarded to a forestry student and to a fisheries and wildlife student who shows professional potential in the field of conservation.

**L.E. McCormick Memorial Scholarship:** These forestry scholarships are provided by an endowment fund established in memory of a former UMC extension forester.

**Marguerite Krueger Conservation Club Forestry Summer Camp Scholarship:** This scholarship, with a stipend of \$250, is awarded to a student attending forestry summer field studies.

**Michael Bruton Memorial Scholarship:** The amount of this scholarship will vary and will be awarded annually to an undergraduate or graduate student (preferably from south-east Missouri) majoring in fisheries and wildlife.

**Missouri Federation of Women's Clubs Inc. Forestry Scholarships:** These two scholarships carry stipends of \$250 each.

**Missouri Forest Products Association Forestry Scholarship:** This award of \$250 is made annually to a wood

products junior or senior who is a Missouri resident.

**R.H. Westveld Forestry Fund:** Established by friends and associates of R.H. Westveld at the time of his retirement as director, the annual earned income provides scholarships of varying amounts and the Westveld Prize in Forestry.

**School of Forestry, Fisheries and Wildlife Development Fund Scholarships:** Gifts to the Development Fund for scholarship purposes are made by friends of the School and are awarded as funds permit.

**UMC Forestry Club Memorial Scholarships:** A number of scholarships are awarded to forestry students each year provided by an endowment established by the Forestry Club and by annual contributions from the club.

**William G. Kohner Scholarships:** These forestry scholarships vary in amounts and were established through the will of W.G. Kohner, a 1918 UMC forestry graduate.

**George L. Hawkins Sr. Student Aid Fund:** Established by Dr. George L. Hawkins Jr. in memory of his father, this fund provides loans to undergraduate and graduate forestry students who are in need of financial assistance.

**James W. Bagby Loan Fund:** Established by Dr. George L. Hawkins Jr. in honor of Dr. James W. Bagby, this fund provides loans to undergraduate and graduate fisheries and wildlife students who are in need of financial assistance.

**Lee C. Fine Memorial Loan Fund:** Established by Leo A. Drey and Mrs. Lee C. Fine in memory of the late Lee C. Fine, this fund provides loans to qualified forestry students.

**Memorial Loan Fund:** This loan fund was established in memory of deceased graduates, friends and associates of the School. The major contributors are members of the Forestry Alumni Association.

## SPECIAL PROGRAMS

### INTERNSHIPS

College of Agriculture students may participate in one of several cooperative programs between the College and approved government agencies, employers and/or organizations who furnish facilities and instruction where students acquire additional knowledge and skills needed in their chosen career field. Students eligible for internships must be in good standing in a degree program with adequate prerequisite qualifications and approved by the adviser and department chairperson or internship coordinator. Specific departmental requirements may vary within each department for the career fields involved. For specific information, students should consult their adviser.

### HONORS PROGRAM

The College of Agriculture Honors Program, designed to provide the academically talented student with greater curriculum flexibility, encourages breadth and depth of study in one or more specific areas.

To qualify, a student must have earned an accumulative GPA of 3.3 or better on 15 or more semester hours while enrolled in a baccalaureate degree program at the University of Missouri-Columbia. An accumulative GPA of 3.0 or better is necessary to remain in the Honors Program.

Students must be *admitted* to the Honors Program before classes begin the last semester they are enrolled in the College of Agriculture; no student will be admitted retroactively. Graduation through the Honors Program, which is recorded on the transcript, requires an accumulative 3.0 GPA.

If students are eligible for and wish to participate in the program, their advisers should petition the dean with a recommendation for an advisory committee of at least two faculty members, one of whom does not have to be in the major department or in the College of Agriculture. The dean gives the final approval on the advisory committee.

The student and the advisory committee

develop a schedule of courses which best meets the educational objectives for the particular student. There are no restrictions on courses, except for the state law requirement of history or political science. The study program signed by the student and the advisory committee must be *submitted* to the dean by the last day of classes of the semester that the committee was appointed. Upon the dean's approval of the study program, the student is officially admitted to the Honors Program.

The student and the advisory committee must approve and sign changes in the study program; a change becomes effective upon approval of the dean.

Even though students may become ineligible because of GPA, they may continue to be advised by their advisory committee.

### NON-TRADITIONAL STUDY PROGRAM

The Non-Traditional Study Program in Agriculture provides an opportunity for interested and qualified individuals to earn a degree in agriculture, even though they cannot return to campus as full-time students.

Primarily, the program is designed for people who:

1. Have interrupted their college career sometime in the past.
2. Find it difficult or impossible to return to campus to complete degree requirements.
3. Have a need and desire for the BS degree in agriculture and the motivation necessary to complete the requirements for the degree.
4. Are engaged in farming or agriculturally related business, or desire to prepare themselves for these occupations.

Applicants to the program should not have been full-time students during the five years preceding enrollment in the program.

The degree awarded and the number of hours required for the degree is the same as for the campus-based program. Credit may be earned through examinations, extension courses, special projects, life-learning experiences and several other avenues.

The course program, designed by the student and adviser, will include suggestions as to acceptable methods of obtaining the required credits. Further information on the program may be obtained by calling the director at (314) 882-6287.

### SCHOOL OF FORESTRY, FISHERIES AND WILDLIFE FIELD STUDIES

In the summer between the sophomore and junior years, students in the forest management, recreational forestry, and forest science and specialization curricula attend a field studies session of six weeks at University Forest. A grade point average of 2.0 for all courses completed prior to attendance and the prerequisites for individual courses are required for participation in this session.

Incidental and field studies fees are based on six credit hours. For non-residents, excepting Kansas and Nebraska students, an appropriate non-resident tuition fee is assessed. For information on the current fees, contact the director of Forestry, Fisheries and Wildlife, 1-30 Agriculture Bldg.

### RECIPROCAL AGREEMENT

Under reciprocal agreements, students from Kansas who attend the School of Forestry,

Fisheries and Wildlife in forestry and students from Nebraska in forestry, fisheries and wildlife are exempt from non-resident tuition.

## AGRICULTURAL EXPERIMENT STATION

The Missouri Agricultural Experiment Station, which has made many valuable contributions to agriculture, is part of an agricultural research program coordinated by the U.S. Department of Agriculture with all land-grant colleges.

With few exceptions, faculty members who teach courses in resident instruction also are Missouri Agricultural Experiment Station staff members and have responsibilities for agricultural research as well as for teaching.

## PROFESSIONAL OPPORTUNITIES

The demand for graduates from various programs in the College is good. While there has been some slowdown in employment opportunities, some areas including pest management and food/lodging management are enjoying tremendous increases. Currently, careers in the agribusiness and general business sectors are the most attractive. About 45 percent of the graduates choose careers in those areas. Another 22 percent pursue graduate and professional degrees. The remaining 33 percent work in production agriculture, vocational agriculture education or in government service. In 1982, the average starting salary for our graduates was estimated at \$16,500.

Forestry-related employment for graduates of the School of Forestry, Fisheries and Wildlife ranged from 50 to 75 percent from 1980-'82. Most positions have been in the private industry sector with a significant number of graduates joining state and federal agencies. Beginning salaries generally have ranged from \$13,000 to \$18,000. Although some decrease in opportunities has occurred due to budgetary restrictions in the public agency sector as well as the general economy, graduates with sound academic standing who are energetic, willing to work and have no restrictive geographical preference usually will find positions. Wood products majors have been very successful. Temporary employment has often led to permanent positions. Fisheries and wildlife majors with only baccalaureate degrees continue to experience the greatest difficulty since agency programs are not as large and the private industry sector is much less significant.

## SUBJECT MATTER AREAS

The teaching, research and extension work of the College of Agriculture includes the School of Forestry, Fisheries and Wildlife, and 21 other subject matter areas. Research work also includes that of the College of Veterinary Medicine.

## AGRIBUSINESS

Undergraduate students in the College of Agriculture may elect to enroll in the agribusiness option. They may do this by indicating their interest in the business emphasis in the Departments of Agricultural Economics, Agri-

cultural Engineering, Agronomy, Animal Science, Dairy Science, Entomology, Food Science and Nutrition, Horticulture or Poultry Science.

Students who desire additional information should contact their adviser or associate dean, College of Agriculture, 2-64 Agriculture Bldg., University of Missouri-Columbia, Columbia, Mo. 65211.

## AGRICULTURAL ECONOMICS

200 Mumford Hall, (314) 882-2831

### DEPARTMENTAL REQUIREMENTS

**Professional Emphasis.** This course of study is planned for the student who intends to pursue a career such as farming, professional farm management or agricultural credit.

## GENERAL REQUIREMENTS FOR BS IN AGRICULTURE

Minimum Credit Hours Required

	Professional	Business	Science
<b>Communications</b>			
English Composition	6	6	6
Public Speaking	3	3	3
Communications Elective	3	3	3
Total 12 credit hours*			
<b>Natural Science &amp; Mathematics</b>			
Chemistry	5	5	5
College Algebra	3	3	3
Botany or Plant Science or Zoology or Animal Science	5	5	5
Science or Math Elective	3	3	3
Total 16 credit hours			
<b>Social Science &amp; Humanistic Studies</b>			
History or Political Science	3-5	3-5	3-5
Rural Sociology or Psychology or Sociology	3	3	3
Social Science or Humanistic Studies Elective	6-8	6-8	6-8
Total 14 credit hours			
<b>Business &amp; Economics</b>			
Agricultural Economics or General Economics	5	5	5
Economics Elective	3	3	3
Total 8 credit hours			
<b>Departmental Requirements</b>			
Major field and supporting courses	48	32	32
Natural and Social Sciences, including Math and Statistics			16
Business and Economics		16	
Total 48 credit hours*			
<b>Additional Electives</b>			
A minimum of 12 of these 30 credit hours must be taken in courses other than those of the College of Agriculture, with not more than two courses of the 12 credit hours being in any one department.	30	30	30
Total Credit Hours Required for BS degree	128	128	128

### Other Requirements

A minimum of 50 credit hours in the total program of 128 must be in courses numbered 100 and above. A minimum of 24 of that 50 credit hours must be in courses numbered 200 and above.

A minimum of 32 credit hours in the total program of 128 must be in courses offered by the College of Agriculture. Twelve hours of this requirement may be satisfied by transferring agricultural credit from another institution.

\*12 hours of communications are still required for students who test out of English Composition I.

\*\*See program listings for specific courses.

### Major Field:

- 220 General Agricultural Marketing or Marketing 204 (3)
- 225 Statistical Analysis or Statistics 207 or 234 or 250 (3)
- 230 Farm Programs or 270 Resources and Economic Development or 271 International Agricultural Development (3)
- 250 Economics of Agricultural Production and Distribution or Economics 251 (3)
- 251 Agricultural Prices (3)
- 260 Farm Management (3)
- 280 Financing the Farm Business or Finance 203 (3)
- 299 Senior Seminar (1)
- 312 Planning the Farm Business or 314 Farm Business Analysis (3)
- 333 Agricultural Law (3)

### Supporting Courses

- Economics 229 or 253 (3)
- Mathematics 60 or 205 or 207 (3)
- Accountancy 37 or 137 (3)
- Computer Science 75 or 104 or Accountancy 258 (3)
- Agronomy 30 or Biological Science 12 (5)
- Agriculture 12 or Biological Science 1 and 2 (5)

Additional agriculture courses at 100 level or higher (other than agric. economics or rural sociology) (12)

### Electives: 26 hours

**Business Emphasis.** This course of study is planned to prepare the student for a field in agricultural business.

### Major Field:

- 220 General Agricultural Marketing or Marketing 204 (3)
- 225 Statistical Analysis or Statistics 207 or 234 or 250 (3)
- 230 Farm Programs or 270 Resources and Economic Development or 271 International Agricultural Development (3)
- 250 Economics of Agricultural Production and Distribution or Economics 251 (3)
- 251 Agricultural Prices (3)
- 260 Farm Management (3)
- 280 Financing the Farm Business or Finance 203 (3)
- 290 Marketing Farm Commodities: Theory and Practice (1)
- 291 or 294 Livestock Marketing or Grain Marketing (2)
- 299 Senior Seminar (1)
- 320 Agricultural Business Management (3)
- 333 Agricultural Law or Management 254 (3)

### Supporting Courses:

- Management 202 (3)
- Accountancy 37 or Accountancy 137 (3)
- Mathematics 60 or 205 or 207 (3)
- Economics 229 or 253 (3)
- Computer Science 75 or 104 or Accounting 258 (3)
- Agronomy 20 or Biological Science 12 (5)
- Agriculture 12 or Biological Science 1 and 2 (5)
- Additional agricultural courses at 100 level or higher (other than agricultural economics or rural sociology) (6)
- Six additional hours at the 200 level or above in accountancy, finance, management or marketing.

### Electives: 23 hours

**Science Emphasis.** This course of study is designed primarily for the student who plans to do graduate work.

### Major Field:

- 220 General Agricultural Marketing or Marketing 204 (3)
- 225 Statistical Analysis or Statistics 207 or 234 or 250 (3)
- 230 Farm Programs or 270 Resources and Economic Development or 271 International Agricultural Development (3)
- 251 Agricultural Prices (3)
- 260 Farm Management (3)
- 290 Marketing Farm Commodities: Theory and Practice (1)
- 299 Senior Seminar (1)
- Supporting Courses:**
- Economics 229 or 253 or Accountancy 36 or 136 or 236 (3)
- Economics 251 or 351 (3)
- Economics 353 (3)
- Mathematics 207 and 208 (6)
- Statistics 320 or 325 or 385 (3)
- Computer Science 104 or 201 or 203 (3)
- Agronomy 30 or Biological Science 12 (5)
- Agriculture 12 or Biological Science 1 and 2 (5)

### Electives: 28 hours

## AGRICULTURAL EDUCATION

435 General Classroom Bldg., (314) 882-7451, 882-3232, 882-7379

Students interested in becoming certified to teach vocational agriculture should enroll in the College of Agriculture. Graduates of the program in agricultural education may be qualified to teach in the following instructional areas: agricultural production, agricultural mechanics, agricultural sales and services, ornamental horticulture and conservation. Students must have at least a 2.5 GPA to enroll for the student teaching sequence of professional courses in the senior year. Programs are planned by the students and their advisers to meet state requirements for certification to teach.

### DEPARTMENTAL REQUIREMENTS

#### Professional Emphasis

#### Education: 29 hours

- Educational Psychology A205 Psychology of Learning (2)
- Education B350 or B351 or B352 Historical Foundations of Education (2-3)
- Education T316 Teaching Reading (3)
- Special Education L339 Education of Exceptional Children (3)

F100 Foundations of Agricultural Education (2)  
F303 The Teaching of Agriculture (3)  
F304 Programs of Out-of-School Groups in Agriculture (2)  
F305 Programs and Instructional Materials in Agriculture (2)  
F306 Teaching Agricultural Mechanics (3)  
F307 Teaching Agricultural Management (2)  
F299 Student Teaching (6)

#### **Agriculture (Major Areas): 49-59 hours**

Each student may choose a major area of specialization or take additional courses in all major areas.

#### **Agricultural Mechanization: 10 hours**

1 Farm Power  
20 Welding  
60 Shop Tools and Processes  
Electives (Ag. Engr. 103, 201, 210, 215, 240, 306, 386)  
**Animal Science: 11 hours**  
Animal Science 202 Principles of Animal Nutrition or  
Animal Science 212 Applied Nutrition  
Animal Science 313 Genetics of Livestock Improvement  
Electives (Animal Science 12, 20, 101, 321, 341; Dairy  
Science 1, 310; Poultry Science 101)

#### **Plant Science: 10 hours**

Agronomy 100 Soil Systems  
Electives (Agronomy 30, 230, 302, 303, 304, 305, 306, 308)  
**Agricultural Economics: 11 hours**  
Agricultural Economics 50  
Agricultural Economics 260 General Farm Management or  
261 Farm Management  
Agricultural Economics 312 Planning the Farm Business or  
314 Farm Business Analysis

#### **General Electives: 0-14 hours**

## **AGRICULTURAL JOURNALISM**

### **1-98 Agriculture Bldg., (314) 882-8237**

The College of Agriculture, in cooperation with the School of Journalism, offers a degree in agricultural journalism. This curriculum provides training to enter a wide variety of occupations in the newspaper and magazine fields, radio and television, public relations and advertising. Students must have 60 hours of credit and a 3.0 GPA for guaranteed admission to the School of Journalism.

#### **DEPARTMENTAL REQUIREMENTS**

##### **Major Field: 30 hours**

Journalism 105 News (3)  
Journalism 110 Editing (3)  
Journalism 120 Advertising Principles and Practice (3)  
Journalism 300 Mass Media and Society (2)  
Journalism 306 Reporting (3)  
Journalism 309 History and Principles of Journalism (3)  
Journalism 310 Newspaper Editing (3) or Journalism 363 Magazine Editing (3)

##### **Business and/or Economics: 6 hours**

##### **Agriculture and/or Journalism Electives: 12 hours**

##### **Additional Electives: 30 hours**

Courses to fill departmental requirements are selected by students and their advisers. Basic typing skills are required for journalism courses.

The flexibility in the curriculum permits students to obtain a broad background in agriculture and journalism, plus some specialization in either of these fields if they so desire.

## **AGRICULTURAL MECHANIZATION**

### **100 Agricultural Engineering Bldg., (314) 882-2350**

New processes and equipment to meet mechanization requirements are being developed by manufacturers at an increasing rate. Agricultural mechanization gives the training needed to provide two-way communication between the manufacturer and the agricultural customer. Training is offered in four major areas: (1) power and machinery, (2) soil and water management, (3) structures and farmstead mechanization, and (4) electrical power and processing.

The agricultural engineering department of-

fers the agricultural mechanization program through the College of Agriculture. The department also offers an agricultural engineering program through the College of Engineering. Curriculum details for the latter are given in the College of Engineering section of this catalog.

#### **DEPARTMENTAL REQUIREMENTS**

**General:** Required by all areas of emphasis are the following:

Agronomy 30 or Animal Science 12 (5)  
Agronomy 100 (5)  
Library Science 105 (1)  
Computer Use Course (3)  
Agricultural Engineering Department courses (22)  
Electives, including 12 hours outside Agriculture (enough hours to total 128 hours)

**Supporting Courses:** For students preparing for farm management/operation.

Select 16 hours minimum from the following:

Accountancy 36  
Agricultural Economics 260, 312, 333  
Agronomy 302, 303, 304, 306  
Animal Science 20, 202, 313, 321, 341

**Supporting Courses:** For students preparing for agri-industry careers.

Select 16 hours minimum from the following:

Accountancy 36, 37  
Finance 123  
Management 202  
Marketing 204  
Agricultural Economics 220, 225, 280, 312, 333

**Supporting Courses:** For students preparing for a technical career in a company which provides services to the farmer (such as soil conservation service, extension service, electric power companies and agricultural equipment manufacturers).

Select a minimum of 16 hours from the following:

Physics 11  
Mathematics 9  
Engineering 30  
Agricultural Chemistry 110  
Agricultural Economics 225  
Agronomy 23, 307, 308

## **AGRONOMY**

### **135 Mumford Hall, (314) 882-2801**

Study in agronomy may be directed to give a greater emphasis in either the area of crop science or soil science. At the undergraduate level, many courses satisfy the needs of either area. This allows a single listing of courses from which a student may choose. Many variations may be developed to fit individual needs. The student interested in weed science should refer to pest management. All agronomy majors upon graduation may be certified by the American Registry of Certified Professionals in Agronomy, Crops, and Soils.

#### **DEPARTMENTAL REQUIREMENTS**

##### **General Requirements**

Agronomy majors are required to take 10 hours of Chemistry with Chemistry 11 and 12 required for the science option, Biological Science 12, 5 hours of Math (9 or higher) and a computer course. The science option requires Physics 11.

**Professional Emphasis:** This curriculum is for those students who expect to engage in farming or agricultural advisory services with emphasis on agronomic production.

##### **Major Field: 48 hours**

Agronomy 30 (5)  
Agronomy 100 (5)  
Agronomy 130 (1)  
Agronomy 225 (3) or Geology 1 (5)  
Agronomy 230 (3)  
Agronomy 315 (3)  
1 course in Soil Fertility (or related field)  
1 course in Weed Science

1 additional Soils course

1 additional Crops course

Business and Economics: 6 hours

Additional requirements include:

2 courses in pests (Pl. Path, Ent., Pest Mgt., etc.)

2 courses in Biology (Microbiology, Ecology, Zoology, etc.)

1 course in Animal Science

1 course in Ag Engineering

Additional hours to be selected in consultation with adviser.

**Business Emphasis:** The business emphasis in agronomy prepares students for employment in the farm supply field, with emphasis on fertilizers, seeds, grains, herbicides and agricultural chemicals.

##### **Major Field: 32 hours**

Agronomy 30 (5)

Agronomy 100 (5)

Agronomy 130 (1)

Agronomy 225 (3\*) or Geology 1 (5\*\*)

Additional courses in agronomy (15\*) or (13\*\*)

##### **Business and Economics: 16 hours**

In consultation with the adviser, select courses from accounting, agricultural economics, economics, statistics and other courses related to business management.

**Science Emphasis:** The science emphasis in agronomy is for students who intend to enter graduate school for study leading to research or teaching in crop or soil science.

**Major Field:** (same as Business or Professional Emphasis)  
**Natural Sciences: 16 hours**

In consultation with the adviser, select courses from chemistry (may include Chemistry 12), physics (must include Physics 11), mathematics (must include a calculus course), statistics, biological sciences (botany, genetics) and other related subjects.

**Additional Electives: 30 hours** (professional, business and science)

In consultation with the adviser, additional courses may be selected from agronomy, biological sciences (botany, genetics), chemistry, mathematics, statistics, physics and other related subjects. A minimum of 12 hours must be in courses other than those in the College of Agriculture, with not more than two of these in one department.

## **ANIMAL SCIENCE**

### **S135 Animal Science Research Center (314) 882-8236**

The Departments of Animal, Dairy and Poultry Science have a unified undergraduate curriculum in animal science. Animal science is a broad field centered on the study of (1) genetics, (2) nutrition, (3) physiology, and (4) production and management of agriculturally important animals. Graduates in the animal sciences—animal, dairy and poultry—have employment opportunities in many areas. Some examples are agribusiness (feed industry; animal health; meat, dairy and poultry products; marketing and sales; public relations; product formulation; research; and management); breed associations; state and federal governmental agencies (regulatory, market development and reporting, FDA, USDA, State Department of Agriculture, etc.); educational institutions working in extension, teaching, research and international programs; production and management (farming; managers of livestock, dairy and poultry operations; consultants; and technical service representatives); and graduate and professional school.

Students seeking admission into graduate and professional schools usually will take more courses in the sciences, whereas students in production and management will select more

business-related courses. Students and their faculty advisers select those courses that fit the students' needs, interest and objectives. The greatest amount of specialization occurs at the advanced degree (MS and PhD) levels.

### DEPARTMENTAL REQUIREMENTS

In addition to the College of Agriculture general requirements, students in the animal sciences must take the following Animal Science core courses:

- 11 Animal Science (5)\*
- 154 Physiology of Domestic Animals (4)
- 202 Principles of Nutrition (3)
- 213 Genetics of Livestock Improvement (3)
- 304 Physiology of Reproduction (4)
- 110 Biochemistry (3) or 205 Organic Chemistry (5)

\*Animal Science 11 cannot be used to meet the College of Agriculture natural science and mathematics studies requirements. Courses which may be used are: Chemistry 1 or 11 (5), Biology 1 or 21 (5). Equivalent or superior courses in these areas may be substituted.

The four program emphasis areas are (1) nutrition, (2) genetics, (3) physiology, and (4) production and management.

Requirements in each area are described below:

#### NUTRITION

**Required courses: 31 hours**

- 212 Applied Nutrition (3)
- 302 Monogastric Nutrition (3)
- 312 Nutrition Technology Lab (2)
- Chemistry 11 General Chemistry (5)
- Chemistry 12 General Chemistry (5)
- Biology 21 General Biology (5)
- Biology 22 General Biology (5)
- Biochemistry 193 Biochemistry (3)

**Elective courses: 28 hours**

- Agriculture 111 Computing and Programming Concepts I (3) or Statistics 207 Statistical Analysis (3)

Mathematics 80 Analytical Geometry and Calculus (5)

Biochemistry 195 Biochemistry (2)

332 Ruminant Nutrition (3)

Other elective courses will be selected in consultation with student's adviser.

#### GENETICS

**Required courses: 17 hours**

- 323 Applied Animal Genetics (3)
- 383 Bovine Breeding (3)
- Biology 11 Introductory Zoology (5)
- Statistics 207 Statistical Analysis (3)
- 384 Artificial Breeding (3)

**Elective courses: 42 hours**

- 20 Livestock and Meat Science (3)
- 294 Selecting and Grading (2)
- Chemistry 12 General Chemistry (5)
- Biology 22 General Biology (5)
- Agronomy 100 Soils Systems (3)
- Agriculture 111 Computing and Programming Concepts I (3)
- Biology 202 General Genetics (3)
- Mathematics 205 Selected Topics in Analysis (3)
- Agricultural Economics 333 Agricultural Law (3)

Other elective courses will be selected in consultation with student's adviser.

\*Courses can be substituted with equivalent genetics course at 200 level or above.

#### PHYSIOLOGY

**Required courses: 39 hours**

- 384 Artificial Breeding
- Physics 11 Elementary College Physics (5)
- Biology 21 General Biology (5)
- Biology 22 General Biology (5)
- Chemistry 11 General Chemistry (5)
- Chemistry 12 General Chemistry (5)
- 212 Applied Nutrition (3)
- Chemistry 210 Organic Chemistry (3)
- Chemistry 211 Organic Chemistry Laboratory (2)
- Chemistry 212 Organic Chemistry (3)

**Electives courses: 20 hours**

- Biochemistry 193 General Biochemistry (3)
- Biology 212 Basic Microbiology (4)
- Biology 222 Embryology (5)

Other elective courses will be selected in consultation with the student's adviser.

#### PRODUCTION AND MANAGEMENT

**Required courses: 18 hours**

**Choose one of the following three courses:**

- 25 Introductory Dairy Science (3)
- 35 Livestock and Meat Science (5)

55 Introductory Poultry Science (3)

**Choose two of the following eight courses:**

- 215 Dairy Cattle Production (3)
- 235 Poultry Production (3)
- 305 Beef Production (3)
- 315 Advanced Dairy Production (3)
- 325 Advanced Horse Production (3)
- 335 Advanced Poultry Production (3)
- 345 Sheep Production (3)
- 355 Swine Production (3)

212 Applied Animal Nutrition (3)

Agricultural Economics 220 General Agricultural Marketing (3)

Agricultural Economics 260 General Farm Management (3) or Agricultural Economics 261 Farm Management (3)

#### Elective courses

- 125 Horse Science (3)
- Biology 22 General Biology (5)
- Agronomy 30 Plant Science (5)
- Agronomy 100 Soil Systems (3)
- Agronomy 303 Forage Crops (3)
- Agronomy Grain Crops (3)
- FSN 214 Meat Classification, Grading, Judging (2)
- Agricultural Engineering 103 Planning Farm Buildings (3)
- Agricultural Engineering 301 Microbiology of Anaerobic Ecosystems (3)
- Agricultural Engineering 386 Mechanized Feed Handling (3)
- Agricultural Economics 290 Marketing Farm Commodities: Theory and Practice (1)
- Agricultural Economics 291 Marketing Farm Commodities: Livestock and Livestock Products (2)
- Agricultural Economics 292 Marketing Farm Commodities: Poultry Products (1)
- Agricultural Economics 295 Marketing Farm Commodities: Milk and Dairy Products ( )
- Agricultural Economics 312 Planning Farm Business (3)
- Agricultural Economics 333 Agricultural Law (3)
- Vet Science 230 Animal Diseases and Sanitation (3)
- Accountancy 36 (3)
- Accountancy 37 (3)
- 323 Applied Animal Breeding (3)
- 105 Livestock Judging (3) or 115 Dairy Cattle Judging (2) or 145 Selecting and Grading of Poultry (2)

Other elective courses will be selected in consultation with the student's adviser.

## ATMOSPHERIC SCIENCE (METEOROLOGY)

701 Hitt St., (314) 882-6591

### DEPARTMENTAL REQUIREMENTS

**Professional and Science Emphasis.** This course of study prepares the student for employment as a meteorologist in government and industry. It also serves as a preparatory curriculum for advanced study in atmospheric science. Many students enter graduate school upon completion of this program.

**ATMOSPHERIC SCIENCE: 29 hours**

The following courses are required:

- 304 Meteorological Analysis I (3)
  - 305 Meteorological Analysis II (3)
  - 316 Micrometeorology (3)
  - 350 Fundamentals of Meteorology (3)
  - 366 Climates of the World (3)
  - 392 Atmospheric Thermodynamics and Statics (5)
  - 393 Atmospheric Kinematics and Dynamics (5)
- Select additional hours from the following:
- 50 Introductory Meteorology (3)
  - 200 Independent Study (1-3)
  - 302 Weather Briefing (1)
  - 303 Meteorology of the Biosphere (3)
  - 314 Cloud and Precipitation Physics (3)
  - 377 Climate Dynamics (3)

**PHYSICAL SCIENCE: 9 hours**

- Physics 80 (3)
- Physics 123 (3)
- Physics 124 (3)

**MATHEMATICAL SCIENCE: 10 hours**

- Mathematics 80 (5)
- Mathematics 175 (5)

**Additional Electives: 30 hours**

The student consults with an adviser to select additional courses in the physical and mathematical sciences. Mathematics 201 and 314 normally are included in these optional courses.

## BIOCHEMISTRY

322A Chemistry Bldg., (314) 882-7606 or M121 Medical Sciences, (314) 882-8795

### DEPARTMENTAL REQUIREMENTS

**Major Field: 50 hours**

- 10 hours of inorganic chemistry
- 8 hours of organic chemistry
- 4 hours of quantitative analysis
- 8 hours of calculus
- 8 to 9 hours of physics
- 11 hours of biochemistry
- 3 to 6 hours of physical chemistry

#### Supporting Courses

Must include 20 hours of biological or agricultural sciences in the following areas: (1) general biology; (2) plant or animal physiology; (3) genetics; (4) microbiology, embryology or developmental biology.

**Additional Electives: 8 hours**

## DAIRY SCIENCE

S102 Animal Science Research Center (314) 882-4454

The Departments of Animal, Dairy and Poultry Science have a unified undergraduate curriculum in animal science. Students seeking training in dairy science should refer to the animal science section for departmental recommendations. Undergraduate courses offered in dairy science are described under animal science in the Description of Courses section.

Graduate courses in dairy science at 400 level and above are listed in the Description of Courses section under dairy science.

## ENTOMOLOGY

1-87 Agriculture Bldg., (314) 882-7894

Entomology is the study of insects and how they relate to man and the environment. Included in a broad spectrum of relationships are insects competing for man's food and human diseases; insects beneficial to man; and insects functioning in the natural environment.

The student receives training in several disciplines or supporting sciences. This broad background enables the entomologist to obtain employment with the USDA, state departments of agriculture, universities, private industry, or self-employment in pesticide application or consulting.

The Department of Entomology offers advanced degree (MS and PhD) programs to qualified students. A student desiring undergraduate training in entomology should consult the pest management curriculum or the department of entomology chairman.

## ENVIRONMENTAL SCIENCE EMPHASIS

100 Agricultural Engineering Bldg., (314) 882-2350

In addition to achieving a major in one of the programs in subject matter areas, a student may include an environmental emphasis by completing at least 24 credit hours from the lists below. These would replace an equivalent number of elective hours under the heading, Additional Electives.

The Departments of Agricultural Economics, Agricultural Engineering, Agronomy, Animal Science, Atmospheric Science, Biochemistry, Dairy Science, Entomology, Food Science and Nutrition, Horticulture, Plant Pathology,

Poultry Science and Rural Sociology are participating in offering programs with an environmental emphasis.

Select one or more courses from each of the three groups listed below and additional courses from the list of general environmental courses to total at least 24 hours.

#### **Socially Oriented Courses**

Agricultural Economics 333 (3)  
Anthropology 250 (3)  
Community Development 190 (3)  
Rural Sociology 120 (2)  
Sociology 216 (3)

#### **Resource Oriented Courses**

Agricultural Economics 270 (3)  
Agricultural Economics 386 (3)  
Atmospheric Science 50 (3)  
Entomology 101 (3)  
Entomology 204 (3)  
Food Science and Nutrition 30 (5)  
Forestry, Fisheries and Wildlife 195 (2)  
Forestry, Fisheries and Wildlife 202 (3)  
Horticulture 254 (3)  
Plant Pathology 304 (3)

#### **Engineering and Technology Courses**

Agricultural Engineering 201 (3)  
Agricultural Engineering 202 (3)  
Atmospheric Science 316 (3)  
Physics 205 (2-3)

#### **General Environmental Courses**

Agronomy 100 (4 or 5)  
Agronomy 308 (3)  
Atmospheric Science 303 (3)  
Atmospheric Science 366 (3)  
Agriculture/Biological Sciences 6 (3)  
Biological Sciences 362 (5)  
Entomology 319 (3)  
Forestry, Fisheries and Wildlife 322 (3)  
Forestry, Fisheries and Wildlife 353 (2)  
Horticulture 10 (3)  
Plant Pathology 307 (4)  
Community Development 360 (3)  
Rural Sociology 304 (3)

## **EXTENSION EDUCATION**

### **103 Whitten Hall, (314) 882-4517**

More than 3,000 extension offices throughout the nation make up the vast facility for extending knowledge to Americans. In Missouri, there are 117 centers and a professional extension staff of more than 385 people.

Extension education provides a graduate program to develop the competencies needed to effectively extend the educational resources of the University to the people.

Students interested in extension are advised to complete the undergraduate degree in the discipline of their choice, and then complete a master's degree in a discipline with supporting extension education courses as electives, or enroll for a master of science in extension education. Many professional positions in extension require a master's degree.

## **FOOD SCIENCE AND NUTRITION**

### **103 Eckles Hall, (314) 882-2639**

Three career opportunity areas are (1) food science—the basic studies which aid our understanding of food and its functions; (2) food business—supplying and distributing food to the market; and (3) food service and lodging management—food service and hospitality. In the food science area, the student may select the science or professional option, while food business and food service and lodging management areas are only a business option. Career opportunities related to such functions as food distribution and service, the hotel and restaurant in-

dustries, research and product development, products production, and safety and environmental quality control are available. The following examples illustrate departmental programs designed to provide competency for these different career opportunity areas.

### **FOOD SCIENCE DEPARTMENTAL REQUIREMENTS**

**Science Option** must include at least 32 hours of the courses listed below:

#### **Major Field: 32 hours**

30 Food Science and Nutrition (5)  
250 Physical Principles for Food Processing (3)  
305 Food Analysis (3)  
309 Food Chemistry I (5)  
330 Food Processing (5)  
360 Food Quality and Sanitation (3)  
372 Food Microbiology (3)  
373 Food Microbiology Lab (2)  
375 Sensory Analysis of Food (3)

#### **Science and Mathematics: 16 hours**

#### **Additional Requirements: 30 hours**

At least one additional food processing course must be completed from the following: FSN 304, 307 and 335.

The above science option is in compliance with the Institute of Food Technology Science requirement.

#### **Professional Option**

**Major Field: 32 hours** of courses in Food Science and Nutrition

**Supporting courses: 16 hours** including at least 6 hours in business management.

#### **Additional Requirements: 30 hours**

### **Food Service and Lodging Management Departmental Requirements**

30 Food Science and Nutrition (5)  
40 Fundamentals of Food Service and Lodging Industry (3)  
75 Attributes of Food Quality (3)  
135 Production Technology for Food Services (5)  
145 Food and Beverage Management (3)  
150 Food Service and Lodging Industry Operations Management (3)  
224 Meat Selection and Identification (3)  
240 Operational Management in Food Service (3)  
255 Management and Training of Personnel (3)  
340 Case Studies and Research in Food Service Management (3)  
345 Advanced Food Production Technology for Food Service (3)  
360 Food Sanitation (3)  
390 Internship (4-6)

#### **Business and Economics: 25 hours**

Select from the following: accountancy, economics, management, labor economics, corporation finance, data processing, statistics and marketing.

#### **Additional Requirements: 21 hours**

May include microwave heating of foods, sensory analysis, organizational behavior and other economic and business courses.

#### **Food Business Option**

#### **Major Field: 32 hours**

30 Food Science and Nutrition (5)  
75 Attributes of Food Quality (3)  
360 Food Quality and Sanitation (3)  
21 additional hours in Food Science and Nutrition or closely related areas

#### **Business and Economics: 16 hours**

#### **Additional Requirements: 30 hours**

## **GENERAL AGRICULTURE**

Students may choose to major in general agriculture rather than a specific subject area. Students in general agriculture must meet the general requirements and additional electives outlined, but instead of meeting the departmental requirements may complete 48 semester hours offered by departments in the College. Agriculture courses used to meet general requirements count toward this total. Fifteen semester hours must be in one department in the College and eight semester hours must be in each of two additional departments in the College.

## **HORTICULTURE**

### **1-40 Agricultural Bldg., (314) 882-7511**

Horticulture is a diverse field, encompassing the areas of ornamental plants such as flowers, ground covers, lawn and turf grasses, shade and flowering trees, shrubs, and food plants such as fruits and vegetables. Horticulture requires highly trained persons with varying combinations of professional, business and scientific skills.

The student and faculty adviser develop an individualized curriculum that is designed to prepare the student to fulfill individual objectives.

Departmental requirements are subdivided into major field requirements and emphasis area requirements. Students majoring in horticulture must meet major field requirements as well as the requirements of one of the emphasis areas. These emphasis areas include flower crops production, retail floristry, nursery crops production, landscape design, fruit and vegetable crop production, turf management and horticulture science. Emphasis area requirements include appropriate courses in horticulture and its supporting fields.

#### **Major Field: 37 hours**

20 Basic Home Horticulture (3)  
160 Garden Flowers (3)  
201 Ornamental Woody Plants I (3)  
203 Plant Propagation (3)  
204 Plant Environments (3)  
205 Plant Nutrition (3)  
206 Plant Protection (3)  
207 Plant Origin and Development (3)  
Agronomy 100 Soils (4)  
Biological Sciences 115 Plant Structure and Function (3)  
Biochemistry 110 Introduction to Biochemistry (3)  
Entomology 101 Insects in the Environment (3)

#### **Supporting Courses**

Selected from the following courses or others as dictated by emphasis area requirements and with adviser's approval.

30 Plant Science (5)  
60 Flower Arranging (2)  
144 Vegetable Gardening (3)  
150 Micro-Environmental Design (3)  
151 Plants for Interior Design (2)  
195 Grapes and Wines of the World (1)  
202 Ornamental Woody Plants II (3)  
250 Landscape Graphics (3)  
252 Planting Design I (3)  
254 Landscape Design (3)  
255 Landforms (3)  
257 Construction Materials (3)  
266 Plant Forcing Structures (3)  
268 Floral Design (3)  
269 Flower Store Management (3)  
272 Planting Design II (3)  
300 Problems (cr. arr.)  
301 Post-Harvest Physiology (3)  
330 Fruit Production (5)  
344 Commercial Vegetable and Truck Crop Growing (5)  
352 Planting Design III (4)  
354 Advanced Landscape Design (4)  
355 Turf (3)  
357 Nursery Crop Production and Management (4)  
361 Fall Greenhouse Crops (4)  
362 Spring Greenhouse Crops (4)  
390 Horticulture Internship (3)

## **PEST MANAGEMENT**

### **47 Agriculture Bldg., (314) 882-7871**

The pest management curriculum is interdisciplinary in nature and includes courses designed to give the student broad experience in areas associated with plant and animal protection. Pest management graduates are required to have knowledge in many fields of agricultural science, with special expertise in entomol-



ogy, plant pathology, weed science and animal damage control.

The courses of study in these disciplines emphasize the biological principles behind the management of pest populations. Moreover, students are presented a holistic view of biological and environmental interactions. At UMC, the emphasis in teaching is placed on the systems approach in which all control procedures are unified to manage the pest species, while taking into consideration the long-term preservation of the environment.

At present, most professional opportunities in this area are related to agricultural production. In the near future, many pest management specialists will be involved in the solution of wide-range problems related to urban, rural, aquatic and forest environments.

## CURRICULUM REQUIREMENTS

**Major Field: 23 hours**

Agronomy 306 Weed Control (3)  
Plant Pathology 305 Introduction to Plant Pathology (3)  
Entomology 312 Bionomics of Insect Pests (3)  
Pest Management 180 Principles of Pest Management (3)  
Entomology 181 Pesticide Chemicals (3)  
Agricultural Engineering 198 Pesticide Application Equipment (3)

Summer Internship (2)

Computer Science 104 Computers and Programming I (3)

**Supporting Courses: 25 hours**

Select from the following courses or others with adviser's approval.

Agronomy 100 Soil Systems (5)  
Agronomy 225 Basic Plant Genetics (3)  
Agronomy 230 Crops and Soils Management (3)  
Agronomy 302 Fertilizers (2)  
Horticulture 203 Plant Propagation (3)  
Horticulture 204 Plant Environments (3)  
Entomology 101 Insects in the Environment (3)  
Entomology 304 Systematic Entomology (3)  
Entomology 315 Medical and Veterinary Entomology (3)  
Entomology 319 Insect Ecology (3)  
Entomology 322 Biological Control of Insects (3)  
Entomology 405 Taxonomy of Immature Insects (3)  
Forestry, Fisheries and Wildlife 60 Ecology of Wildlife and Man (3)  
Forestry, Fisheries and Wildlife 202 Environmental Quality in Forest Systems (3)  
Plant Pathology 307 Mycology (4)  
Plant Pathology 361 Insects in Relation to Plant Diseases (3)  
Plant Pathology 391-392-393 Clinical Plant Pathology (2)(1)  
Atmospheric Science 50 Introductory Meteorology (3)  
Biological Science 12 General Botany (5)  
Biological Science 212 Basic Microbiology (4)  
Biological Science 214 Plant Taxonomy (4)  
Biological Science 362 General Ecology (5)  
Mathematics 207 Calculus for Social and Natural Sciences I (3)  
Statistics 31 Elementary Statistics (3)

**Additional Electives: 30 hours**

## RURAL SOCIOLOGY

102 Sociology Bldg., (314) 882-6085

### DEPARTMENTAL REQUIREMENTS

**Subject Matter Core.** In all of the following alternative programs of study, a core of six courses, consisting of 18 credit hours, provides the general substantive foundation upon which the unique features of each program are built. This core is selected from the following list. Each program is planned by an adviser working with the student; certain substitutions are permitted.

(Rural Sociology Department is abbreviated RS and Sociology S.)

RS 155 Agriculture in Communal Settings  
RS 175 Corporate Farms vs. Family Farms  
RS 180 Social Research I  
RS 185 Contemporary Social Problems  
RS 120 Population and Ecology  
RS 299 Recent Theories in Sociology

RS 310 Rural Social Organization  
RS 340 Community Social Structure

**Science Emphasis.** This course of study is designed for those students who plan to do graduate work in sociology or rural sociology. In addition to the six core courses, the student's program would include Rural Sociology 375, Social Statistics, (also Sociology 180, if not included in the core) and additional courses in sociology/rural sociology and/or related disciplines, to make up the 48 hours of departmental requirements required by the College of Agriculture.

It is recommended that courses in symbolic logic and/or philosophy of science be used to satisfy the humanistic studies elective of the general education requirements.

**Business Emphasis.** The following program is suggested for students who plan to enter the business world. In addition to the rural sociology core, the student should take 201, Organization and Leadership in Modern Society, and nine other courses, either from the remaining courses offered by the Departments of Sociology and Rural Sociology, or from the following courses offered by other departments:

Accountancy 37 Accounting II  
Agricultural Economics 220 General Agricultural Marketing  
Agricultural Economics 250 Economics of Agricultural Production and Distribution  
Economics 251 Theory of the Firm  
Economics 253 Macroeconomic Policy  
Agricultural Economics 230 Farm Programs  
Agricultural Economics 241 Cooperative Business Organizations  
Agricultural Economics 251 Agricultural Prices  
Agricultural Economics 290, 291, 292, and/or 294 Marketing Farm Commodities: Grain Crops  
Agricultural Economics 344 Management of Cooperative Firms  
Family Economics and Management 175 The Consumer in our Society  
Finance 203 Corporation Finance  
Management 202 Fundamentals of Management  
Marketing 204 Principles of Marketing  
Marketing 312 Marketing Management  
Marketing 316 Sales Management

It is assumed that the student will use Agricultural Economics 50 (or general economics) and Accounting I to satisfy the business and economics general education requirement of the College.

**Professional Emphasis.** The following programs are designed to provide students with the foundations for a saleable body of knowledge/skills for various types of careers, such as research technicians, demographic analyst, youth work, Peace Corps, community development, social service agencies, etc.

**Demographic Analyst or Research Technician.** In addition to the six core courses and 290 Practicum, a block of 27 additional hours are necessary to complete the departmental requirements.

The following courses should be included:

RS 375 Social Statistics  
RS 376 Advanced Social Statistics  
RS 184 Social Impact Analysis  
RS 311 Applied Sociology  
S 305 Dynamics of Population  
Political Science 324 Survey Research Methods

**Rural Community Development.** In addition to the six core courses and 290 Practicum, the student should select nine or more courses from the following list.

RS 170 Sociological Aspects of Poverty  
RS 201 Organization and Leadership in Modern Society  
S 210 Public Opinion and Communication  
S 215 Collective Behavior  
RS 225 Social Processes of Communication and Diffusion  
S 260 Social Psychology

S 343 Advanced Social Psychology  
S 344 Group Dynamics and Role Theory  
RS 304 Human Ecology  
S 305 Dynamics of Population  
S 217 The Sociology of Work and Leisure  
S 218 Industrial Sociology  
RS 335 Social Change and Trends  
S 336 Social Movements and Conflicts  
S 354 Political Sociology  
Agricultural Economics 270 Resources and Economic Development  
Political Science 312 Issues in Public Bureaucracy  
Political Science 317 Public Policy  
Political Science 325 Politics of Pressure Groups  
Political Science 328 Political Behavior  
Community Development 192 The Field of Community Development  
Community Development 194 Planning and the Community  
It is assumed that the student will use Political Science I or II to satisfy the Missouri state law requirement.

**People Services/Agency Systems.** In addition to the six core courses and 290 Practicum, students should select nine or more courses from the following list, depending on their areas of interest. Appropriate courses also may be taken in the Departments of Psychology, Child and Family Development, and Family Economics and Management.

RS 170 Sociological Aspects of Poverty  
RS 201 Organization and Leadership in Modern Society  
S 127 Ethnic and Racial Minorities  
S 211 Criminology  
S 212 Contemporary Corrections  
S 260 Social Psychology  
S 262 Sociology of Age and Sex Roles  
S 344 Group Dynamics and Role Theory  
S 337 Racial and Cultural Relations  
S 339 The Black Americans  
S 215 Collective Behavior  
S 214 The Family  
RS 255 Youth in Today's World  
S 322 Aging in American Society  
S 217 The Sociology of Work and Leisure  
S 218 Industrial Sociology  
S 323 Death and Dying  
S 324 Sociological Concepts and Health  
S 326 The Sociology of Sickness and Illness  
RS 347 The Sociology of Community Health  
S 252 Occupations and Professions  
RS 270 The Sociology of Religion  
**Additional Electives: 29 hours**

## PREVETERINARY MEDICAL PROGRAM

Students wishing to prepare for application to the College of Veterinary Medicine may enroll in the College of Agriculture under the science emphasis programs. In satisfying the requirements of the science program, the requirements for entering veterinary medicine also may be satisfied. However, before applying to the College of Veterinary Medicine, a student should make certain that the following requirements have been satisfied.

A minimum of 64 semester hours, exclusive of ROTC and physical education, is required for admission to the College of Veterinary Medicine. Credit received in the CLEP exams or for testing out of a course may be counted in total hours, but will not be counted as part of the required hours below. The 64 semester hours must include the following or equivalent:

Animal Science 12 (5)  
Animal Science 202 (3)  
English: 6 hours  
College Algebra: 3 hours  
Inorganic Chemistry: 8 hours  
Organic Chemistry: 8 hours  
Physics: 5 hours  
Biological Science: 10 hours  
Social Science and Humanistic Studies: 10 hours  
Electives: Select courses toward the BS degree of your choice.

## FORESTRY, FISHERIES AND WILDLIFE CURRICULA BACHELOR OF SCIENCE

For all curricula in Forestry, Fisheries and Wildlife, the last 60 hours must be completed in residence. The faculty may grant an exception under unusual circumstances.

Satisfactory completion of 135 hours in the forest management and recreational forestry curricula, 130 hours in wood products, forest science and specialization, and 125 hours in fisheries and wildlife is required for graduation. Course work taken at the University must be completed with an average of C (a 2.0 GPA; A = 4.0.)

Elective courses must be approved by the student's adviser. A maximum of 18 credit hours in ROTC courses (Air Force, Army or Navy) is permitted to count as elective credit toward the degree of which six hours may be substituted for social science and humanities electives. Only four credit hours in physical education courses may be used in calculating the grade point average and toward credit for graduation.

### Core Content

Four curricula in forestry and one in fisheries and wildlife are offered at the undergraduate level—forest management, recreational forestry, wood products, forest science and specialization, and fisheries and wildlife. All curricula are based on a common foundation of physical, biological and social sciences, plus humanities. This background provides not only essential material prerequisite to professional course offerings but also gives the student a basic liberal education.

The general education core includes the following groups of courses:

Communications (writing, speech) 9 to 12 hours  
Mathematics (statistics, calculus, computer science) 9 to 12 hours  
Natural Sciences (botany, chemistry, physics, geology, etc.) 22 to 28 hours  
Social Sciences and Humanities (economics, American history, or political science, plus student's selection from 16 fields) 17 hours

Students who qualify on Freshman Placement Tests in mathematics will be awarded advance credit for Math 10. Students scoring in the lower range in English on FPT will need to pass English 1 during their freshman year and English 60 after their freshman year. If placed in English 60 on FPT, an elective may be taken. The student is expected to have a working knowledge of trigonometry and college algebra. A student without adequate mathematical background may take trigonometry and college algebra as electives.

Required courses in mathematics (exclusive of computer science and statistics), chemistry and physics should be completed in the first 60 hours of college work. Transfer students should complete them in the first possible semester after transfer.

### MASTER OF SCIENCE

The master of science programs in forestry are available in ecology, economics, entomology, hydrology, mensuration, photogrammetry, physiology, policy, recreation, silviculture, soils,

timber management, wood science and wood technology. The MS programs in fisheries and wildlife are offered in areas of ecology, reproduction, animal behavior, limnology and water quality, wildlife management, fishery biology and management, and population dynamics.

### DOCTOR OF PHILOSOPHY

The doctor of philosophy programs in forestry are available in ecology, economics, entomology, hydrology, physiology, policy, recreation, silviculture, soils and wood science. The program areas for the PhD in fisheries and wildlife are the same as the program areas for the MS.

### FOREST MANAGEMENT

The forest management curriculum is designed to prepare the student for varied types of land management work in forestry. It includes professional courses relating to the multiple-use aspects of forestry—timber, recreation, wildlife, water and range—and to forest administration biology, forest measurements and engineering, and forestry as affected by human institutions.

#### FRESHMAN

##### Fall Semester

English 1 Composition or Elective (3)  
Geology 2 Physical Geology (3) or Geology 1 Principles of Geology (5)  
Biological Science 12 General Botany (5)  
1 Forestry Orientation (1)  
Mathematics 10 College Algebra or Elective (3)  
Total: 15-17 hours

##### Winter Semester

Chemistry 1 Introductory Chemistry or Chemistry II General Chemistry (5)  
Statistics 31 Elementary Statistics or Statistics 207 Statistical Analysis or Agricultural Economics 225 Statistical Analysis (3)  
Economics 51 General Economics or Agricultural Economics 50 Agricultural Economics (5)  
Elective (3)  
Total: 16 hours

#### SOPHOMORE

##### Fall Semester

Civil Engineering 20 Surveying (3)  
Mathematics 207 Calculus for Social and Natural Sciences I (3)  
151 Dendrology (4)  
Computer Science 104 Computers and Programming I or Agriculture III Computing and Programming Concepts I (3)  
Elective (3)  
Total: 16 hours

##### Winter Semester

Speech and Dramatic Art 75 Introduction to Speech Communication (3)  
Agronomy 100 Soil Systems (4)  
Physics 11 Elementary College Physics (5)  
154 Forest Graphics (2)  
English 60 Exposition (3)  
Total: 17 hours

##### Summer Session—Field Studies

140 Basic Forest Measurements (1)  
141 Forest Ecology and Silviculture (2)  
143 Forest Utilization (1)  
144 Forest Engineering (2)  
Total: 6 hours

#### JUNIOR

##### Fall Semester

207 Forest Fire Control and Use (2)\*  
211 Resource Measurements (3)  
302 Silvics (3)  
306 Forest Photogrammetry (2)  
309 Watershed Management (3)  
318 Forest Economics (3)  
Total: 16 hours

##### Winter Semester

203 Forest Inventory (2)  
Entomology 210 Forest Entomology (3)\*  
295 Forest Products Utilization (3)  
303 Practice of Silviculture (2)  
Elective (6)  
Total: 16 hours

#### SENIOR

##### Fall Semester

English 161 Technical Writing (3)  
Plant Pathology 305 Introduction to Plant Pathology (3)\*  
314 Timber Management (3)  
322 Range and Wildlife Habitat Management (3)  
Electives (4)

Total: 16 hours

##### Winter Semester

320 Recreational Land Management (3)  
353 Public Resource Policy (2)  
360 Management-Utilization Trip (1)\*\*  
391 Land Use Planning (2)

Electives (9-10)

Total: 17 hours

Total hours required for degree: 135

\*Two of the three listed protection courses must be completed for the degree. All three are recommended.

\*\*Recommended, but not required.

### RECREATIONAL FORESTRY

Recreational forestry places particular emphasis upon the amenity and environmental values of forests and tree plantings. As in the forest management curriculum, considerable time is devoted to forest biology, but several additional social science courses are included to emphasize the interface between recreationists and the forest resource.

#### FRESHMAN

##### Fall Semester

English 1 Composition or Elective (3)  
Geology 2 Physical Geology (3) or Geology 1 Principles of Geology (5)  
Biological Science 12 General Botany (5)  
1 Forestry Orientation (1)  
Mathematics 10 College Algebra or Elective (3)  
Total: 15-17 hours

##### Winter Semester

Chemistry 1 Introductory Chemistry or Chemistry II General Chemistry (5)  
Statistics 31 Elementary Statistics or Statistics 207 Statistical Analysis or Agricultural Economics 225 Statistical Analysis (3)

Economics 51 General Economics or Agricultural Economics 50 Agricultural Economics (5)

Elective (3)

Total: 16 hours

#### SOPHOMORE

##### Fall semester

151 Dendrology (4)  
Civil Engineering 20 Surveying (3)  
English 60 Exposition (3)  
Mathematics 207 Calculus for Social and Natural Sciences I (3)

Elective (3)

Total: 16 hours

##### Winter Semester

Physics 11 Elementary College Physics (5)  
Agronomy 100 Soil Systems (4)  
154 Forest Graphics (2) or Horticulture 250 Landscape Graphics (3)  
Sociology 1 General Sociology (3)\*  
Elective (3)

Total: 17-18 hours

##### Summer Session—Field Studies

140 Basic Forest Measurements (1)  
141 Forest Ecology and Silviculture (2)  
143 Forest Utilization (1)  
144 Forest Engineering (2)  
Total: 6 hours

#### JUNIOR

##### Fall Semester

211 Resource Measurements (3)  
302 Silvics (3)  
306 Photogrammetry (2)  
Computer Science 104 Computers and Programming I or Agriculture III Computing and Programming Concepts I (3)

Recreation or Shade Tree Management (3)\*\*

Elective (3)

Total: 17 hours

##### Winter Semester

Entomology 210 Forest Entomology (3)  
320 Recreational Land Management (3)  
Speech and Dramatic Art 75 Introduction to Speech Communication (3)  
Recreation or Shade Tree Management Course (3)\*\*

Elective (3)  
Total: 15 hours

#### SENIOR

##### Fall Semester

English 161 Technical Writing (3)  
Plant Pathology 305 Introduction to Plant Pathology (3)  
340 Advanced Recreation Land Management (3)  
314 Timber Management (3), 353 Public Resource Policy (2), 391 Land Use Planning (2) (2 of 3 courses required)  
Recreation or Shade Tree Management Course (3)\*\*  
Total: 17 hours

##### Winter Semester

361 Recreational Forestry Trip (1)  
Recreation or Shade Tree Management courses (6)\*\*  
Sociology 260 Social Psychology (3)\*  
Electives (6)  
Total: 16 hours

#### Total hours required for degree: 135

\*Sociology 260 and 260 are specified in addition to the 13 hours of social science/humanities electives.

\*\*Three courses from one of the following groups and two from the other must be completed.

##### Recreation (6-9 hours)

Recreation and Park Administration 111 Introduction to Planning and Evaluating Recreation Environments (3)  
Recreation and Park Administration 212 Planning Recreation and Leisure Environments (3)  
Recreation and Park Administration 231 Principles of Interpretive Outdoor Recreation (3)  
Recreation and Park Administration 331 Outdoor Recreation—Education (3)  
Recreation and Park Administration 316 Administration of Leisure Services (3)  
Recreation and Park Administration 333 Park Management (3)

##### Shade Tree Management (6-9 hours)

Horticulture 201 Ornamental Woody Plants I (3)  
Horticulture 202 Ornamental Woody Plants II (3)  
Horticulture 203 Plant Propagation (3)  
Horticulture 204 Plant Environments (3)  
Horticulture 205 Plant Nutrition (3)

## WOOD PRODUCTS

In the wood products curriculum, the student must complete a minimum of 21 hours in any one of three areas of specialization. Specialization areas include science, utilization and management and are directed toward research or teaching, wood manufacturing or product sales, and managing a wood-based enterprise, respectively. At least 12 hours of the specialization program must be in courses numbered 200 or above.

The science specialization includes courses in the physical and biological sciences. It emphasizes knowledge of wood's chemical and physical properties. The primary objective is to train students for careers in teaching or research.

The utilization specialization includes courses in manufacturing or structural design. It emphasizes engineering as applied to the manufacture and use of wood products. Graduates with a degree in utilization probably will find their best opportunities in manufacturing and sales in the wood industry.

The management specialization includes courses in industrial organization and control. It emphasizes the decision making aspects of operating a forest- or wood-based enterprise. Graduates normally find career opportunities in industrial sales, management and administrative positions.

#### FRESHMAN

##### Fall Semester

English I Composition or Elective (3)  
Geology 2 Physical Geology (3) or Geology 1 Principles of Geology (5)  
Biological Science 12 General Botany (5)  
1 Forestry Orientation (1)  
Mathematics 10 College Algebra or Elective (3)  
Total: 15-17 hours

#### Winter Semester

Chemistry 1 Introductory Chemistry or Chemistry 11 General Chemistry (5)

Statistics 31 Elementary Statistics or Statistics 207 Statistical Analysis or Agricultural Economics 225 Statistical Analysis (3)

Economics 51 General Economics or Agricultural Economics 50 Agricultural Economics (5)

##### Elective (3)

Total: 16 hours

#### SOPHOMORE

##### Fall Semester

204 Wood Technology (3)  
253 Light Construction (3)  
Agronomy 100 Soil Systems (4)  
Computer Science 104 Computers and Programming I or Agriculture III Computing and Programming Concepts I (3)

##### Elective (3)

Total: 16 hours

#### Winter Semester

#### JUNIOR

##### Fall Semester

206 Wood Engineering (3)  
211 Resource Measurements (3)  
Mathematics 207 Calculus for Social and Natural Sciences I or Mathematics 60 Finite Mathematics or Mathematics 155 The Mathematics of Finance (3)  
302 Silvics (3)

##### Elective (3)

Total: 15 hours

#### Winter Semester

English 161 Technical Writing (3)  
254 Wood Processing (3)\*  
295 Forest Products Utilization (3)  
Specialization (6)

##### Elective (3)

Total: 18 hours

#### SENIOR

##### Fall Semester

Specialization (9)  
Elective (8)  
Total: 17 hours

#### Winter Semester

245 Wood Science (4)\*  
255 Wood Seasoning and Preservation (3)\*\*  
Specialization (3)  
Elective (6)  
Total: 16 hours

#### Total hours required for degree: 130

\*Course can be taken either junior or senior year.

Offered winter semester, odd years.

\*\*Offered winter semester, even years.

## FOREST SCIENCE AND SPECIALIZATION

Students aiming toward graduate study or who wish to specialize in a particular narrow field at the undergraduate level should seriously consider enrolling in forest science and specialization. This curriculum offers maximum flexibility to the student with well-defined goals not accommodated in other curricula. The procedure detailed below should be followed.

**Admittance to the Curriculum.** To qualify for admission into the forest science and specialization curriculum, the student must submit to the Undergraduate Programs Committee a detailed typewritten application outlining reasons for selecting the desired area of specialization and a career objective. The Undergraduate Programs Committee, following consultation with the student, forwards the application to an adviser.

With the aid of the adviser, the student develops an individualized program of study. The curriculum should include at least 40 additional credit hours directed toward the desired specialization.

The application and proposed curriculum are circulated to the entire faculty for information and suggestions and are submitted to a committee of three forestry, fisheries, and wildlife faculty members (including the adviser) se-

lected by the student and adviser. This committee reviews the application, makes recommendations and grants final approval of the student's program. Changes must be approved by the entire faculty.

Students may make application for inclusion under this option at any time. However, in order to take full advantage of the flexibility and opportunities available, they should make this decision as early in their undergraduate career as possible.

#### FRESHMAN

##### Fall Semester

English 1 Composition or Elective (3)  
Geology 2 Physical Geology (3) or Geology 1 Principles of Geology (5)  
Biological Science 12 General Botany (5)  
1 Forestry Orientation (1)  
10 College Algebra or Elective (3)  
Total: 15 hours

#### Winter Semester

Chemistry 1 Introductory Chemistry or Chemistry 11 General Chemistry (5)  
Statistics 31 Elementary Statistics or Statistics 207 Statistical Analysis or Agricultural Economics 225 Statistical Analysis (3)

Economics 51 General Economics or Agricultural Economics 50 Agricultural Economics (5)

##### Elective (3)

Total: 16 hours

#### SOPHOMORE

##### Fall Semester

Mathematics 207 Calculus for Social and Natural Sciences I (3)

Agronomy 100 Soil Systems (4)

211 Resource Measurements (3)

##### Elective (6)

Total: 15 hours

#### Winter Semester

Physics 11 Elementary College Physics (5)  
Computer Science 104 Computers and Programming I or Agriculture III Computing and Programming Concepts I (3)

English 60 Exposition (3)

##### Elective (4)

Total: 15 hours

#### Summer Session—Field Studies

140 Basic Forest Measurements (1)  
141 Forest Ecology and Silviculture (2)  
143 Forest Utilization (1)  
144 Forest Engineering (2)

Total: 6 hours

#### JUNIOR

##### Fall Semester

302 Silvics (3)  
Speech and Dramatic Art 75 Introduction to Speech Communication (3)

Specialization Courses (10)

Total: 16 hours

#### Winter Semester

English 161 Technical Writing (3)

Specialization (6)

##### Elective (8)

Total: 17 hours

#### SENIOR

##### Fall Semester

Specialization Courses (9)

##### Elective (6)

#### Winter Semester

Specialization Courses (15)

#### Total hours required for degree: 130

## FISHERIES AND WILDLIFE

The fisheries and wildlife curriculum is designed to provide the essential biological and management background necessary to the student planning entrance into wildlife management of fisheries biology. It also may be selected by students having a concern for the effect of man's environmental modifications upon animal species.

#### FRESHMAN

##### Fall Semester

English I Composition (3)  
Geology 1 Principles of Geology (5)  
70 Ecology and Renewable Resource Management (3)

Biological Science 12 General Botany or Biological Science 21 General Biology (5)

Total: 16 hours

#### Winter Semester

Chemistry 1 Introductory Chemistry or Chemistry 11 General Chemistry (5)

Mathematics 10 College Algebra (3)

Biological Sciences 11 Introductory Zoology or Biological Science 22 General Biology (5)

History 11 Themes in American History or Political Science 11 Introduction to Political Science (3)

Total: 16 hours

#### SOPHOMORE

##### Fall Semester

Agricultural Economics 50 Agricultural Economics or Economics 51 General Economics (5)

Mathematics 207 Calculus for Social and Natural Sciences (3)

English 60 Exposition (3)

120 Colloquium in Fisheries and Wildlife (1)

Elective (3)

Total: 15 hours

##### Winter Semester

Physics 11 Elementary College Physics (5)

150 Ornithology (3)\*

Speech and Dramatic Arts 75 Introduction to Speech Communication (3)

Biological Science 214 Plant Taxonomy (4)

Total: 15 hours

#### JUNIOR

##### Fall Semester

307 Mammalogy or Elective (304)\*

311 Ichthyology or Elective (4)\*

Biological Science 202 Genetics or Biological Science 302 Evolution (3)

Statistics 150 Introduction to Probability and Statistics I (3)

English 161 Technical Writing (3)

Total: 16-17 hours

##### Winter Semester

333 Animal Population Dynamics and Management (3)

Biological Science 362 General Ecology (5)

Statistics 250 Introduction to Probability and Statistics II (3)

Agricultural Economics 333 Agricultural Law (3)

Entomology 204 General Entomology (3)\*

Total: 17 hours

#### SENIOR

##### Fall Semester

Physiology 201 Elements of Physiology or Biological Science 270 Physiological Zoology (5)

327 Principles of Wildlife Management or Elective (3)

Electives (7)

Total: 15 hours

##### Winter Semester

328 Fisheries Management or Elective (3)

353 Public Resource Policy (2)

391 Land Use Planning (2)

Electives (8)

Total: 15 hours

**Total hours required for degree: 125**

\*Three of the following are required:

150 Ornithology (3)

307 Mammalogy (3-4)

311 Ichthyology (4)

Entomology 204 General Entomology (3)

Biological Science 325 Herpetology (4)

\*\*One of the four is required:

FFW 322 Range and Wildlife Habitat Management (3)

FFW 323 Wildlife Management Techniques (3)

FFW 324 Limnology, (3-4)

FFW 328 Fisheries Management Techniques (3)

Student desiring to complete the educational requirements for certification as an associate wildlife biologist should complete *FFW 322* or *FFW 323* to have at least 6 hours in principles and practices of wildlife management.

## FACULTY

### ADMINISTRATION

**Roger L. Mitchell**, dean and professor, PhD, Iowa State University

**William F. Pfander**, associate dean and professor, PhD, University of Illinois

**Darryl P. Sanders**, associate dean and professor, PhD, Purdue University

**Kenneth L. Larson**, associate dean and professor, PhD, University of Wisconsin

**Samuel B. Shirky**, associate dean emeritus, MA, University of Missouri-Columbia

**Ray C. McClure**, counseling coordinator and assistant professor, MEd, University of Missouri-Columbia

**Roger L. Morrison**, placement director and instructor, MS, University of Illinois

**Kenneth C. Schneeberger**, assistant dean and professor, PhD, Oklahoma State University

**Charles E. Campbell**, assistant director and associate professor, EdD, Oklahoma State University

**James A. Reid**, administrative manager, BS, Missouri Valley College

### AGRICULTURAL ECONOMICS

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**Myron Bennett**, professor, MS, University of Missouri-Columbia

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**Kenneth B. Boggs**, professor, PhD, University of Wisconsin

**Curtis H. Braschler**, professor, PhD, Purdue University

**Maury E. Bredahl**, associate professor, PhD, University of Minnesota

**Harold F. Breimyer**, professor, PhD, American University

**Thomas G. Brown**, professor, PhD, North Carolina State University

**Charles L. Cramer**, professor, PhD, University of Missouri-Columbia

**Ervin Dauenhauer**, associate professor, MS, University of Missouri-Columbia

**Gary T. Devino**, professor, PhD, Cornell University

**David E. Ervin**, assistant professor, PhD, Oregon State University

**Robert M. Finley**, professor, PhD, University of Illinois

**Glenn Grimes**, professor, MS, University of Missouri-Columbia

**Joseph C. Headley**, professor, PhD, Purdue University

**Norlin Hein**, associate professor, PhD, University of Minnesota

**Victor E. Jacobs**, professor, PhD, Kansas State University

**Stanley R. Johnson**, professor, PhD, Texas A&M University

**Elmer R. Kiehl**, professor, PhD, Harvard University

**James B. Kliebenstein**, associate professor, PhD, University of Illinois

**John Kuehn**, associate professor, PhD, University of Missouri-Columbia

**William B. Kurtz**, professor, PhD, University of Arizona

**Stephen F. Matthews**, associate professor, PhD, JD, University-Columbia

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**James R. Oglesby**, assistant professor, PhD, University of Missouri-Columbia

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**C. Leroy Day**, professor, PhD, Iowa State University

**James R. Fischer**, associate professor, PhD, University of Missouri-Columbia

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**Charles Fulhage**, associate professor, PhD, University of Missouri-Columbia

**Albert Garcia III**, instructor, MS, San Jose State University

**Maurice R. Gebhardt**, professor, PhD, University of Missouri-Columbia

**Robert M. George**, professor, MS, University of Missouri-Columbia

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**J. Perry Gustafson**, associate professor, PhD, University of California

**Roger G. Hanson**, associate professor, PhD, University of Minnesota

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**Zane R. Helsel**, assistant professor, PhD, Iowa State University

**Luther B. Hughes**, associate professor, PhD, Purdue University

**C.J. Johannsen**, professor, PhD, Purdue University

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**Russell L. Larson**, associate professor, PhD, University of Illinois  
**Harry C. Minor**, associate professor, PhD, University of Illinois  
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**Gyorgy P. Redei**, professor, CSc, University Budapest (Hungary)  
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**Joe H. Scott**, associate professor, MS, Mississippi State University  
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**Wayne E. Loch**, assistant professor, PhD, University of Missouri-Columbia  
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**C.V. Ross**, professor, PhD, University of Illinois  
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**Barbara Cooper**, instructor, MA, Emporia State University  
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**Joanne Fredmeyer**, assistant professor, MS, University of Missouri-Columbia  
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**Harlan Lynn**, instructor, MA, University of Missouri-Columbia  
**Joseph J. Marks**, professor, MA, Michigan State University  
**Ray A. McClure**, assistant professor, MEd, University of Missouri-Columbia  
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**Maynard E. Anderson**, associate professor, PhD, University of Missouri-Columbia  
**Milton E. Bailey**, professor, PhD, Louisiana State University  
**Ruth E. Baldwin**, professor, PhD, University of Wisconsin  
**Owen J. Cotterill**, professor, PhD, The Ohio State University  
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**Gray S. Henderson**, associate professor, PhD, Cornell University  
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**E. Allen McGinnes Jr.**, professor, PhD, New York State College of Forestry  
**Kenneth E. Moore**, associate professor emeritus, MF, Yale University  
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**Andrew J. Nash**, professor, PhD, New York State College of Forestry  
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**James P. Pastoret**, associate professor, MWT, University of Michigan  
**Lee K. Paulsell**, professor, MS, University of Missouri-Columbia  
**R. Brooks Polk**, associate professor emeritus, MS, Montana State University

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**Einar W. Palm**, professor, PhD, North Dakota State University  
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**A.E. Gaus**, professor, PhD, University of Missouri-Columbia  
**V.N. Lambeth**, professor, PhD, University of Missouri-Columbia  
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**Gary G. Long**, associate professor, PhD, Michigan State University-East Lansing

**N.J. Natarella**, associate professor, PhD, Michigan State University-East Lansing  
**M.N. Rogers**, professor, PhD, Cornell University  
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**Daryl J. Hobbs**, professor, PhD, Iowa State University  
**John S. Holik**, associate professor, PhD, University of Missouri-Columbia  
**James R. Pinkerton**, associate professor, PhD, University of Wisconsin



# COLLEGE OF ARTS AND SCIENCE

The College of Arts and Science was established in 1841. It is the oldest and largest academic division in the University. It provides a wide range of high-quality undergraduate and graduate degree programs in humanities, arts, social sciences and sciences, while at the same time offering a solid foundation in basic studies for students in professional and specialized programs in other colleges.

The College of Arts and Science provides the broadest range of educational opportunities in the University in fine and performing arts, humanities, and natural and social sciences.

The College serves a variety of educational functions:

1. To prepare students with a broad, liberal education, one which exposes them to a variety of ways of approaching the world, its history, its present and its future.
2. To provide an education which will allow students to become more effective participating members of society.
3. To furnish within the framework of that education the opportunities for intellectual and social growth which come through close daily contact with faculty and other students.

4. To provide students with preprofessional education.

The Departments of Aerospace Studies (Air Force ROTC) and Military Science (Army ROTC) are in the College of Arts and Science.

The College offers the student a liberal education which is a foundation of study in many disciplines and is designed to enable the students to serve any of several roles in society—whether in business, government or social service—or to continue their education with advanced academic study. To these ends, the College encourages excellence in both teaching and scholarship among its faculty, seeks to provide traditional and innovative undergraduate curricula of the highest quality, and allows a flexibility in individual courses of study which enables its students to take the best possible advantage of the many resources at their disposal.

Many students who enroll in the College during their first two years at the University have not yet determined what their particular major field of study will be. The structure of the College is such that students need not commit themselves to any particular major until the

sophomore year. This allows students time to explore various possibilities, consider likes and dislikes and career and professional objectives.

## ADMISSION

The majority of UMC undergraduates are enrolled in the College of Arts and Science. Students who have met the admission requirements to the University of Missouri-Columbia may enroll in the College. Freshman and sophomore students comprise 64 percent of the College's total enrollment.

Students planning to enter the Colleges of Business and Public Administration or Veterinary Medicine or the Schools of Journalism, Law, Medicine or Nursing usually spend the first two or four years in the College of Arts and Science in preparation for professional training. Most students, realizing the increased necessity for a broad background in the liberal arts for all professions, earn an undergraduate degree in the College prior to enrolling in the Schools of Law or Medicine. Preprofessional study for veterinary medicine may be completed either in the College of Agriculture or the College of Arts and Science.

## CREDIT BY EXAMINATION

Students planning to enter the College as freshmen may apply to take advanced standing examinations in several subject matter fields. Those who pass the examinations with sufficiently high grades receive credit toward the bachelor's degree and may apply it toward fulfillment of specific requirements for graduation or toward admission to any of the professional schools on the Columbia campus except the School of Law. Although the School of Journalism accepts, as fulfillment of entrance requirements, credit by examination and advanced standing offered by some UMC departments for completion of advanced courses, no semester hours of credit are awarded toward admission or graduation.

Examinations accepted for advanced placement include (1) most of the University of Missouri's advanced placement examinations, and (2) some of the advanced placement examinations given by the College Entrance Examination Board of Princeton, N.J.

This program is designed exclusively for entering freshmen. Students who have completed any previous college work are not eligible.

The College of Arts and Science does not award credit for the successful completion of the College Level Entrance Program (CLEP) General Examinations. (The same policy exists in the College of Business and Public Administration and the School of Journalism.) However, the College does accept all of the CLEP subject matter examinations.

**University Examinations.** An application to take an advanced placement examination must be made before enrollment in the class. Applications normally are made to the departments indicated; however, during the summer preregistration period, examinations in those subjects followed by an asterisk can be taken at Counseling Services without formal application to the respective departments. In addition, the examination administered by Counseling Services may be taken anytime during the academic year.

**Anthropology:** Apply to the Department of Anthropology, 210 Switzer Hall, UMC, Columbia, Mo. 65211. Three credit hours may be earned in each of the following courses: 1 General Anthropology, 150 Introduction to Physical Anthropology, 152 Introduction to Archaeology, 153 Introduction to Cultural Anthropology, and 154 Introduction to Anthropological Linguistics.

**Biological Sciences:** Apply to the Division of Biological Sciences, 105 Tucker Hall, for an examination for five credit hours in 1 General Biology.\*

**Chemistry:** 11 General Chemistry, 5 hours.\*

**French:** Apply to the Department of Romance Languages, 27 Arts and Science Bldg., for an examination for three credit hours equivalent to the completion of 3 French Reading. Upon successful completion of this test, a student will be awarded 10 hours of advanced standing for French 1 and 2 in addition to the three hours indicated.

**Geography:** Apply to the Department of Geography, 8 Stewart Hall, for an examination for three credit hours in 1 Regions and Nations of the World 1.

**Geology:** Apply to the Department of Geology, 101 Geology Bldg., for an examination for five credit hours in 1 Principles of Geology.

**German:** Apply to the Department of Germanic and Slavic Studies, 448 General Classroom Bldg. Three credit hours may be earned in each of the following courses: 4 German Reading, 106 German Conversation and Composition 1, and 203 Advanced German Reading. Upon successful completion of one of these tests, a student will be awarded nine hours of advanced standing for German 1, 2 and 3 in addition to the three hours indicated.

**History:** Apply to the Department of History, 143 Arts and Science Bldg. Four credit hours may be earned in 1 Foundations of Western Civilization.\* and five credit hours may be earned in 20 American History.\*

**Italian:** Apply to the Department of Romance Languages, 27 Arts and Science Bldg., for an examination for three credit hours equivalent to the completion of 3 Italian Reading. Upon successful completion of this test, a student will be awarded 10 hours of advanced standing for Italian 1 and 2 in addition to the three hours indicated.

**Latin:** Apply to the Department of Classical Studies, 420 General Classroom Bldg., for an examination for three credit hours in 3 Latin Reading. Upon successful completion of this test, a student will be awarded 10 hours of advanced standing for Latin 1 and 2 in addition to the three hours indicated.

**Mathematics:** Apply to the Department of Mathematics, 202 Math Sciences Bldg. Three credit hours may be earned in each of the following courses: 10 College Algebra,\* 76 Plane Analytic Geometry,\* and 201 Calculus III. Five credit hours may be earned in 80 Analytic Geometry and Calculus I\*, and 175 Calculus II.

**Music:** Apply to the Department of Music, 140 Fine Arts Bldg., for credit for theory courses by examination and various applied music courses by audition.

**Political Science:** Apply to the Department of Political Science, 123 Middlebush Hall, for an examination for five credit hours in 1 American Government.\*

**Portuguese:** Apply to the Department of Romance Languages, 27 Arts and Science Bldg., for an examination for three credit hours equivalent to the completion of 3 Portuguese Reading. Upon successful completion of this test, a student will be awarded 10 hours of advanced standing for Portuguese 1 and 2 in addition to the three hours indicated.

**Psychology:** Apply to the Department of Psychology, 209 McAlester Hall, for an examination for three credit hours in 1 General Psychology.\*

**Russian:** Apply to the Department of Germanic and Slavic Studies, 448 General Classroom Bldg. Three credit hours may be earned in both 4 Russian Reading and 106 Russian Composition and Conversation. Upon successful completion of one of these two tests, a student will be awarded nine hours of advanced standing for Russian 1, 2 and 3 in addition to the three hours indicated.

**Spanish:** Apply to the Department of Romance Languages, 27 Arts and Science Bldg., for an examination for three credit hours equivalent to the completion of 3 Spanish Reading. Upon successful completion of this test, a student will be awarded 10 hours of advanced standing for Spanish 1 and 2 in addition to the three hours indicated.

**Statistics:** Apply to the Department of Statistics, 222 Math Science Bldg., for an examination for three credit hours for 31 Elementary Statistics.

\*Administered by the UMC Counseling Services during the summer preregistration period; no formal application necessary then.

**CEEB Examinations.** College Entrance Examination Board Advanced Placement Examinations in the following subjects have been approved as a basis for advanced credit at the University. Applications to take CEEB examinations, and inquiries about the material covered, should be addressed to College Board Advanced Placement Examinations, P.O. Box 592, Princeton, N.J.

The following examination subjects are for five credit hours: biology, calculus AB, chemistry, American history, European history, and physics. Calculus BC is for 10 credit hours.

**Credit by Examination Restrictions.** A student who has a record of enrollment in a course will not be eligible later for credit on the basis of an examination covering the same subject matter area, nor will a student who has received credit on the basis of an examination be eligible later for credit on the basis of either a course or a different examination covering the same subject.

Credit by examination will not be granted on the basis of a repeated examination.

## TRANSFER STUDENTS

The College of Arts and Science has an additional criterion to those established by the

UMC Faculty Council concerning the acceptance of credit from other institutions. The transfer of credit policy is explained in the Academic Regulations section of this catalog.

The additional Arts and Science criterion is the relationship of the GPA (grade point average) to maximum number of hours accepted for each semester transferred:

GPA Below	2.5	16 hours a semester
GPA Between	2.5-3.0	17 hours a semester
GPA Between	3.0-3.5	18 hours a semester
GPA Above	3.5	19 hours a semester

## STUDENT SERVICES

### ADVISING

Students who have declared a major area of study are assigned an adviser by the academic department chairperson.

Freshmen who have not yet decided on a field of study are assigned to special advisers in the dean's office, 210 Jesse Hall, and to special faculty advisers.

All Arts and Science degree candidates must declare a major area of study during the second semester of the sophomore year. This regulation is not applicable to candidates for admission to the Schools of Law and Medicine who have a GPA of at least 2.0 or to students enrolled only on a part-time basis.

### PLACEMENT

Specialized placement services are provided at the Career Planning and Placement Center for students enrolled in the College of Arts and Science. The CPPC is described in the General Information section of this catalog.

### STUDENT ORGANIZATIONS

The Arts and Science Student Government provides services and academic advocacy programs for Arts and Science students. Services include a speakers program, film series, a faculty lecture program, a public forum series, finals week study hall, subsidies to the Art and Archaeology Museum, joint programs with the Honors College and the CPPC, and Arts and Science Week. The *Arts and Science Newsletter* keeps students informed on what is happening in Arts and Science. Other publications are distributed to new students during Summer Orientation.

Advocacy activities include appointing Arts and Science students to student/faculty committees; proposing curriculum and regulation changes designed to improve the teaching assistant and undergraduate advising programs; and working with Academic Council, MSA and other campus groups to improve campus academic environment.

Students interested in representing Arts and Science students in the Legislative Council should present a petition with the signatures of 10 Arts and Science students to the Council. The government office is at 604 Kuhlman Court. Further information may be obtained by calling (314) 882-7767.

Most of the Arts and Science organizations are honoraries sponsored by the various departments. The chief honorary which students are selected to in the senior year is Phi Beta Kappa. Information concerning this fraternity is available in the dean's office, 210 Jesse Hall.

## SCHOLARSHIPS IN THE COLLEGE OF ARTS AND SCIENCE

Recipients of all scholarships are selected by the departments' scholarship committee.

**Horace Allen and Ruth Melcher Allen Scholarship:** Family and friends of the late H.E. Allen, MD, established an endowment to provide an annual scholarship in music for an undergraduate or graduate student of wind instruments, strings or piano. Selection is based on high scholastic ability, character and contribution to the activities of the music department. It was established in recognition of Dr. Allen's lifetime interest and participation in music activities at UMC.

**Applied Music Scholarships:** Thirty scholarships, each carrying a stipend equal to applied music fees for a semester, are available. Need, as well as musical talent, is an important consideration. Established by the Board of Curators and awarded on recommendation of the music department.

**Jan Blankenship Memorial Scholarship in Piano:** Endowment established by family and friends of the deceased provides an annual scholarship for a piano major in the music department. Selection is made by music faculty.

**Philip L. Blazer Memorial Scholarship:** Endowment income is awarded annually to a student in Arts and Science or the School of Journalism. Recipient must be a Missouri resident, a worthy graduate of a Missouri high school, with outstanding scholarship, and in need of financial assistance. Available to an entering freshman; renewable for three additional years of undergraduate study as long as recipient meets qualifications and high standards. For applications, contact the Honors College, 612 Kuhlman Court, UMC, Columbia, Mo. 65211.

**William L. Bradshaw Memorial Scholarship:** Family and friends of W.L. Bradshaw, former professor of political science and former dean of the College of Business and Public Administration, established an endowment in his memory. The fund's income provides scholarships for juniors who have an interest in some aspect of state, county or municipal government. Stipends range from \$300 to \$600. Recipients shall be Missouri residents; selection is based on academic excellence (GPA 3.4 or better), and recipients are recommended by a committee of the staff of the Department of Political Science.

**Rhodes Clay Scholarship:** Stipend awarded to a freshman on basis of scholarship, deportment and general worthiness, including moral character and physical constitution. Recipient must spend following year pursuing work at UMC. Established by Green Clay in memory of his son. For applications, contact the Honors College, 612 Kuhlman Court.

**Columbia Art League Scholarship:** Awarded by the Columbia Art League to a graduate or undergraduate student recommended by the Department of Art. Final selection is made by UMC Scholarship Committee.

**Hardin Craig Scholarship in English Literature:** Established in memory of Professor Craig, this scholarship is for students majoring in English literature.

**Curators Scholars in Music:** Scholars receive a waiver of the incidental fee for two semesters. Awarded to undergraduates majoring in music or participating in musical activities. Recipients recommended by music department faculty on the basis of musical ability, scholastic standing and financial need. All applicants audition.

**Curators Scholars in Orchestra:** Eighteen scholars receive a waiver of incidental fees for two semesters. Selection is by application and audition based on talent and performance and on music department recommendations. Students selected for University Concert Orchestra are eligible to apply.

**Curators Scholars in Speech and Dramatic Art:** Nine scholars receive a waiver of the incidental fee for two semesters. Undergraduates recommended by the speech and dramatic art department faculty on the basis of scholastic excellence, financial need and forensic ability as demonstrated through participation in high school or university activities.

**Michael Deppe Phi Mu Alpha Memorial Scholarship:** An award will be made to a music major in the area of performance, music history, theory, composition or education for outstanding service to the Department of Music. The recipient must be an undergraduate of at least sophomore standing with a grade point average of 2.50 or higher. Selection is made by a committee.

**Development Scholarships in Band and Orchestra:** The Development and Alumni office offers several yearly scholarships to encourage talented students to participate in the band and orchestra. Recipients and amount of stipend are recommended by the music department. Apply to the Scholarship Committee, Department of Music.

**Freshman Prose Prizes:** A first and second prize offered for the best English papers, of whatever character, submitted

as regular assignments by any student enrolled in the freshman course in composition.

**Geology Scholarship Awards:** Established by the Department of Geology, royalties from the sale of the *Geology Laboratory Manual* provide awards for scholarship excellence to students selected by the department; achievement and character also considered.

**William B. Ittner Sr. Fine Arts Prize:** Awarded for most meritorious work in music or art. Established by Ittner, a fellow of the American Institute of Architects of St. Louis.

**Eldon L. Jones Memorial Award:** Stipend given on recommendation of music department. Jones was known for assisting other students, conducting musical groups and making musical arrangements. Award established by former students associated with him at UMC.

**W. Alton Jones Memorial Scholarship:** Endowment established by Nettie Marie Jones in memory of her husband. Awarded annually to an unmarried freshman or sophomore selected on the basis of scholastic excellence, high moral character, financial need and an interest in the arts and humanities. Those training to be teachers in these fields are considered qualified applicants. For applications, contact the Honors College, 612 Kuhlman Court.

**Harvey A. Kantor Memorial Scholarship:** For undergraduate students majoring in American history. Recommended by history department chairman. Established through contributions from various donors.

**Michael A. Kinney Scholarship Fund:** A gift from the many friends of Kinney, known as the dean of Missouri's Senate, in recognition of his long years of service in the Missouri legislature; provides scholarships for worthy students in political science.

**Paulina Kuntz Music Award:** Two equal awards consisting of books, parchment or cash given to a man and a woman, candidates for degrees in music, who during the year have done exceptional work in the field of original musical composition. Established by Harriet C. Hulick in memory of Kuntz.

**Mahan Prizes:** Established by George A. Mahan in memory of his wife, Ida B. Mahan. First and second prizes are offered in each of three divisions (original short stories, non-fiction articles, and original poetry) for work written and submitted by any resident student.

**Paul and Gertrude Mathews Scholarship in Music Education:** Funds established by the will of Paul W. Mathews, former UMC music professor, provides a scholarship for a junior, senior or graduate student majoring in music education. Recipient shall possess outstanding teaching potential and after graduation teach music education in a public or private school or college for at least two years. Recipients recommended by music department to the Scholarship Committee on Aids and Awards.

**McAnally Medal:** Awarded annually for the best essay submitted as a regular assignment by any resident student enrolled in an upperclass course in English. Established by David R. McAnally Jr.

**Mary Margaret McCarty Scholarship:** Endowment fund income provides stipends for students studying biology. Recipients selected on basis of both academic standing and financial need. Recommendations made by biological sciences division.

**Fred McKinney Family Scholarship:** Trust fund income provides stipends for students selected by a committee in the Department of Psychology.

**Missouri Federation of Women's Clubs, Pearl Boucher Mathews Scholarship in Music:** An annual scholarship, preferably for a junior or senior who is a serious student of music or who would make a contribution to the music world through performance, composition, or teaching. Scholarship named for a past president of donor organization.

**James G. Mitchell Memorial Fund in Geology:** Awarded every year to a junior in geology. Based on academic excellence without regard to financial need. Established by the widow and friends of Mitchell.

**Ernest J. Palmer Memorial Scholarship Fund:** Scholarships available annually from an endowment established by Mrs. Elizabeth MacDougall Palmer, E. MacDougall Palmer, Grace E. Palmer, and Theodore W. Palmer in memory of the husband and father of the donors. Recipients recommended by the Department of Geology and Biological Sciences Division from among graduate or undergraduate students interested in paleontology and systematic botany who need financial help to complete their studies. Recipients are encouraged to spend some time in cataloging and caring for the collections of rocks and minerals donated to UMC by the family.

**Pi Mu Epsilon Awards in Mathematics:** Awards for excellence in mathematics given annually to a member of the junior class and senior class majoring in mathematics who, in the judgment of the officers of Pi Mu Epsilon and the

mathematics staff, have demonstrated exceptional ability and accomplishment in mathematics.

**Sibyl Pommer Poetry Award:** Income from an endowment in Pommer's will provides an annual award to a student of worthy character who does the best work in versification during the freshman year.

**William and Stella Pommer Scholarships:** Annual income from an endowment in Sibyl Pommer's will provides a scholarship for a student in music enrolled in the first two years at UMC. Established in memory of her parents—William Pommer had been a music professor at UMC.

**James S. Rollins Scholarships:** Two scholarships awarded annually in recognition of merit and character to students in various UMC divisions; two are awarded to juniors in the College of Arts and Science. Established by Rollins.

**James E. Schaperkotter Memorial Scholarship in Political Science:** Awarded during the second semester of the school year to a junior or senior majoring in political science with the intent to pursue the study of law. Academic excellence and not financial need is the criterion for selection. Recipient is selected by a committee composed of the law school dean, political science department chairman, and student financial aids director. Parents and friends established the scholarship in memory of Schaperkotter.

**Walter V. Scholes History Scholarship:** Awarded to a graduate student who passes the PhD comprehensive examinations and shows a high degree of scholarly ability. Recommended by Department of History Scholarship Committee. Established through contributions from various donors.

**Herbert W. Schooling Scholarship in Art History and Archaeology:** An endowment established by friends and other donors. The income provides an award to students enrolled in the Department of Art History and Archaeology. Only outstanding students with a strong commitment to the field of art history or classical archaeology will be considered. Recommended by the department.

**Robert J. Schwegman University Singers Scholarship:** Gift income provides stipends for students in University Singers who are worthy in character, have financial need, and show good intentions of remaining members of the Singers. Selection is made by its director.

**Sigma Alpha Iota Scholarship:** Established by St. Louis alumnae of Sigma Alpha Iota. Awarded on the basis of ability, talent and financial need to a female student member of the Iota Lambda Chapter.

**Weldon H. "Pete" Steiner Memorial Scholarship:** Family members and friends established an endowment in memory of Steiner. The income will provide scholarships for entering freshmen from Van-Far R-I High School in Vandalia, Mo., who have demonstrated scholarship and leadership during high school. Preference shall be given to students entering the College of Arts and Science with a major in journalism. If there is not a qualified journalism student, then preference given to music student. If no qualified music student, then any qualified student from Van-Far R-I. Renewable each year.

**Frank and Louise I. Stephens History Scholarship and Fellowship Fund:** The wills of Dr. and Mrs. Stephens established an endowment providing scholarships and fellowships for outstanding students in history on the graduate level. Dr. Stephens was a former arts and science dean and professor of history.

**O.M. Stewart Prize:** Available annually to a senior majoring in physics whose grades and personal excellence meet standards which the O.M. Stewart Fund Committee considers outstanding.

**O.M. Stewart Scholarships:** Stipends awarded to undergraduates majoring or intending to major or minor in physics. Apply to the chairman of the physics department. Established by the will of Stewart, a physics professor at UMC from 1901 to 1944.

**W.A. Tarr Memorial Scholarship in Geology:** An endowment was established by the estate of Dr. Tarr in his memory, recognizing his many years as a UMC geology professor. The fund's income provides an annual stipend for an outstanding student in mineralogy or economic geology as recommended by the geology department staff.

**Norman Maclaren Trenholme History Scholarship:** The will of Louise I. Stephens provides scholarships for juniors, seniors or graduate history students chosen by a committee from the history department appointed by the chairman.

**Ella Ferguson Turner Memorial Piano Scholarship:** The income from an endowment provides scholarships for students studying piano in the Department of Music. Recommended by a committee of that department.

**University Band Scholarships:** Stipend awarded each member of the University band who participates in the program throughout the year. Members chosen by audition and may or may not be enrolled for credit in Music 41,



University Concert Band. The band organization serves athletic, military and concert functions. Scholarships established by the Board of Curators.

**University Essay Prizes:** A first and a second prize offered for the best original essays written and submitted by any resident student.

**University Singers Voice Scholarship:** Members of the staff and others interested in vocal music contribute to a fund to provide scholarships from time to time for students participating in vocal music. Apply to the Department of Music.

**Jonas and Ruth H. Viles Memorial Scholarship:** Given to a graduate student in the field of American history who, by achievement, promise, character and interest in scholarly endeavor, has proved worthy. Established by a gift of Philip H. Viles in memory of his parents. His father was a former history department chairman.

**Jonas Viles Jr. Scholarships:** Stipend awarded to a graduate student chosen by the biological sciences division for study at the Maine Biological Laboratory or some similar institution. Established by Dr. and Mrs. Viles in memory of their son.

**J.G. Heinberg Award:** Established by family and friends of Heinberg, a former political science professor, to be given to an undergraduate or graduate student of political theory. Scholarship of approximately \$750 usually awarded for excellence (GPA 3.4 or better).

**Winterton Conway Curtis Scholarship:** Awarded to students majoring in biological sciences.

**Maurice G. Mehl Scholarship:** Awarded each spring to a student majoring in geology.

**A.P. Green Scholarship:** Awarded each spring to a student majoring in geology.

**E.B. Branson Memorial Fund:** A scholarship is awarded each spring to a student majoring in geology.

**R.G. Peck Prize:** A scholarship is awarded periodically to a student majoring in geology.

**Friedel C. Maasdorf Foreign Language Education Scholarship:** A scholarship is awarded each spring to a student (at least junior standing) pursuing an undergraduate degree which will lead to a career to foreign language education.

**Elsa Nagel Memorial Fund:** A scholarship is awarded each spring to an undergraduate majoring in German or Russian.

**T.A. Brady Scholarship in Ancient History:** A scholarship is awarded each spring to a history student with special consideration given to students specializing in ancient history.

**J.C. Rainbolt Scholarship:** A scholarship is awarded each spring to a doctoral candidate specializing in history.

**A.C. White Jr. Fellowship:** A scholarship is awarded each spring to a graduate student specializing in history.

**L.E. Atherton Research Fund:** A scholarship is awarded each spring to a graduate student specializing in history.

**A.F. Yanders Arts and Science Scholarship:** A scholarship is awarded each fall to a junior in Arts and Science. Application materials available at 612 Kuhlman Court.

**J. Warsaw Scholarship in Spanish:** A scholarship is awarded each spring to a junior or senior specializing in Spanish.

**Friends of Music Scholarship:** Scholarships averaging \$800 are awarded each year through contributions provided by the Friends of Music.

**L. Milgram Band Scholarship:** Annual awards averaging \$400 are awarded each year to participants in the band program.

## SPECIAL PROGRAMS

### GENERAL STUDIES

**420 General Classroom Bldg., (314) 882-6060**

The General Studies degree program gives students a large amount of freedom, flexibility and accountability in designing educational programs to meet needs not met by traditional departmental programs. A student admitted to the College of General Studies must have selected a team of two or three faculty advisers. Students and their advisers plan a program consisting of a minimum of 120 hours of courses. Upon completion of the program students are awarded a bachelor of general studies degree. Each degree is tailored to fit each student's needs and interests. Students are encouraged to explore a wide variety of courses (chosen from any department or college) while,

at the same time, satisfying their own educational goals.

The qualifications for admission to the program are a high degree of educational motivation and independence and a set of educational goals which cannot be reached in some regular University program. The College of General Studies is interested in adults returning to school and students with specific but unusual interests. To gain admission to the program, a student must have at least one semester of regular college work or its equivalent. To apply for admission to the program, students present a personal statement of their educational goals and a transcript of previous college work to a selection committee which reviews them for evidence of individual initiative, responsible maturity and self-direction.

### THE HONORS COLLEGE

**612 Kuhlman Court, (314) 882-3893**

All students with a cumulative GPA of 3.3 and above are automatically eligible for Honors courses and sections. In addition, students whose cumulative GPA falls between 3.0 and 3.29 may petition into an Honors course, section, or degree program by presenting a current transcript to the Honors College for evaluation. Freshmen who enter the University as National Merit/National Achievement, Curators or Huggins Undergraduate Scholars are automatically eligible to enroll in Honors courses or sections during their first semester. Other freshmen are eligible if they ranked in the upper 15 percent of their high school classes and scored in the upper 15 percent on the Freshman Placement Tests.

Honors courses fall into three categories: (1) General Honors, (2) Honors sections of basic courses (History 20GH is the Honors section of History 20), and (3) departmental Honors courses designed primarily for students planning to graduate with Honors in their major.

Honors courses and Honors sections of multisectioned courses are listed at the conclusion of the *Schedule of Courses* under the heading of the department offering the course. The Honors College courses are listed under the heading "General Honors." They include a humanities program (GH 101-104) which provides a unified introduction to western cultural and intellectual history from ancient to contemporary times; discussion groups, colloquia and seminars at various levels (GH 35, 50, and 100); independent readings and independent study (GH 25 and 125); and credit for assisting a professor in research (GH 150).

Exceptional circumstances will allow a student to apply some credit earned at other institutions during the final 60 hours to the record which will be evaluated for Honors designations; in these cases, the grade point requirements noted above will be enforced both with reference to work done elsewhere and with reference to work done at UMC.

**The General Honors Certificate.** Honors students can earn a general Honors certificate by participating in the General Honors program. The certificate requires a minimum of 20 hours in Honors courses. Of the 20 credit hours necessary, no more than six hours of General Honors electives (50GH or 100GH) and/or departmental Honors courses in work toward a departmental Honors degree may be counted

toward a certificate.

Any Honors student may apply for a General Honors certificate. Successful completion of the requirements is accompanied by both a certificate and formal notation on the transcript.

**Graduation with Honors.** A student who has completed the last 60 semester hours at UMC may graduate with Honors with the following minimum grade point averages; 3.7, cum laude; 3.8, magna cum laude; and 3.9, summa cum laude. The cumulative GPA necessary for these designations is subject to change, however, since the number of students qualifying for each designation is limited to a certain percentage of the graduating class.

## DUAL DEGREES

### LAW OR MEDICINE

The College has a special dual degree program with the Schools of Law and Medicine. To enroll in these programs, the student must have completed all of the specific course requirements for the bachelor of arts degree prior to admission to one of these professional schools and also must have completed the junior year in residence in the College of Arts and Science at UMC.

### OTHER DUAL ENROLLMENTS

An increasing number of candidates enrolled in undergraduate professional schools enhance their career opportunities by qualifying for both a professional school degree and a bachelor of arts degree.

In order to receive two baccalaureate degrees, a student must complete a minimum of 132 semester hours and complete all of the specific requirements for both degrees. Normally, a minimum of one additional semester is required for both degrees. Each candidate for a dual degree is assigned an adviser in the particular professional school and in the department of major interest in the College. A candidate in the dual enrollment program in the College of Arts and Science and in the College of Engineering should note that if the area of concentration in arts and science is centered in a department other than chemistry, mathematics or physics, additional hours may be required to obtain both degrees.

**Graduate School.** A final-semester senior who needs fewer than 15 hours for completion of the baccalaureate degree and who ranks in the upper half of the class may dually enroll in the College of Arts and Science and the Graduate School with permission of the deans of both divisions. This enables the student to complete some graduate course work prior to receiving the baccalaureate degree. Application forms for dual enrollment in these two schools may be obtained from the Graduate School dean in 205 Jesse Hall.

**Teaching Certificate.** A student who plans to receive a degree from the College of Arts and Science and who also wishes to receive a teaching certificate awarded by the Missouri Department of Elementary and Secondary Education, is required to complete 25-26 hours of secondary professional education requirements for the College of Education in addition to completing the requirements for the degree in the College of Arts and Science.

Students should consult the College of Education section of this catalog for information regarding its admission policy and specific requirements for general education courses, preprofessional, area of specialization and professional course work.

Prior to enrollment in any professional education course, students must formally apply for admission to the program.

## PREPROFESSIONAL STUDY

### PRELAW

The prelaw program is designed for students planning to enter law school. Students who have not been through a prelaw program, however, are not precluded from making application to law school. Prelaw students are encouraged to consider and prepare for alternative careers based on their personal interests and abilities, should circumstances prevent them from pursuing a legal education. The prelaw program is designed to provide maximum opportunity for preparation of skills determined to be necessary for success in law school.

Students entering law school must have completed at least 90 hours in residence of approved college work acceptable for a baccalaureate degree, must present a grade point average meeting the existing law school requirements, and must have received a satisfactory score on the Law School Admissions Test, which should be taken in the fall semester of the last undergraduate year. When there are more qualified applicants than places to be filled, only the best qualified applicants are accepted for admission to law school.

Admission to the UMC School of Law is based on the criteria given above regardless of the applicant's enrollment in a prelaw, dual-degree or other area of concentration. Applicants from other schools, colleges and universities are given equal consideration.

Students entering without a baccalaureate degree must receive an undergraduate degree before or concurrently with graduation from law school.

The following courses may not be used to satisfy the 90-hour admission requirement: correspondence courses, non-theory courses in ROTC, hygiene, domestic arts, physical education, vocal and instrumental music, practice teaching, teaching methods and techniques, and similar non-theory courses.

Prelaw students should particularly emphasize English and other courses which require written papers. Facility of expression is prerequisite to successful work in law schools. A course in logic also is highly recommended.

Prelaw students should be aware that a baccalaureate degree is required for admission to some law schools, and a few states (but not Missouri) do not recognize the dual degree program for bar admission purposes.

Prelaw students are invited to discuss any problems as to prelaw programs of study or admission and pick up the *School of Law Catalog* and application forms for the Law School Admissions Test in 14 Tate Hall.

The program of study outlined below is a suggested guide to students planning to become candidates for dual degrees in the College of

Arts and Science and the School of Law. Students who complete their freshman or sophomore or both years at another institution should plan their programs of study accordingly. In order to avoid having to spend additional time to complete the requirements for the undergraduate degree, candidates for dual degrees must restrict their enrollment to only those courses that fulfill specific requirements for the bachelor of arts degree.

### FRESHMAN YEAR

#### First Semester 12-16 hours

English Composition or Elective (3)

Foreign Language (3-5)

American Government or American History (3-5)

Humanistic or Social Studies (3)

#### Second Semester 14-16 hours

Foreign Language (3-5)

Science (5)

Humanistic or Social Studies or English Composition (6)

### SOPHOMORE YEAR

#### First Semester 16 hours

Foreign Language (3)

Science (5)

Economics (5)

Elementary Accounting\*\* (3)

#### Second Semester 15-16 hours

Exposition (3)

Elementary Accounting\*\* (3)

Science, Mathematics or Foreign Language (3)

Humanistic or Social Studies (2-3)

Area of Concentration Courses\* (4)

### JUNIOR YEAR

#### First Semester 16 hours

Upperclass Humanistic or Social Studies (3)

Area of Concentration Courses\* (13)

#### Second Semester 16 hours

Upperclass Humanistic or Social Studies (3)

Area of Concentration Courses\* (13)

\*At least 20 hours must be upperclass courses.

\*\*Optional, but recommended.

### PREMEDICAL

Medical schools recognize the value of general education. Premedical students may choose to center the area of concentration in any department, provided they also fulfill admission requirements for medical schools. A specific area of concentration in the natural sciences should be chosen only because of interest. Those who concentrate in the sciences are strongly encouraged to elect additional courses in the humanistic studies and social sciences.

Students planning to study medicine should be aware of the competition involved in gaining admission and, consequently, should plan to apply to several institutions. The book *Medical School Admission Requirements*, published yearly by the Association of American Medical Colleges, gives concise information concerning premedical curricula planning, medical training, and internship and residency training. In addition, it describes educational programs and admission requirements at each medical school. Those interested in the medical areas also should keep alternate careers in mind. Among these are medical social work, medical education, hospital administration, health administration, sanitary engineering, nursing, dentistry, pharmacy, clinical psychology, medical technology, physical therapy and graduate work in the various biological and physical sciences. Also, programs have been established for some years to train physician's assistants.

Credits required for admission to medical school are: English composition and literature, two semesters; general zoology or biology (including laboratory), one semester; additional

biological sciences work—may include comparative anatomy, embryology, or genetics—two semesters; mathematics (algebra, calculus, statistics, or trigonometry), two semesters; general physics, two semesters; inorganic chemistry (including laboratory), two semesters; and organic chemistry (including laboratory), two semesters.

Questions concerning required admission credits should be directed to the School of Medicine. To the extent possible, the Pre-Med Club will serve as an important communication link between interested undergraduates and the School of Medicine.

As explained under the dual degree programs for the AB degree, there is an arrangement between the School of Medicine and the College of Arts and Science which permits students who have completed all specific requirements in three years in the College to receive a bachelor of arts degree after completing the first year of medicine. This arrangement applies only to students who complete the junior year in the College of Arts and Science and who attend the School of Medicine at UMC. Pre-medical students who wish to take advantage of this special degree program must plan their programs of study carefully in order to complete all of the requirements for the AB degree within three years. In planning to undertake such a three-year program, potential applicants should understand that acceptance prior to the senior year is extremely competitive.

There are health professions advisers in the dean's office and in the Biological Sciences Division and the Departments of Chemistry and Physics.

### PREPROFESSIONAL STUDY FOR VETERINARY MEDICINE

A minimum of two years of preprofessional study is required before a student may be admitted to the professional program leading to the doctor of veterinary medicine degree in the College of Veterinary Medicine. Preprofessional requirements may be completed at any accredited college or university where the course work is offered.

Students interested in completing the preprofessional requirements at UMC should address inquiries to the Office of Admissions, 130 Jesse Hall, UMC, Columbia, Mo. 65211.

Students must complete at least 64 semester hours of college work by the end of the winter semester (spring quarter) of the year in which admission is sought. However, the average semester hours presented usually is over 100. Students admitted with only two years of preprofessional work are usually those with exceptionally good scholastic achievement records and aptitude scores.

Students should incorporate the preprofessional curriculum into a degree program other than veterinary medicine, since only a limited number of applicants can be admitted into the College of Veterinary Medicine.

The following courses and credit hours must be taken in residence at an accredited institution of higher learning to qualify for admission to the College of Veterinary Medicine. The UMC courses listed fulfill the requirements. Equivalent courses at other accredited colleges or universities are accepted. If a student has

credit by examination, a more advanced course in the same discipline must be taken. No credit is awarded for CLEP General Examinations. Courses taken on the satisfactory/unsatisfactory grading system are not counted for admission to the College of Veterinary Medicine.

**English or Communication: 6 hours**

English I Composition; 50 Creative Writing; 60 Exposition; 65 GH Honors Exposition; 70 Creative Writing; 161 Technical Writing or more advanced courses.

Speech and Dramatic Art 75 Introduction to Speech Communication or more advanced courses.

**Mathematics: 3 hours**

Math 10 College Algebra or more advanced courses.

**Inorganic Chemistry: 8 hours**

Chemistry 11 General Chemistry; 12 General Chemistry or more advanced courses.

**Organic Chemistry: 8 hours**

Chemistry 210 Organic Chemistry; 211 Organic Chemistry Laboratory; 212 Organic Chemistry or more advanced courses. Biochemistry cannot be substituted for organic chemistry.

**Physics: 5 hours**

Physics 11 Elementary College Physics or more advanced courses.

**Biological Science: 10 hours**

Biological Sciences 11 Introductory Zoology and 12 General Botany or more advanced courses or 21 General Biology and 22 General Biology or more advanced courses. Required Biological Science courses must be taken in either the area of biology or zoology.

**Social Science and/or Humanistic Studies: 10 hours**

Can include courses from history, economics, political science, geography (except those in cartography, meteorology and climatology), fine arts, classical and foreign languages, literature, mythology and philosophy.

**Animal Science: 5 hours\***

Dairy Science 12 Poultry Science 12 or Animal Science 12 or more advanced courses.

**Animal Nutrition: 3 hours\***

Principles of Animal Nutrition 202 or more advanced courses.

**Electives: 6 hours**

May be taken in any area. Students, again, are encouraged to pursue a degree program.

**Total: 64 hours**

For additional information concerning admission guidelines and application procedures, contact the Assistant Dean and Student and Alumni Affairs, W203 Veterinary Medicine, UMC, Columbia, Mo. 65211.

## OTHER PREPROFESSIONAL PROGRAMS

Students planning to enroll in other professional programs not available at UMC frequently complete their requirements for admission to the professional school of their choice in the College of Arts and Science. Among the preprofessional students enrolled in the college are those who are planning to study dentistry, pharmacy, optometry, osteopathy, theology and mortuary science. Students completing preprofessional requirements in the College should obtain a catalog from the professional school of their choice to insure completion of all admission requirements.

## PROFESSIONAL OPPORTUNITIES

Because employment opportunities in the various disciplines of the liberal arts vary greatly, it is impossible to enumerate these opportunities within the confines of this catalog. Most departments in the College have printed information available describing employment opportunities. The Career Planning and Placement Center helps students determine career plans and assists college graduates with job placement.

## SUMMARY OF REQUIREMENTS FOR BACHELOR OF ARTS DEGREE

(Effective for freshmen entering college May 1, 1983)

- I. Must be regularly admitted to the college.
- II. **Hours and Points:** 120 hours passed with an overall average grade of at least C. Last 60 hours must be completed with grade point average of at least 2.0.
- III. **Residence:** Last 30 hours, including at least 12 hours in the area of concentration in residence.
- IV. **200-Level Requirement:** 30 hours in courses numbered 200 or above, including courses in the area of concentration.
- V. **Basic Skills:\***

a. **ENGLISH COMPOSITION**

(3 to 6 hours)

English 1 (if required on basis of English placement test) and English 60; English 60 only, if exempted from English 1 on basis of placement test; OR English 65GH, if eligible for Honors Exposition.

b. **MATHEMATICS**

2½ units of mathematics in high school (including 1½ units of algebra and excluding general mathematics); demonstration of proficiency by examination; OR satisfactory completion of a course in college algebra.

c. **FOREIGN LANGUAGE:**

1. Attainment of proficiency equivalent to the completion of at least 12 hours of college-level work in a single language;
2. Four units of high school credit in a single language;
3. Satisfactory completion of appropriate examinations in foreign language departments.

\*N.B. Courses used to fulfill basic skills requirements may not be used also to fulfill General Education requirements.

VI. **General Education Requirements:\***

- a. Biological, physical and mathematical sciences: 9 hours, including at least one course with laboratory. At least two of the three areas must be represented.
- b. Behavioral sciences: 5 or 6 hours in anthropology, theoretical courses in linguistics, psychology and/or sociology.
- c. Social sciences: 9 hours taken in at least two of the following fields: history, economics, political science, or geography.
- d. Humanities and Fine Arts: 12 hours in no fewer than three of the following areas: appreciation of art and music; foreign civilizations, literature and linguistics; courses concerned with the history of public speaking, the theater, or broadcasting; philosophy; upperclass courses in the creative and performing arts; the humanities sequence—101, 102, 103 and 104; religious studies.

A further note: A candidate must pass a minimum of three courses numbered 100 or above, distributed among at least two of the four areas described above.

\*N.B. Courses used as partial fulfillment of general education requirements may not be used in the area of concentration. Additionally, courses used to fulfill these requirements may not be selected from the departments in which the student's area of concentration is centered.

VII. **State Requirement:** At least one course in American history or American government.

VIII. **Area of Concentration:** A program of related courses consisting of 32 hours or more with at least eight hours outside major department, and including a minimum of 20 hours of upperclass course work completed with grades of A, B or C. At least 12 hours of upperclass course work appearing on the area must be completed in residence at UMC in the department in which the area is centered. Upperclass courses completed with grades of D may not be included in the area of concentration without the approval of the adviser and the dean. A cumulative grade point average of 2.0 must be earned in all course work attempted in the major field.

IX. **Scholastic Standing:** At the time of graduation, all candidates must be in good scholastic standing.

## REQUIREMENTS FOR GRADUATION

(For first time Freshmen admitted prior to May 1, 1983)

### BACHELOR OF ARTS

In order to receive the bachelor of arts degree, a candidate must complete the following requirements. General Honors courses numbered 100, which vary in subject matter, usually may be applied toward fulfillment of these requirements.

I. **Admission**

A candidate must have been regularly admitted to the College.

II. **Hours and Grade Points**

A candidate must pass 120 semester hours of credit with an overall average grade of C. Courses completed at UMC with a grade of D may not be counted toward graduation unless balanced by A or B grades earned in residence at UMC. A student dually enrolled in the College and in either the School of Medicine or the School of Law may not apply D grades in professional school course work toward the degree.

A candidate must pass a minimum of 30 hours in upperclass courses accepted for credit in the College of Arts and Science, excluding advanced ROTC courses. At least three of the upperclass courses must be distributed among at least two of three fields: (1) behavioral sciences, (2) social sciences, (3) humanistic studies and fine arts. At least 20 of the upperclass hours completed with a grade of C or higher, must be in the area of concentration. The last two semesters, which must include at

least 12 hours in the area of concentration, must be completed in residence at UMC.

With the exception of courses used to complete the basic skills requirements, no more than 40 hours from any one department may be presented for a degree.

The last 60 hours of course work presented for the degree must be completed with a grade point average of at least 2.0. Grades attained in courses not applicable toward the degree are not incorporated within the grade point average, even though such grades are recorded on the official grade report of each student.

**Time Limitation on Degree Credit.** A student whose education has been interrupted for more than one semester may not count toward graduation credit earned eight years prior to the resumption of progress toward the degree.

### III. Basic Skills

Course requirements in the following basic skills are determined for each student either on the basis of the level of attainment in proficiency tests given at the beginning of the freshman year or by the number of high school units in particular fields presented for admission. Courses used to fulfill basic skills requirements may not be used for the student's area of concentration.

**English Composition.** Entering freshmen who score in the lowest range on the Missouri College English Test, a freshman placement examination, are required to pass English 1 Composition in the freshman year and also English 60 Exposition in the sophomore or junior year. Students scoring in the middle range will be required to pass English 60 Exposition in the sophomore or junior year. Those scoring in the upper range may fulfill requirements by passing English 65 GH Honors Exposition.

Transfer students who receive credit for six or more hours of freshman composition are not subject to any additional basic skills requirement in English composition.

**Mathematics.** A student may satisfy the requirement in mathematics by:

1. Presenting 2½ high school units in mathematics, including 1½ units of algebra and excluding general mathematics.
2. Demonstrating proficiency in mathematics by examination.
3. Passing the equivalent of a course in college-level algebra—i.e., at UMC, Mathematics 10 College Algebra; 12 Basic Concepts of Modern Mathematics; 14 Algebra and Trigonometry; or 15 Elementary Functions.

Courses taken to fulfill this requirement may not be applied toward partial fulfillment of the general education requirement in biological, physical and mathematical sciences.

**Foreign Language.** Each student is required to attain the degree of proficiency equivalent to the completion of 12 or 13 hours of college-level work in a single foreign language.

A student who presents four units of high school credit in a single language and who elects to take a lower-level course in that same language automatically negates the option of completing the language requirement on the basis of high school units and must, therefore, continue that language through the complete sequence of 3 or 4, 106 or 109.

A student who has had some language study in high school, but not enough to satisfy the college requirement, may enroll for full credit in any lower-level college language course suited to the individual's level of skill. The following scale of placement is recommended for most cases.

<b>Romance and Classical Language Courses</b>	
If students present:	They should enroll in:
1 high school unit	Course 1
2 high school units	Course 2
3 high school units	Course 2 or Course 3
<b>Germanic and Slavic Language Courses</b>	
If students present:	They should enroll in:
1 high school unit	Course 2
2 high school units	Course 3
3 high school units	Course 4

Students who have not had sufficient course work in high school to meet the foreign language requirement but who think their knowledge of a language is at such a level may partially or completely satisfy the requirement by passing an appropriate examination in one of the foreign language departments.

Students transferring from other colleges or universities who have not completed the equivalent of the Missouri requirement must complete the requirement after entering UMC. Once a student has completed a course in a foreign language in residence, he may not interrupt the sequence until the requirement has been satisfied.

A student who completes German 21GH, 22GH and 23GH is considered to have fulfilled the equivalent of German 4.

International students are exempt from the foreign language requirement but may not receive credit for basic skills courses in their native languages. Others with native competence in one or more foreign languages offered by UMC may, at the discretion of the language department(s) concerned, be granted advanced standing for basic skills courses. In no case can the maximum amount of credit granted exceed that which would be earned by a student in fulfilling minimum arts and science language requirements by taking regularly scheduled University courses in a language not previously studied: under current requirements, 12 or 13 hours.

Enrolling on the S/U basis in a foreign language in order to establish advanced standing risks failure to complete the course successfully if the grade is D, because D is reported as U under the S/U system.

### IV. General Education Requirements

Courses used as partial fulfillment of general education requirements may not be used in the area of concentration. A student from an accredited community or junior college in Missouri whose associate of arts degree requires 60 hours of college-level work oriented toward the baccalaureate degree will be regarded as having fulfilled the requirements for the AB degree so long as the requirements have not been fulfilled through CLEP General Examinations but, rather, completion of specific courses.

**Biological, Physical and Mathematical Sciences.** A student must complete at least nine hours in the biological, physical and mathematical sciences, including at least one course with laboratory work. The nine hours must be derived from courses in at least two of the following three areas:

1. Biological sciences (general biology, genetics, animal biology, microbiology, and plant biology, Anthropology 150 if preceded by Biological Science 1 or equivalent).

2. Physical sciences (astronomy, chemistry, physics and geology).

3. Mathematical sciences (mathematics, statistics and computer science). (Math 10, 12, 14 or 15 may not be used in partial fulfillment of this requirement).

**Behavioral Sciences.** A student must complete five or six hours of work in anthropology, theoretical courses in linguistics, psychology and/or sociology. Research and methods courses may not be used.

**Social Sciences.** A student must complete nine hours in two of four fields: history, economics, political science or geography. A student in cartography, meteorology or climatology should choose nine hours in two of three fields: history, economics or political science. Research and methods courses may not be used. One-hour topics courses may be used as partial fulfillment of this requirement, provided they are not used to meet the upperclass course requirement. A student who elects one-hour topics courses must complete a minimum of three as partial fulfillment of the upperclass course requirements.

**Humanistic Studies and Fine Arts.** A student must complete at least 12 hours of work in the humanistic studies and fine arts, and the 12 hours presented must be derived from courses in at least two of the following six areas:

1. Appreciation or history of art and music, except research and methods courses.

2. Foreign civilizations (courses in classical archaeology and mythology, civilization courses taught in foreign language departments or in area studies programs).

3. Literature (all literature courses in the Department of English, all literature courses numbered above 103 in foreign language departments, courses given by the Department of Speech and Dramatic Art that are concerned with the history of public speaking, the theater or broadcasting).

4. Philosophy.

5. Creative and performing arts—studio art, music and speech (a maximum of two courses in this area may be counted; they must be numbered above 100).

6. The humanities sequence—101, 102, 103 and 104 (students who complete all four courses in this sequence are exempted from the distribution requirement for the humanistic studies and fine arts).

All General Honors courses offered in the above areas also may be used in fulfillment of this requirement.

### V. State Requirement

According to Missouri state law, a candidate for an undergraduate degree at UMC must present for graduation at least one course in American history or American government.

### VI. Area of Concentration

The area of concentration consists of at least 32 hours of course work acceptable to the department in which the student elects a major. No fewer than 18 nor more than 40 hours may be selected from the major subject matter field. The area also must include eight hours of

course work, including at least two upperclass courses, in other departments related to the student's major interest. A student completing an area of concentration in geology is not required to complete two upperclass courses outside the major department. The area must include a minimum of 20 hours of upperclass course work, 12 of which must be completed in residence at UMC in the department in which the area is centered. Upperclass courses completed with grades of D may not be included in the area without the approval of the adviser and the dean, and students must achieve an overall average of C in all of the courses attempted in their major departments at UMC. A student majoring in art may not include any D grades in the area of concentration. A student may not count toward the area of concentration any courses used to satisfy general education or basic skills requirements.

### VII. Scholastic Standing

At the time of graduation, all candidates must be in good scholastic standing. No student on scholastic probation will qualify for graduation.

### BACHELOR OF FINE ARTS

The bachelor of fine arts degree, offered by the Department of Art, is designed for students interested in more professional training in the visual arts than is possible under the bachelor of arts degree program. The requirements for the degree are the same as for the bachelor of arts degree with the following *exceptions*:

#### I. Admission

In addition to having been regularly admitted to the College, the student must present a portfolio to the Department of Art for acceptance as a degree candidate and have a minimum cumulative grade point average of 2.0 (3.0 in studio art courses).

#### II. Basic Skills and General Education

##### Requirements

##### A. Basic Skills

**Foreign Language.** Although a foreign language is not required, a course in a foreign language taken in residence may in part satisfy the humanities requirement.

##### B. General Education

**Biological, Mathematical and Physical Sciences.** No fewer than eight hours must be completed, including at least one laboratory course.

**Behavioral Sciences, Social Sciences and Humanities and Fine Arts (excluding Art History).** A minimum of at least 18 hours must be completed, including at least one course in each of the fields. At least one upperclass course must be completed in each of two fields.

#### III. Area of Concentration

The area of concentration normally consists of 60 to 70 hours of studio art courses and 12 hours of art history. A minimum of two upperclass courses in art history must be taken. At least 35 semester hours must be completed in residence at UMC. Upperclass courses completed with a grade of D may not be included in the Area, and the student must maintain an overall grade point average of at least 3.0 in studio art.

### BACHELOR OF MUSIC

The bachelor of music degree offers a maximum concentration in music combined with the elements of a liberal education. The requirements for this degree are the same as those for the Bachelor of Arts degree with the following exceptions.

#### III. Basic Skills\*

**Foreign Language.** Each student is required to attain the degree of proficiency indicated by completing one course beyond the equivalent of the intermediate level (generally 12 or 13 hours) of a foreign language as set forth under the foreign language requirement for an AB degree. Students majoring in music should follow this schedule:

For an instrumental major or a theory or composition major: 12 hours in German or 13 hours in either French or Italian.

For a voice major: 22-24 hours required by taking either French or Italian. The remainder must be fulfilled by completing the elementary course in each of the other two languages (Elementary German I and II).

For a music history major: 9 hours of German, plus 10 hours in either French or Italian, and a three-hour reading course in one of these.

#### IV. General Education

Humanistic Studies and Fine Arts, Behavioral and Social Sciences. A total of 16 hours must be completed in these fields. The 16 hours must include two courses in literature, one course in European history, and at least one other course in the behavioral or the social sciences.

Biological, Physical and Mathematical Sciences. No requirement. Students who have not fulfilled the basic skills requirement in mathematics must, however, complete Mathematics 10, College Algebra or 12, Basic Concepts of Modern Mathematics.

#### VI. Area of Concentration

The area of concentration for the bachelor of music consists of no fewer than 62 hours and no more than 90 hours in individual performance courses, music history, theory and ensemble. The specified course work in each of these is determined by the particular areas of music which the student wishes to emphasize.

\*All candidates for this degree who plan to receive teacher certification may opt to complete the new degree requirements. See the music department for details.

A candidate for the bachelor of music degree with a performance major must pass a candidacy examination in the areas of performance at the completion of their sophomore year. This exam is administered by the applied faculty concerned, and must be passed before entrance to the 300-level individual performance courses (16 hours minimum requirement) is approved.

In addition to performances at student recitals, each performance major is required to present a junior and senior recital. The performances are to be approved two weeks in advance by a faculty hearing committee.

Upperclass courses completed with grades of D may not be included in the area of concentration without the approval of the adviser and the dean, and the student must achieve an overall average of C in all of the courses attempted in

the music department.

### BACHELOR OF SCIENCE

The bachelor of science degree, offered in the Departments of Chemistry, Geology and Physics, is designed for students interested in more professional training in the sciences than is possible under the program of the bachelor of arts degree. The requirements for this degree are the same as those for the bachelor of arts degree with the following exceptions.

#### II. Hours and Points

A candidate for the bachelor of science degree must have passed a minimum of 30 hours in upperclass courses. At least two of the upperclass courses must be distributed among at least two of three fields: (1) behavioral sciences, (2) social sciences, and (3) humanistic studies and fine arts.

#### III. Basic Skills and General Education

##### Requirements

##### A. Basic Skills

##### Foreign Language/Special Emphasis Area

a. A student may fulfill this requirement by attaining the degree of proficiency equivalent to the completion of at least 12 hours of college-level work in a single foreign language as outlined in the foreign language requirement for the AB degree. Students who plan to continue their studies beyond the bachelor's level should be advised that many graduate schools have a foreign language proficiency requirement for graduation which may be satisfied by this option. A student who completes German 21GH, 22GH and 23GH is considered to have fulfilled the equivalent of German 103 and thus will receive three hours of upperclass credit. This requirement may be satisfied in full or in part by high school credit as outlined in the foreign language requirements for the AB degree.

b. Alternatively, a student may fulfill this requirement by completing a special program unit consisting of no fewer than 12 credit hours of upperclass course work, not in the parent department and not normally required of all departmental majors nor appearing elsewhere in the area of concentration. This program must be a carefully planned, coherent unit, formally approved by both the undergraduate adviser and the department. Students who plan to continue their studies beyond the bachelor's level should be advised that many graduate schools have a foreign language proficiency requirement for graduation which would not be satisfied by this option.

##### B. General Education

**Distribution Requirement:** A candidate must pass a minimum of two courses numbered 100 or above, distributed among two of three areas:

(1) behavioral sciences, (2) social sciences, and (3) humanities and fine arts. Courses used as partial fulfillment of general education requirements may not be used on the area of concentration. Students from an accredited community or junior college in the state of Missouri whose associate of arts degree requires 60 hours of college-level work oriented toward the baccalaureate degree will be regarded as having completed the general education requirements for the BS degree as long as the requirements have not been fulfilled through CLEP General Examinations, but rather through completion of specific courses. **Biological, Mathematical and Physical Sciences.** The student's science program is planned by an area adviser to fulfill the requirements of the department in which the area is centered. In the BS degree program there is no general requirement for biological sciences. **Behavioral Sciences, Social Sciences and Humanities and Fine Arts.** At least 18 hours of course work in behavioral sciences, social sciences, and humanities and fine arts must be completed, including courses in at least two of these fields. At least one upperclass course must be completed in each of two fields.

## DEGREE DECLARATION

After the fourth semester at UMC, arts and science students must declare candidacy for a degree and pursue the specific requirements for graduation. Only preadmission students are exempted from this requirement, but no student who has completed six semesters can continue without filing an area of concentration.

## DEGREE PROGRAMS

The degree program, centered around the area of concentration, permits (1) specialization in a major subject matter field of the student's choice and (2) work in various departments related to the student's major interest.

The student plans the area of concentration with the help of an adviser from the department in which the area is centered. It is the responsibility of the student to initiate the planning of an area prior to the first semester of the junior year.

The area of concentration has been adopted by the College in place of major-minor system in order to prevent the intellectual isolation of overspecialization. It recognizes that while specialization in a field is necessary for proficiency, many fields are related and cannot be isolated by arbitrary limits.

The student has three options in fulfilling the area of concentration requirement: (1) The student may pursue an area of concentration within a specific department; (2) the student may select one of the special area of concentration programs; or (3) within the special area of concentration the student may plan, with the adviser, an individualistic and interdisciplinary program.

If an area of concentration within a department is selected, it must include at least: 32 hours of course work; 18 hours, but not more than 40 hours, in the department of major interest; eight hours of course work including at least two upperclass courses, outside the major department; 20 upperclass hours with a grade of C or higher.

Of the upperclass hours, 12 must be completed in residence at UMC in the department in which the area is centered.

Upperclass courses completed with grade of D may not be included in the area of concentration without the approval of the adviser and the dean (exception: the area of concentration in art). In addition, the student must achieve an overall GPA of 2.0 (C) in all of the courses attempted in the major department at UMC.

Courses applied to the general education and basic skills requirements may not be included in the area of concentration.

**Dual Areas of Concentration.** Studies of a complementary nature in two departments may be developed with the concurrence of departmental advisers. A notation of successful completion of the two areas appears on the student's transcript.

## CREDIT RESTRICTIONS

**Credit in Physical Education.** A maximum of two hours of credit in Health and Physical Education 1 may be counted as elective credit toward a degree. The grade will be incorporated in the grade point average; however, a student on scholastic probation must be enrolled in a minimum of 12 hours of course work in addition to this course.

**Credit in Studio Art and Individual Performance Courses in Music.** The maximum credit in studio art and individual performance courses in music for a non-major in those departments may not exceed 12 hours. Only six hours of music ensemble courses may be applied toward the AB, BS, or BFA degrees.

**Courses Regularly Offered for Credit in the College of Arts and Science.** All courses offered in the departments of the College of Arts and Science regularly are accepted for credit toward degrees in the College with the exception of English 1a or 1b, Mathematics 3, 4, 7, 8. Courses from other departments may be counted toward the degree under the provisions of the 18-hour rule.

## AEROSPACE STUDIES (AIR FORCE ROTC)

### 213 Crowder Hall, (314) 882-7621

The mission of Air Force ROTC is commissioning career-minded male and female officers to meet the officer requirements of today's Air Force. Air Force ROTC is the largest source of Air Force officers. Graduates of UMC's Air Force ROTC are serving in virtually every nation of the free world. They are performing challenging and rewarding duties in career fields ranging from crew member of the numerous aerospace systems through personnel, education, intelligence, engineering, communications-electronics, information and security.

UMC's Air Force ROTC traditionally has met its objective by placing lieutenants on active duty who demonstrate dedication to their

assignments, a willingness to accept responsibility, critical and creative thinking and the ability to speak and write effectively.

This is one of more than 150 units from Hawaii to Puerto Rico which offer professional academic and military training in conjunction with other college career programs.

## THE NEW LOOK

A modern university needs modern programs and academic curricula and the Air Force strives to keep both its program and the curriculum up-to-date. Since 1964, the Air Force ROTC program has had a new look. In that year, Congress passed the ROTC Vitalization Act which provided a totally new, flexible Air Force ROTC program geared to the changing patterns of higher education and the varying needs of today's college student and Air Force. The legislation authorizes two separate ROTC programs. Colleges and universities may now select the traditional four-year program, a two-year program or both. UMC offers both programs.

## PROGRAMS

### Four-Year

The traditional four-year program consists of a two-year General Military Course and a two-year Professional Officer Course. The GMC, or basic course, is open to all undergraduate students with at least four years of college remaining. Exceptions can be made for some who have only three years remaining. Students can enroll in the GMC by registering for Aerospace Studies II, The Air Force Today, just as they register for any other course. This can be done by new students when they submit their pre-enrollment forms, or when they enroll during the regular registration period.

The GMC curriculum consists of four semesters, with one hour of academics and one hour of leadership laboratory per week. The first two semesters' academics include doctrine, strategies and functions of the Air Force. The last two semesters are concerned with the study of the history of air power.

Qualified cadets in GMC are selected on a highly competitive basis for entry into the POC. Selections are based upon:

1. Results of an Air Force Officer Qualifying Test.
2. A military physical examination.
3. University grade point average.
4. A personal interview with detachment officers on the Air Force ROTC staff.

Students selected for POC complete a four-week field training encampment and then enter into a mutual contract with the secretary of the Air Force. This is the first time students obligate themselves to future military duty (unless they previously received a scholarship). Students agree to attend three hours of classroom instruction and one hour of leadership laboratory per week for two years; to accept, if offered, a commission in the U.S. Air Force; and to serve for a period of not less than four years on active duty (pilots and navigators must serve six and five years, respectively, after completion of flight training). The Air Force, in return, provides all required uniforms and a tax-free allowance of \$100 per month during the two-year POC membership. POC cadets also are entitled to such fringe benefits as

limited use of certain facilities on Air Force bases and free space available travel on military aircraft.

### **Two-Year**

The two-year program is designed to provide greater flexibility in meeting the needs of students desiring Air Force commissions. UMC students who did not participate in the four-year program, or junior college transfers, are eligible for enrollment. Basic entry requirements are that students have at least two academic years (either undergraduate or graduate, or a combination of both) remaining at UMC. Applicants must be in good academic standing, pass the Air Force Officers Qualifying Test and the Air Force medical examination, and be selected by an interview board.

After successful completion of a six week field training encampment designed to prepare them for entry into the Professional Officer Course, applicants meeting all requirements may be permitted to enroll in Air Force ROTC upon their return to campus. During these two years, cadets study national security forces in contemporary American society and Air Force management and leadership, along with professional preparation for future Air Force duty. Cadets also receive a tax-free allowance of \$100 per month and may be eligible for a two-year Air Force ROTC scholarship.

Upon admittance to the POC, cadets are required to enter into the same contractual agreement as a student entering through the four-year program.

### **SCHOLARSHIPS**

Air Force scholarships are available to cadets in the Air Force ROTC two-year and four-year programs. The scholarships pay all tuition costs, incidental and laboratory fees, and reimbursement for the purchase of books. Scholarship cadets also receive \$100 a month tax-free pay. A four-year scholarship is valued between \$8,000 and \$14,000.

Scholarship nominees are selected from among the cadet corps on the basis of:

1. Scores achieved on the Air Force Officers Qualifying Test.
2. Grade average for all college work completed.
3. The rating from an interview board composed of Air Force ROTC staff officers.

Names of scholarship nominees are then forwarded to Air Force ROTC headquarters for final selection.

### **GENERAL INFORMATION**

The Air Force provides all textbooks and items of the uniform required in the AFROTC program. Upon commissioning, the student may purchase from the University a set of uniforms valued at \$300 for a very nominal cost (usually around \$50). A cash allowance of \$300 also is given by the Air Force for additional uniforms.

Students receiving their commissions from either the two-year or four-year program normally will enter an Air Force career field directly related to their college training (unless they attend pilot or navigator training). For example, engineers usually will be assigned to duty with one of the aerospace research projects or to a base engineering office.

### **Field Training**

Air Force ROTC cadets' first extended exposure to a military environment comes with a field training encampment. To most cadets this is a memorable high point on their road to an Air Force commission. Here the cadet gets a close look at Air Force life and activities and the Air Force takes a searching look at the cadet.

Two field training courses are offered. One is of four weeks duration for cadets in the four-year Air Force ROTC program. The other, for applicants to the two-year program, lasts six weeks. The extra two weeks includes an intensive academic program that four-year cadets receive during their first two years. Normally, students in the four-year program must attend the four-week encampment during the summer between their sophomore and junior years. The six-week encampment must be successfully completed by all candidates for the two-year Air Force ROTC program during the summer preceding their entry into the POC.

Both encampments include cadet orientation, survival training, junior officer training, aircraft and aircrew indoctrination, physical training, organization and function of an Air Force base, career orientation, small arms familiarization, and supplemental training. In addition, each cadet rides in an Air Force jet trainer.

Cadet organization during field training closely parallels actual Air Force organizational structure. Each cadet receives several opportunities to serve in responsible positions within the organization. Discipline is stringent, with emphasis placed on customs and traditions of the Air Force.

A large number of future Air Force officers attend field training each summer. They meet and work with peers from all geographical areas of the United States, a broadening and motivating experience in itself.

Travel pay to and from the student's home is provided, or the Air Force provides a paid ticket for a commercial carrier. Room and board also are provided throughout field training. While there, the cadet receives approximately \$630 in pay at the six-week encampment or about \$430 at the four-week encampment.

### **GRADUATE STUDY**

The Air Force realizes there is an increasing demand for graduate education among its personnel and has established several programs to provide this training. The Air Force Institute of Technology is available to AFROTC graduates and offers advanced degree training in college curricula which are related to Air Force career fields. These include all fields of engineering, meteorology, the physical sciences, mathematics, languages and business management.

### **QUALIFICATIONS**

All students who desire to enter the Air Force ROTC program must be U.S. citizens, be of sound physical condition, be of the highest moral character, and be at least 14 years of age to enroll but not more than 30 years old upon graduation and commissioning. Highly deserving applicants may be eligible for age waivers to age 35. Additional qualifications for admission to the POC include, for the two year applicant, the completion of the six-week field

training. In addition, all applicants must pass the Air Force Officer's Qualifying Test, the Air Force physical examination, be interviewed by a board of officers and join the Air Force Reserve prior to entry into the POC. (This incurs no additional training requirements other than normal Air Force ROTC requirements.)

Entry into the POC is highly competitive and students are selected on a "best qualified" basis. Satisfactory completion of the minimum qualifications does not assure that a student will be accepted.

### **PHYSICAL REQUIREMENTS**

Detailed information on physical requirements is available at 214 Crowder Hall, UMC, Columbia, Mo. 65211.

### **MILITARY OBLIGATION**

Upon graduation and commissioning as an officer in the United States Air Force, students fulfill their military obligation by agreeing to retain their commission for a period of six years and serving at least four of these years on active duty. Availability of programs authorizing a delay of entry into active duty is contingent upon the needs of the Air Force.

### **THE CORPS OF CADETS**

The AFROTC unit at UMC is organized as a cadet group with squadron staffs and several flights. Freshman and sophomore cadets are assigned to one of the flights. They receive instructions from POC cadets in basic military customs and courtesies, drill movements and many other facets of Air Force operations. Junior and senior cadets are assigned and rotated through various leadership positions, gaining experience in management procedures. The Corps of Cadets is a cadet function, with all planning and operations accomplished by cadets. A drill competition is held once a year. During this competition, each flight competes against other flights. The commander of the flight winning the competition receives the coveted Board of Curators' Cup, awarded annually by the University.

### **CADET ACTIVITIES**

Air Force ROTC cadets at UMC are given an opportunity to visit Air Force bases for a first-hand look at the facilities and equipment and to gain a general idea of how a base functions. In past years, cadets have visited the North American Defense Command at Cheyenne, Mout. Colo.; Patrick Air Force Base, Fla. (including a visit to Kennedy Space Center and Disney World); and Wright-Patterson Air Force Base, Ohio (headquarters for Air Force Logistics Command, Systems Command and home of the Air Force museum). Such trips range from one to three days and usually are highlighted by transportation in an Air Force aircraft.

In addition to base visits, the cadets participate on Air Force ROTC athletic teams and publish their own newsletter. Cadets may join a professional AFROTC cadet organization known as the Arnold Air Society which furthers the purpose and traditions of the U.S. Air Force. Members participate in community service projects, as well as social activities such as an annual military ball, picnics, and conclaves where they meet and exchange ideas with cadets from other universities.

## FLIGHT INSTRUCTION PROGRAM

Air Force ROTC offers an FAA approved civilian contracted Flight Instruction Program at UMC. This instruction consists of ground school and 13 hours (12 dual, 1 solo) of flight training. The Air Force pays for all flight instruction, textbooks, navigation equipment, flight jacket, and transportation to and from the flying school. The Flight Instruction Program is a required extracurricular activity for all cadets in their second year of the advanced POC course who intend to become pilots after being commissioned. This program is managed by an experienced Air Force officer who has flown military aircraft for many years.

## SUPPLEMENTAL COURSE REQUIREMENT

**Foreign Language Requirement.** Students who accept a scholarship must agree to successfully complete at least one semester of college instruction in a major Indo-European or Asian language prior to commissioning.

**English Composition Requirement.** Four-year scholarship students must successfully complete a course in English composition by the end of their fourth semester. Other scholarship recipients must complete the requirement within two academic years.

**Mathematical Reasoning Requirement.** All students must successfully complete a course in mathematical reasoning prior to commissioning.

## ANTHROPOLOGY

### 210 Switzer Hall, (314) 882-4731

Anthropology is literally the study of humans. Students have an opportunity to view humans comparatively and to consider the interplay between biology and culture. Anthropological study has four foci—(1) physical (concerning the evolution and biology of humans and other primates), (2) cultural (study of ways of life of recent and present day peoples), (3) archaeological (using methods of determining ways of life of the past), and (4) linguistic (an approach to human behavior through the study of language in its cultural context)—each contributing to a discipline which has been called “the most humanistic of the sciences, the most scientific of the humanities.” Indeed, although most anthropology courses meet behavioral science requirements, particular ones presently meet other general education requirements.

A concentration in anthropology may provide the core of a broadly based liberal education or it may serve specific vocational or professional goals of the student. For example, it is of particular value to students planning professional careers in a world of cultural and ethnic diversity. Faculty specialties allow students to emphasize any of the four foci, select some combination of them, or choose interdisciplinary programs in cooperation with other departments or schools. Such programs are made possible by departmental focus on a number of geographic regions and topics (cultural ecology, medical anthropology, forensic anthropology, cognitive science). The MA and PhD degrees also are offered by the department. Undergraduate training in anthropology prepares students for full-time research (espe-

cially in archaeology), museum curatorships, work in governmental agencies, and graduate study leading toward college or university teaching of anthropology. American Anthropological Association publications on career opportunities are available from the director of undergraduate studies.

Undergraduate majors will be permitted two options in filling the area of concentration, depending on their objectives. The minimum requirements for an area of concentration are different in each.

**Liberal Arts Emphasis.** This program is designed for students who wish to study anthropology for its general educational value. Required are 27 hours of anthropology, selected under special advisement, and eight hours of related courses outside anthropology.

**Preprofessional Emphasis.** This program is intended primarily for students considering graduate work in anthropology or a closely related field. Required courses are:

- 150 Human Evolution (5)
- 152 Introduction to Archaeology (3-4)
- 153 Introduction to Cultural Anthropology (3)
- 154 Introduction to Anthropological Linguistics (3)
- Area course (e.g., Cultures of Asia) (3)
- Topical course (e.g., Political Anthropology) (3)
- Methods or techniques course
- Theory course (e.g., Culture Change) (3)
- Related courses outside anthropology (8)

The departmental Honors program entails independent research during the senior year. For information, consult Professor R.F.G. Spier, Anthropology Honors director.

Undergraduates have opportunities to participate, as volunteers or as paid workers, in research projects in all divisions of the discipline and in different parts of the world. Students may take part in one of several ongoing Missouri archaeological projects or learn specialized laboratory analytical techniques (paleoethnobotany, zooarchaeology, human osteology, thermoluminescence). Other research and undergraduate teaching programs have recently been held in France, Luxembourg, Mexico and Peru.

The department is one of several cooperating in the South Asia Area Studies program and is a participant in the campus cooperative linguistics program. Through physical anthropology there is an interchange with the Division of Biological Sciences, the School of Medicine and the College of Veterinary Medicine.

## ART

### A-126 Fine Arts Center, (314) 882-3555

The Department of Art offers studio courses on the undergraduate and graduate levels in drawing, painting, design and graphic design, sculpture, printmaking, ceramics, fibers and photography. Undergraduate study leads to the bachelor of art and the bachelor of fine arts degrees. The AB is intended for the student desiring a liberal education with a concentration in art, while the BFA provides for more professional training in the studio area. The BFA also is the required undergraduate degree for admission to most master of fine arts programs.

Students enrolled in either the AB or BFA degree programs may not include (within the area of concentration) art department courses with a grade of D.

The Department of Art reserves the right to retain selective examples of student work for its collection.

## BACHELOR OF ARTS

Minimum studio course requirements for the AB degree include a core program plus an area of specialization consisting of at least 15 credit hours.

### Minimum Core Requirements

- 2 Introduction to Art
- 20 Basic Design I
- 21 Basic Design II
- 220 Beginning Spatial Design
- Drawing (3 semesters)
- Painting or Watercolor (one semester)
- Crafts (Ceramics, Metals, or Fibers) (1 semester)
- Art History at least 9 hours

At least 15 hours in a studio area of two related media, (such as drawing and photography) are required. No more than 40 semester hours of course work in the department may be included in the AB curriculum.

## BACHELOR OF FINE ARTS

The College of Arts and Science requirements for the BFA degree are the same as for the AB degree, with the exceptions outlined in Requirements for Graduation Section.

Students accepted to the BFA program are assigned a departmental adviser. It is the student's responsibility to meet with the adviser as soon as possible and plan a program of study with emphasis in a major studio area.

**Area of Concentration.** Normally 60 to 70 hours of studio art courses and 12 hours of art history courses are required. At least two art history courses must be upperclass level. The last two full semesters and at least 35 hours of upperclass work in the area must be completed in residence at UMC. The BFA candidate must achieve a grade point average of 3.0 in studio and art history courses in order to be graduated.

### Studio course requirements for BFA degree.

- 2 Introduction to Art
  - 20 - 21 Basic Design I and II
  - 220 Beginning Spatial Design or 285 Beginning Sculpture
  - 60 and 160 Beginning Drawing I and II
  - 260 Intermediate Drawing
  - 165 Anatomical Drawing or 360 Advanced Drawing
  - 177 Beginning Painting
  - 277 Intermediate Painting or 175 Beginning Watercolor
- One course from each of two of the following areas: photography, metals, ceramics or fibers  
Elective studio art courses to bring total to between 60 and 70 credit hours

## CAREER OPPORTUNITIES

**Teaching.** Students who wish to teach on the elementary and secondary level normally pursue the BS in education degree. AB and BFA candidates may acquire an elementary and/or secondary art teaching certification by completing the additional art education requirements not already completed in their AB or BFA programs.

**Commercial Art.** Students specializing in graphic design and photography may find employment with advertising agencies, newspapers and industries employing their own artists. According to the U.S. Department of Labor, employment opportunities for commercial artists should remain constant through the '80s.

**Other.** Opportunities exist to establish private studios selling to the public, to do freelance work for clients, or to work in art galleries or museums.



## ART HISTORY AND ARCHAEOLOGY

109 Pickard Hall, (314) 882-6711

The development of the material culture of man and the artistic manifestations of that culture through the ages are the subjects of study in art history and archaeology.

Undergraduate areas of concentration are available both in art history and in archaeology and usually follow the guidelines below. Each student's program is planned to meet individual interest and professional requirements.

### ART HISTORY

#### I. Required courses: 24 hours minimum

10, 11 Introduction to Western Art (3)

180 Introduction to Art History and Archaeology (1)

4-5 courses in art history and archaeology surveys

2-3 courses at 300 level from art history or archaeology to complete minimum of 24 hours (average major 30-36 hours)

#### II. Recommended related area, electives or general requirements:

Classical mythology

Classical literature in translation

All history and anthropology courses

Geology

Art courses (maximum 12 hours)

Film

Literature

Philosophy, aesthetics

#### III. Language study required through the reading level in German and French or Italian.

## ARCHAEOLOGY

#### I. Required courses:

10 Introduction to Western Art (3)

180 Introduction to Art History/Archaeology (1)

219 Art and Archaeology of Ancient Egypt (3)

220 Classical Art and Archaeology I: Greece (3)

221 Classical Art and Archaeology II: Rome (3)

2-3 courses in ancient field at 300 level from art history or archaeology to complete 24 hours.

#### II. Recommended related area, electives or for fulfilling general requirements:

All courses in classics

All ancient history courses

Anthropology 152

Civil Engineering 20 Surveying

#### III. Languages

13 hours or equivalent, in both Greek and Latin plus a beginning course in German and French. If the program is begun late in the undergraduate years, language requirements may be adjusted to the individual student's program.

## BIOLOGICAL SCIENCES

105 Tucker Hall, (314) 882-4068

The biological sciences division offers a bachelor of arts degree program in the biological sciences for students planning a career in any of the many different areas of basic and applied biology. The program, together with the general education requirements of the College of Arts and Science, provides a fundamental background in biological sciences and the supporting ancillary sciences. The program is

flexible, giving each student an opportunity to select courses of special interest. A student majoring in biological sciences obtains the foundation to enter many technical and professional fields. Information about careers and advanced degree programs in the life and health sciences is available in the divisional office.

Undergraduate participation in Honors research and proseminar courses is encouraged, primarily because it gives a student individualized instruction by professional scientists. Contact the Honors director for details about the Honors degree in biological sciences.

Graduate programs in research and study leading to the MA and PhD degrees are available to qualified students.

### BIOLOGICAL SCIENCES AREA

#### Ancillary science requirements

Chemistry, a minimum of 17 hours, including one semester of organic chemistry and one additional course in chemistry or biochemistry.

Physical sciences other than chemistry, eight hours, of which one course must be physics.

Mathematics, one semester of calculus.

#### Biological sciences requirement

A student must select a minimum of 33 hours, including either 21 and 22 General Biology or 11 Zoology and 12 Botany, a genetics course (202, 238 and 239, or 202 and 238), a physiology course (203, 270, or 313), and an environmental course (250, 302 or 362). In addition, the student must present at least 11 hours in formal courses numbered 200 or above. One course must include a laboratory and one course must be at the 300 level.

For examples of emphasis areas and requirements, consult your adviser.

### MICROBIOLOGY

#### INTERDISCIPLINARY PROGRAM

In cooperation with selected departments from the Colleges of Agriculture and Veterinary Medicine and the School of Medicine, the biological sciences division offers an area of concentration with emphasis in microbiology.

The following courses are required by those who elect the Interdivisional microbiology program:

212 Basic Microbiology (3) transfer students who have had an introductory microbiology course elsewhere should select 212 as their first microbiology course at UMC, and it will serve as a Category B elective—see below.

202 General Genetics (3)

Chemistry 11 and 12 General Inorganic Chemistry (10)

Chemistry 210 and 211 Organic Chemistry (lecture and laboratory) (5)

Physics 11 and 12 Elementary College Physics (8)

Mathematics 80 Analytical Geometry and Calculus I

In addition to the above required courses, 18 to 24 credits in electives must be taken. At least two of these courses must be selected from Category A, and the remainder of the hours may be filled from Category B. Other courses, not listed here, may be accepted for credit in Category B, but only if approved by your microbiology adviser.

#### Category A Courses

303 Systematic Bacteriology (2)

305 General Phycology (3)

307 Mycology (4)

322 Protozoology (3)

354 Advanced Bacteriology (3 or 5)

Veterinary Microbiology 343 Concepts and Methods in Animal Virology (3)

#### Category B Courses

Agronomy 312 Soil Microbiology (lecture) (2)

Agronomy 312 Soil Microbiology (lecture and laboratory)

(3) (The three-hour course has a prerequisite of Agronomy 100.)

Biochemistry 270 Biochemistry (3)

Biochemistry 272 Biochemistry (3)

Biochemistry 274 Biochemistry Laboratory (3)

Biochemistry 301 Biophysics (3)

203 Introduction to Cell Biology (3)

210 Parasitology (3)

241 Genetics Laboratory (2)

260 Molecular Biology (4)

300 Problems (independent research, by adviser's permission) (1 to 3)

324 Limnology (3 or 4)

326 Analysis of Biological Macromolecules (3)

340 Mammalian Cell Genetics (3)

346 Genetics of Microorganisms (3)

360 Techniques in Cell Culture (4)

371 Cellular Physiology (3 or 5)

374 and/or 375 Cell Biology I and II (3 to 8)

Chemistry 212 Organic Chemistry (3)

Chemistry 230 Physical Chemistry (3)

Civil Engineering 393 Sanitary Engineering Microbiology (3)

Food Science and Nutrition 372 Food Microbiology (3)

Food Science and Nutrition 373 Food Microbiology Laboratory (2)

Food Science and Nutrition 374 The Bacterial Spore (2)

Microbiology 304 Immunology (3)

Microbiology 314 Immunology Laboratory (1)

Microbiology 315 Bacterial and Viral Genetics (4)

Veterinary Microbiology 340 Microbial Physiology (3)

Veterinary Microbiology 345 Veterinary Parasitology I (3)

Veterinary Microbiology 346 Veterinary Parasitology II (3)

## CHEMISTRY

123 Chemistry Building, (314) 882-2439

The chemistry department offers a bachelor of science degree in chemistry certified by the American Chemical Society. The bachelor of arts degree with an area of concentration in chemistry is designed for those students who desire a more general education or who are preparing for medical or dental training.

Because the bachelor of science program includes so many specific requirements, the undergraduate curriculum in chemistry, mathematics and physics is outlined below.

Suggested Schedule of Chemistry, Mathematics and Physics Courses for BS Degree in Chemistry

Chemistry 11 (5) (or advanced placement examination)

Mathematics 80 (5)

Mathematics 175 (5)

Chemistry 210 (3)

Mathematics 201 (3)

Chemistry 211 (2)

Physics 80 (3)

Chemistry 212 (3)

Chemistry 213 (2)

Physics 123 (3)

Chemistry 12 (5)

Chemistry 223 (4)

Chemistry 231 (3)

Physics 124 (3)

Chemistry 233 (3)

Chemistry 234 (3)

Chemistry 341 (3)

Chemistry 312 (4)

Suggested Schedule of Chemistry, Mathematics and Physics Courses for AB Degree

Although the schedule for the AB degree is more flexible than that of the BS degree, most students satisfy the chemistry, mathematics and physics requirements in the following order.

Chemistry 11 (5)

Chemistry 12 (5)

Mathematics 80 (5)

Mathematics 175 (5)

Chemistry 210 (3)

Chemistry 211 (2)

Mathematics 201 (3)

Chemistry 212 (3)

Chemistry 213 (2)

Physics 80 (3)

Chemistry 223 (4)

Physics 123 (3)

Chemistry 231 (3)

Physics 124 (3)

Chemistry 233 (3)

Chemistry 234 (3)

## CLASSICAL STUDIES

420B General Classroom Bldg., (314) 882-3340

The classical studies department offers courses in the life, language and thought of the Greeks and Romans.

The department offers five emphases leading to the AB degree. Requirements are as follows:

#### Classical Civilization

Greek or Latin through the 103 level

12 hours in the department's courses taught in translation  
12 hours in related fields (history, philosophy, English, comparative literature, archaeology, linguistics, etc).

#### Greek or Latin

22 hours in either language (usually 1, 2, 3, 210, two 3-hour courses at the 300 level).

9 hours in English language courses  
 9 hours in related fields  
**Classics (Greek and Latin)**  
 Greek or Latin through two 3-hour courses at the 300 level;  
 the other language through the 210 level  
 9 hours in English language courses  
 9 hours in related fields  
**Classics, for secondary school teachers**  
 22 hours in either language (usually 1, 2, 3, 210, two  
 3-hour courses at the 300 level)  
 9 hours in English language courses

## COMPUTER SCIENCE

### 304 Math Science Bldg., (314) 882-3842

The computer science department offers programs of study leading to the bachelor of science and the bachelor of arts degrees. The bachelor of science degree program is designed for those students preparing for graduate study in computer science and for those who wish to apply the fundamental concepts and methods of computer science to areas such as systems programming and scientific applications programming. The bachelor of arts degree program is designed for those students who wish to apply the fundamental concepts and methods of computer science to areas such as business data processing and management systems. This degree program does not include sufficient training in mathematics to qualify a student for graduate study in computer science but, with the proper electives, it prepares the student for graduate study in other fields such as business administration and accountancy.

### COURSES REQUIRED

All the courses from one of the following degree programs must be completed with an overall GPA of 2.4 and a grade of C or better in each course before an area of concentration will be approved.

#### BS Degree Program: 22 hours

Comp Science 104 Computers and Programming I (3)  
 Comp Science 203 Computers and Programming II (3)  
 Comp Science 210 Introduction to Systems Concepts (3)  
 Mathematics 80 Analytic Geometry and Calculus I (5)  
 Mathematics 175 Calculus II (5)  
 Mathematics 201 Calculus III (3)

#### AB Degree Program: 24 hours

Comp Science 104 Computers and Programming I (3)  
 Comp Science 203 Computers and Programming II (3)  
 Comp Science 210 Introduction to Systems Concepts (3)  
 Mathematics 60 Finite Mathematics (3)  
 Mathematics 61 Elements of Calculus (3)  
 Statistics 150 Introduction to Probability and Statistics I (3)  
 Accountancy 36 or 136GH Accounting I (3)  
 Accountancy 37 or 137GH Accounting II (3)

### GRADE POINT AVERAGE REQUIRED

The student must have a 2.6 cumulative GPA before an area of concentration will be approved.

### AREAS OF CONCENTRATION

#### BS Degree in Computer Science: 67 hours

##### Computer Science Courses: 27 hours

Comp Science 104 Computers and Programming I (3)  
 Comp Science 203 Computers and Programming II (3)  
 Comp Science 210 Introduction to Systems Concepts (3)  
 Comp Science 305 Assembly Language Programming (3)  
 Comp Science 320 Data Structures (3)  
 Comp Science 330 Computer Organization I: Design Fundamentals (3)  
 Comp Science 341 Automata Theory I (3)  
 Comp Science 343 Compilers I (3)  
 Comp Science 351 Systems Programming I (3)

##### Related Courses: 40 hours

Mathematics 80 Analytic Geometry and Calculus I (5)  
 Mathematics 175 Calculus II (5)  
 Mathematics 201 Calculus III (3)  
 Mathematics 226 Discrete Mathematical Structures (3)  
 Mathematics 323 Numerical Analysis (3)  
 Statistics 320 Introduction to Mathematical Statistics (3)

Physics 80 University Physics I (3)  
 Physics 123 University Physics II (3)  
 Accountancy 258 Computer-Based Data Systems (COBOL) (3)

English 161 Technical Writing (3)

Technical Electives (6)

#### AB Degree in Computer Science: 57 hours

##### Computer Science Courses: 24 hours

Comp Science 104 Computers and Programming I (3)  
 Comp Science 203 Computers and Programming II (3)  
 Comp Science 208 Job Control Languages and System Utilities (3)  
 Comp Science 210 Introduction to Systems Concepts (3)  
 Comp Science 305 Assembly Language Programming (3)  
 Comp Science 320 Data Structures (3)  
 Comp Science 330 Computer Organization I: Design Fundamentals (3)  
 Comp Science 351 Systems Programming I (3)

##### Related Courses: 33 hours

Mathematics 60 Finite Mathematics (3)  
 Mathematics 61 Elements of Calculus (3)  
 Statistics 150 Introduction to Probability and Statistics I (3)  
 Statistics 250 Introduction to Probability and Statistics II (3)  
 Accountancy 36 or 136GH Accounting I (3)  
 Accountancy 37 or 137GH Accounting II (3)  
 Accountancy 258 Computer-Based Data Systems (COBOL) (3)  
 Accountancy 358 EDP Systems Analysis and Design (3)  
 English 161 Technical Writing (3)  
 Technical Electives (6)

## ECONOMICS

### 118 Professional Building, (314) 882-4574

A basic understanding of economics develops insight into the many problems facing our contemporary society—inflation, unemployment, poverty, environmental pollution, the energy crisis, urban decay and the appropriate role of government in the economic life of the society. An economics major prepares one for careers in business and government and for graduate work in areas such as economics, business and law.

The department offers the AB degree in the College of Arts and Science and the BS BA degree in the College of Business and Public Administration. Details of the program for the BS BA degree in business administration are found in the College of Business and Public Administration section of this catalog. Students choosing the AB degree must take the following courses in economics:

51 General Economics (5) or 1 and 2 Fundamentals of Macro- and Micro-economics (6)  
 229 Money and Banking (3)  
 351 Intermediate Price Theory (3)  
 353 Intermediate Income Analysis (3)

At least three of the following courses selected in consultation with the student's adviser (9):

311 Employment and Wages (3)  
 315 Public Finance (3)  
 316 State and Local Finance (3)  
 320 Economic Doctrines (3)  
 325 International Economics (3)  
 329 Banking and Money Market (3)  
 355 Structure of Industry (3)  
 361 Comparative Economic Systems (3)  
 362 Welfare Economics (3)  
 368 Business Fluctuations (3)  
 370 Quantitative Economics (3)  
 371 Applied Econometrics (3)  
 384 Economic and Demographic Change (3)

Occasionally (subject to adviser approval) a student may substitute an alternative economics course for one of the above.

At least eight hours, including two upper-class courses, in a related subject approved by the adviser.

Statistics 31 Elementary Statistics or equivalent (3)

The electives in economics and the courses

in the outside field differ for each student and enable students to design the area of concentration toward specific educational objectives.

## ENGLISH

### 231 Arts and Science Bldg., (314) 882-6066

A major in English gives the student an appreciation and understanding of the great literary works in the English language and develops skills in reading, critical thinking, and written communication. The area of concentration in English has the following requirements:

2 Introduction to Poetry (3)  
 3 Introduction to Fiction (3) or 4 Introduction to Drama (3)

One course selected from seven of the following eight areas, plus one additional choice from any course listed below: (24)

The English Language: 309, 319, 320, 322, 323  
 Medieval Literature: 325, 326  
 Renaissance Literature: 331, 333, 335, 336, 345, 351, 352  
 Eighteenth-Century Literature: 355, 356, 357  
 Nineteenth-Century Literature: 365, 366, 367, 368, 369  
 American Literature: 304, 375, 377, 378  
 Modern Literature and Criticism: 316, 317, 318, 389, 391, 392, 393, 394, 395, 396

Topics and Special Themes: 201, 202, 206, 310, 221, 223, 301, 310, 385

Courses in related humanities (art, art history and archaeology, classics and classical civilization, foreign literature, history, music, philosophy, speech and dramatic art, religious studies and women's studies). (8)

The area of concentration in English offers a special emphasis in creative writing. The creative writing student takes an additional prerequisite (either English 50 or 70), chooses six courses in different categories, instead of seven, and adds two upperclass courses in writing (302, 303, 313, 314 or 315).

The required six hours of composition, which the student should complete before taking upperclass courses in literature, are excluded from the maximum 40 hours of English which may be counted toward the degree.

Students who maintain a minimum GPA of 3.3 are eligible for the departmental honors program. These students take six courses in different categories plus 196 and 197 (Honors seminars) and 190 Honors Senior Essay. Further information is available from the English Honors director.

In the entire AB program, a student may count no more than 40 hours of English toward graduation. The required six hours of composition, which the student should complete before taking upperclass courses in literature, may be in addition to the 40 hours of English.

Although a major in English does not provide specific vocational training, it can lead to many possible careers. Teaching has long been the most obvious career possibility, but others are becoming prominent. English continues to provide excellent preparation for professional schools, especially in law, medicine, and business. Other possible opportunities are in publishing, editing, advertising, writing and research for government or business, and public relations. More information about career opportunities for an English major is available both at the Career Planning and Placement Center and from the director of undergraduate studies.

The department also offers work leading to the MA and PhD degrees.

# GEOGRAPHY

8 Stewart Hall, (314) 882-8370

The undergraduate program of the geography department has three purposes: to serve the vocational goals of some students; to prepare for graduate study; and to provide a focus for those students wanting a broadly based liberal education. The area of concentration in geography can integrate a student's interests into a framework of spatial, areal and environmental associations.

The area of concentration in geography requires a minimum of 32 hours of course work, of which at least 18 hours must be in the geography department and eight hours in other departments. Twenty of the hours must be upperclass, including at least two upperclass courses in other departments.

Specific programs in geography are designed to fit the interests and needs of individual students. Each area of concentration is worked out by consultation between the student and adviser.

All areas of concentration in geography normally include four to six of the following courses:

- 1 Regions and Nations of the World I (3)
- 2 Regions and Nations of the World II (3)
- 100 Economic Geography (3)
- 105 Cultural Geography (3)
- 111 Physical Geography I (3)
- 112 Physical Geography II (3)
- 116 United States and Canada (3)
- 117 Geography of Europe (3)
- 337 Cartography (3)

To complete the area of concentration, geography majors may find it desirable to emphasize one of the following:

**Regional, political, historical, cultural geography.** This emphasis provides the broadest background in geography. Students may select from among the following courses: 116, 117, 125, 150GH, 152, 171, 180, 305, 317, 340, 341, 371, 372 and 396. Related work should be selected from such fields as anthropology, sociology, history, economics and political science.

**Economic geography, urban geography and planning.** Course work should include 346. Related work should be selected from such fields as economics, statistics, political science, sociology, history, regional and community affairs, and computer science.

**Physical and environmental geography.** Course work should be selected from 50, 303, 311 and 366. Related work would be selected from such fields as biology, geology, environmental history, atmospheric science, forestry, soil science, statistics and agricultural economics.

**Cartography.** The department provides various opportunities for involvement in cartographic problems. Course work should include 137, 337, 338, and 339. Related work should be selected from such fields as statistics, computer science, surveying and photogrammetry.

The departmental Honors program is open to superior students and encourages independent study with individual faculty. The area of concentration for departmental Honors students includes 196 Honors (3), 197 Honors (3), and 350 Special Readings (3).

The geography department participates in interdisciplinary degree programs, such as South Asian Area Studies, Latin American Studies, Russian Area Studies, Black Studies and Peace Studies.

Geographers are employed as: cartographers, including map editors; planners with governmental agencies and private firms; area intelligence specialists; environmental analysts; natural resource managers; map librarians; land use specialists; remote sensing and air photo interpreters; industrial development specialists; travel agents; teachers at all levels; and positions related to marketing, transportation, and

placement of such facilities as health care and recreational services. An internship program (Geography 399) with a state agency may be arranged during a student's senior year.

The department cooperates with the Career Planning and Placement Center to find appropriate jobs for its majors after graduation and will assist them in planning programs compatible with their individual career objectives and ambitions. Further information on jobs and careers in geography is available from the Association of American Geographers, 1710 16th St. N.W., Washington, D.C. 20009, or (for teachers) the National Council for Geographic Education, Western Illinois University, Macomb, Ill. 61455.

The department also offers the MA degree. For further information on the graduate program, contact the director of graduate studies.

## GEOLOGY

101 Geology Bldg., (314) 882-6785

The geology department offers course work leading to the bachelor of science and the bachelor of arts degrees. The bachelor of science degree is designed to prepare the student for graduate study in geology or for possible employment. The bachelor of arts degree provides a cultural curriculum, but does not include sufficient training in geology and in related sciences to allow the student to enter directly into graduate study.

The Departments of Geology and of Civil Engineering offer a dual degree program leading to bachelor of science degrees in both departments. The five-year curriculum for this degree is listed below.

The minimum requirements for the areas of concentration for both undergraduate programs in the department and the dual degree program are listed below.

### AB DEGREE IN GEOLOGY

#### Geology courses

- 1 Principles of Geology (5) or 2 Physical Geology (3)
- 127 Surficial Earth Processes and Products (4)
- 128 Internal Earth Processes and Products (4)
- 224 Historical Geology (4)
- Field Course (8)

At least two additional lecture courses in geology (6-8)

#### Related Courses

Proficiency in trigonometry (may be taken in high school); at least 18 hours from the natural sciences or mathematics and statistics, subject to approval of adviser.

### BS DEGREE IN GEOLOGY

#### Geology Courses

- 1 Principles of Geology (5) or 2 Physical Geology (3)
- 127 Surficial Earth Processes and Products (4)
- 128 Internal Earth Processes and Products (4)
- 224 Historical Geology (4)
- 234 Mineralogy (4)
- 307 Structural Geology (4)
- 308 Sedimentology (4)
- 324 Introduction to Petrology (4)
- Field Course (8)

One 300-level course representing three of the following six areas: paleontology (5), geochemistry (4 or 3), 323 Optical Mineralogy (3), applied geology (3 or 4), 303 Exploration Geophysics (3).

#### Related courses

- Biological Science 1 or 2 years of high school biology
- Chemistry 11 (5)
- Chemistry 12 (5)
- Math 80 (5)
- Math 175 or 3 hours of statistics (3-5)
- Physics 11, or 80 and 123 (5-6)

### DUAL DEGREE GEOLOGY/ CIVIL ENGINEERING

#### Geology courses

- 1 Principles of Geology (5)
- 127 Surficial Earth Processes and Products (4)

- 234 Mineralogy (4)
- 328 Optical Mineralogy (3)
- 324 Introduction to Petrology (4)
- 336 Field Course (8)
- 9 hours of geology electives

#### Engineering Courses

- 5 Digital Computer Computation (2)
- 30 Engineering Graphics (3)
- 85 Statics and Elementary Strength of Materials (3)
- 99 Engineering Thermodynamics I (3)
- 124 Circuits, Devices and Systems (3)
- 195 Intermediate Strength of Materials (3)

#### Civil Engineering Courses

- 113 Engineering Measurements (3)
- 221 Structural Analysis I (4)
- 185 Introduction to Dynamics (3)
- 212 Transportation Systems Engineering (3)
- 232 Civil Engineering Materials (3)
- 241 Fluid Mechanics (1)
- 251 Fluid Mechanics (3)
- 340 Applied Fluid Mechanics (2)
- 341 Hydrology (3)
- 355 Soil Mechanics (3)
- 374 Civil Engineering Systems Design (3)
- 391 Introduction to Water Quality (3)

Plus three electives, two of which should be design courses.

#### Related Courses

- Chemistry 5 (5)
- Mathematics 80 (5)
- Mathematics 175 (5)
- Mathematics 201 (3)
- Mathematics 304 (3)
- Physics 80 (3)
- Physics 123 (3)
- Physics 124 (3)
- Foreign Language (13)
- English 60 Exposition (3)
- English 161 Technical Writing (3) or Speech 75 Introduction to Speech Communication (3)
- Humanities and Social Science Electives (18); must include an economics course (Economics 41 preferred), an American government or history course, and must satisfy the College of Engineering grouping requirements.

## GERMANIC AND SLAVIC STUDIES

451 General Classroom Bldg.

The Department of Germanic and Slavic Studies offers courses in German and Russian language, literature and civilization. The bachelor of arts degree is given in German and Russian. Certain courses, such as German civilization, Russian civilization, and literature in translation courses, do not presuppose a knowledge of German or Russian, either language or literature.

### AREA OF CONCENTRATION

#### I. Courses in the Department

**German:** The area of concentration in German consists of 27 semester hours in German beyond the courses needed to fulfill the language requirement of the College of Arts and Science. German 203, Advanced German Reading, and German 275, German Classics, are prerequisite to most 300-level courses and usually are required. Specific courses to be taken should be decided upon in consultation with the adviser.

**Russian:** The area of concentration in Russian consists of 27 semester hours beyond the language requirements of the College of Arts and Science. Russian 366, Structure of the Russian Language, and at least one 300-level course in Russian literature are required.

#### II. Courses Outside the Department

At least eight semester hours in related humanities or social sciences should be selected in consultation with the adviser. German and Russian are, for purposes of planning an area of concentration, considered two distinct and separate disciplines.

## HISTORY

### 143 Arts and Science Bldg., (314) 882-2481

The history department offers undergraduate work in ancient, medieval, and modern European history; the history of the United States; the history of Latin America; and the history of Asia. In addition, the department participates in interdepartmental programs in Ancient Studies; Black Studies; Medieval and Renaissance Studies; Peace Studies; Women's Studies; and Latin American, Russian, and South Asia Area Studies.

The area of concentration in history requires a total of 29 hours of history courses and eight hours (including two upperclass courses) in the related area, which should consist of a meaningful cluster of courses chosen from one or more departments, normally in the humanities, social or behavioral sciences areas. The history courses should include the following:\*

#### Survey courses 13 hours

- 1 Foundations of Western Civilization (4)
- 3 Survey of U.S. History to 1865 (3)
- 4 Survey of U.S. History since 1865 (3)
- 100 History of Modern Europe (3)

#### Specialized Courses 16 hours

- History Colloquium (1)
- Undergraduate Seminar (3)
- Upperclass elective in U.S. History (3)
- Upperclass elective in non-U.S. history (3)
- Two other upperclass history courses (6)

#### 29 Total History Hours

**Related Area:** 8 hours (including two upperclass courses)

\*With the consent of the departmental director of undergraduate studies, certain of the history requirements can be waived for students pursuing interdisciplinary programs or dual degrees.

## LIBRARY SCIENCE

### 111 Stewart Hall, (314) 882-4044

The best educational program for librarians consists of a broad, substantial background in the liberal arts, some specialization in a particular academic subject area, and a basic core of professional courses in library science. This training is provided in the undergraduate general education and basic skills program and in the area of concentration in library science. The area is planned by each student in consultation with the adviser. It consists of 40 hours of course work, including 18-22 hours of library science and 18-22 hours in another subject in the College of Arts and Science. Special programs combining an interest in librarianship with such fields as sociology, English, foreign languages, biology, chemistry and computer science offer fruitful possibilities.

#### Area of Concentration: 40 hours

- 211 Elementary Cataloging (3) or 312 Principles of Cataloging and Classification (5)
- 326 Developing Library Collections (2)
- 231 Elementary Reference (3) or 332 Bibliography and Reference (5)
- 341 Management of Information Agencies (3)

One of the following: 322 Literature of the Humanities (3), 323 Literature of the Social Sciences (3) or 324 Literature of Science and Technology (3) if the student has no working experience in a library; 380 Practicum (3).

Primary academic specialization (18-22)

Students who expect to qualify as public school librarians should consult the College of Education section of this catalog for details regarding certification requirements.

## LINGUISTICS

### 231 Arts Sciences Bldg., (314) 882-3582

Linguistics is the study of human language as a dimension of human behavior. It seeks to understand and explain language in a clear and

formal manner. Although specialists in this field commonly do know one or more foreign languages, such knowledge is complementary rather than essential.

The area of concentration in linguistics, leading to the AB degree, offers students a liberal education and prepares them for postgraduate study in linguistics or a related field. Many professional opportunities in linguistics require an advanced degree or a second major. A student in linguistics develops verbal and analytical skills that are valuable in many different careers.

The area of concentration consists of at least 24 semester hours in linguistics courses numbered 100 or above, including the three core courses 371, 372, and 374 and one of the following: 120, 306, 308, 373, 383 or 393. No more than six hours of Linguistic 350, Special Readings, may be included in the area.

#### Sample Area of Concentration

##### Core courses

- 371 Introduction to General Linguistics (3)
- 372 Techniques of Linguistic Analysis (3)
- 374 Issues in Linguistic Analysis (3)
- One of the following: 120 Languages of the World (3), 306 Sociolinguistics (3), 308 Historical Linguistics (3), 373 Linguistic Phonetics (3), 383 Studies in Linguistics (3), 393 Field Methods in Linguistics (4).

Other Courses in Linguistics (total of 12 hours from linguistics listings), a sample program might include:

- 319 The Structure of American English (3)
- 335 Philosophy and Language (3)
- 346 Language and Culture (3)

Courses Outside the Department (total of 9 hours of related courses): Courses are chosen mostly from one of a wide number of other fields, such as anthropology, computer science, English, foreign languages, geography, history, mathematics, philosophy, psychology, sociology, speech or statistics.

A program of study leading to an AB with Honors also is available. In addition, the linguistics area program offers an MA degree.

## MATHEMATICS

### 202 Math Sciences Bldg., (314) 882-6221

The language and methods of mathematics are fundamental to an understanding of almost every science. Furthermore, the increasing use of computers in our society is generating a growing need for mathematical knowledge in many areas outside of the sciences; thus, the mathematics department provides mathematical training needed to pursue careers in a number of diverse areas. Students may select areas of concentration combining mathematics with computer science, statistics, actuarial science, physics, chemistry, biology, economics, philosophy and a number of other fields.

#### REQUIREMENTS

The minimum requirements for the area of concentration consists of:

Calculus 80, 175, 201

A minimum of eight courses numbered above 300 in mathematics, statistics or computer sciences. At least six of these courses must be in mathematics.

These courses must include at least one course in each of the following: differential equations (304 or 308), linear algebra (331, 341 or 324), advanced calculus (302, 310 or 309).

These courses also must include at least two of the following sequences:

- Applied advanced calculus (302 and one of 303 or 305)
- Applied mathematics (308, 309)
- Advanced calculus (310, 311)
- Numerical Analysis (323, 324)
- Probability or statistics (325, 326)
- Algebra (340, 341)
- Topology or geometry (372 and one of 362, 366 or 367).

Exceptions to these requirements must be approved by the director of undergraduate studies and must be an equivalent variation of these requirements.

## SUGGESTED PROGRAMS

Students majoring in mathematics usually have career options requiring (1) a thorough knowledge of higher mathematics or (2) a sound mathematical background with an applied emphasis or (3) training suitable for teaching high school mathematics.

Below are some course suggestions which are appropriate for each of these options. Many alternate programs are available.

#### Sample Program of Option (1) (Pure)

- 80 Analytic Geometry and Calculus (5)
- 175 Calculus II (5)
- 201 Calculus III (3)
- 304 Differential Equations (3)
- 305 Introduction to Complex Variables (3)
- 310 Advanced Calculus I (3)
- 311 Advanced Calculus II (3)
- 340 Introduction to Abstract Algebra I (3)
- 341 Introduction to Abstract Algebra II (3)
- 358 Mathematical Logic (3)
- 366 Foundations of Geometry (3)
- 372 Introduction to Topology (3)

#### Sample Program of Option (1) (Applied)

- 80 Analytic Geometry and Calculus I (5)
- 175 Calculus II (5)
- 210 Calculus III (3)
- 305 Introduction to Complex Variables (3)
- 308 Applied Mathematics I (3)
- 309 Applied Mathematics II (3) or 324 Numerical Linear Algebra (3)
- 310 Advanced Calculus I (3)
- 311 Advanced Calculus II (3)
- 320 Introduction to Mathematical Statistics (3)
- 323 Numerical Analysis (3)
- 340 Introduction to Abstract Algebra I (3)
- 341 Introduction to Abstract Algebra II (3)

#### Sample Program of Option (2)

- 80 Analytic Geometry and Calculus I (5)
- 175 Calculus II (5)
- 201 Calculus III (3)
- 302 Advanced Calculus with Applications (3)
- 305 Introduction to Complex Variables (3)
- 308 Applied Mathematics I (3)
- 323 Numerical Analysis (3)
- 324 Numerical Linear Algebra (3)
- 325 Introduction to Probability Theory (3)
- 326 Statistical Inference I (3)
- 331 Matrix Theory (3)
- 337 Applied Modern Algebra (3)
- Sample Program of Option (2) (Computer Oriented)**
- 80 Analytic Geometry and Calculus I (5)
- 175 Calculus II (5)
- 201 Calculus III (3)
- Computer Science 303 Programming Languages and Their Compilers I (3)
- Computer Science 305 Assembly Language Programming (3)

- 308 Applied Mathematics I (3)
- 309 Applied Mathematics II (3)
- 320 Introduction to Mathematical Statistics (3)
- 323 Numerical Analysis (3)
- 324 Numerical Linear Algebra (3)
- 331 Matrix Theory (3)
- 337 Applied Modern Algebra (3)
- Sample Program of Option (3)**
- 80 Analytic Geometry and Calculus I (5)
- 175 Calculus II (5)
- 201 Calculus III (3)

- 250 Survey of Mathematics (3)
- 302 Advanced Calculus with Applications (3)
- 304 Differential Equations (3)
- 320 Introduction to Mathematical Statistics (3)
- 331 Matrix Theory (3)
- 358 Mathematical Logic (3)
- 366 Foundations of Geometry (3)
- 372 Introduction to Topology (3)

Students in secondary education may count 331 and 333 as one of the required sequences.

Recommended courses for related areas, electives, or general requirements are:

## Computer Science

- 104 Computers and Programming I (3)
- 203 Computers and Programming II (3)
- 305 Assembly Programming Language (3)

## Statistics

- 307 Nonparametric Statistical Methods (3)
- 320 Introduction in Mathematical Statistics (3)
- 375 Operations Research (3)

## Physics

- 123 University Physics (3)
- 124 University Physics (3)
- 314 Mechanics (3)

It is strongly recommended that all mathematics majors have at least one course in the computer sciences. Individual programs should be worked out with an adviser in order to best meet specific needs and requirements. The area of concentration generally is completed during the sophomore year.

The three career options mentioned above can lead to a wide variety of opportunities. Some of the possibilities are given below.

**Option 1.** Programs of study that provide a thorough knowledge of higher mathematics are suggested for those who wish to pursue a higher degree in a mathematical, physical or engineering science. Students who are interested in Option 1 and who wish to seek careers in industry immediately after the AB degree should take some upperclass courses in computer science and the physical sciences.

**Option 2.** Programs of study that provide a sound mathematical background with an applied emphasis are suggested for those who wish careers that combine undergraduate mathematics with other fields. Careers in scientific programming require a background in computer science as well as mathematics. A broad knowledge in the physical sciences is required for careers in industrial mathematics. Additional courses in economics, accountancy, finance, statistics and computer science are suggested for those who seek careers in business or actuarial science.

**Option 3.** Programs of study in Option 3 are intended for those who wish to pursue a career in secondary education.

Students interested in a degree in mathematics with Honors should contact the director of undergraduate studies.

The mathematics department offers graduate work leading to the degrees of master of arts, master of science in applied mathematics, master of science for teachers, and doctor of philosophy.

**Credit by Examination in Mathematics.** Credit in Mathematics 10, College Algebra, is awarded on the basis of the student's score on a mathematics test taken by all incoming freshmen. Transfer students may qualify for credit by taking an algebra test administered in the department.

**Credit in Mathematics 80,** Analytic Geometry and Calculus I, and Mathematics 175, Calculus II, may be awarded on the basis of examinations administered in the department. These examinations are designed for students who have had a comprehensive, one-year course in calculus in high school. Credit in Mathematics 80 also may be awarded on the basis of a ranking of three or better on the AB Calculus Examination of the College Entrance Examination Board and credit for Mathematics 80 and 175 will be awarded on a ranking of three or better on the BC courses in the

department is available to students who qualify by virtue of their background for the examination. Credit for a course by examination is not available to students who have essentially covered the material of the course in college or university courses.

## MILITARY SCIENCE (ARMY ROTC)

202 Crowder Hall, (314) 882-7721

The purpose of the military science department is development of well-educated young men and women for positions of responsibility in the U.S. Army. Army ROTC cadets may request to go into the regular Army, the Army Reserve, or the Army National Guard upon graduation.

### Benefits

Army ROTC offers UMC students:

1. A challenging, important, and well-paid job at graduation in one of the many professional fields that the modern Army has to offer. The starting pay for a second lieutenant is approximately \$17,000 per year.

2. College financing. All students accepted in the final two years of Army ROTC are paid a minimum of \$2,500 (all receive \$100 per month for 10 months each year, plus a salary and transportation expenses for a six-week summer training session).

3. One-, two-, three-, and four-year scholarships. Fully enrolled University students are eligible for the many ROTC scholarships. Army ROTC scholarship students receive \$100 per month and total payment for University tuition, incidental and laboratory fees, books and school supplies, and travel expenses.

4. Option of two careers. Upon graduation and commissioning as officers in the U.S. Army, students may fulfill their military obligation by agreeing to serve three years on active duty. Included are many benefits such as travel, free medical and dental care, 30 days paid vacation per year and advanced educational opportunities.

Students may request instead to serve in the Army Reserve or National Guard. For those preferring a civilian job after graduation, experience as an Army ROTC graduate is a strong plus on any resumé.

### THE PROGRAM

College students who successfully complete the program earn commissions as second lieutenants in the U.S. Army at the same time they receive their degrees at UMC. Although students normally begin the program as freshmen, they may enter at any point in their first four semesters. Students who are veterans enroll one semester at a time and assume no obligation either to continue that semester or for any military service of any kind. ROTC students attend a summer advanced camp (with pay) for six weeks between their junior and senior years.

### FOUR-YEAR PROGRAM

The military science curriculum is traditionally offered as a four-year program. It is best started during the freshman year, but special arrangements can be made for those who elect to start as sophomores. The first two years of military science are intended to give the student

a perspective on what the Army has to offer. Attendance during the first two years is completely voluntary and the student may drop out at any time, with no obligation. The student who decides to continue in ROTC for the third and fourth years signs a contract acknowledging that fact with the Department of the Army. Students agree to take military science for two academic years, to accept a commission in the U.S. Army at graduation and to spend some time (a minimum of three months) on active duty. In return, the Army pays the student a tax-free subsistence allowance of \$2,500 during the last two academic years and provides necessary uniforms and texts.

### TWO-YEAR PROGRAM

The two-year program is designed to provide greater flexibility in meeting the needs of students desiring Army commissions. UMC students who did not participate in the four-year program and junior college transfers are eligible for enrollment. Basic prerequisites for entering the two-year program are:

1. Applicants must be in good academic standing, pass the Army Officers Qualifying Test and the Army medical examination.

2. The student must have at least two academic years of study remaining—either as an undergraduate, graduate or any combination.

The student will attend a six-week summer basic training camp. Graduation from basic camp places individuals on a military training level with students in the four-year program. Attendance at the basic camp does not obligate the prospective ROTC student in any way. It is intended to give the student a look into what the Army is and has to offer.

### SIMULTANEOUS MEMBERSHIP

Students who qualify for the Simultaneous Membership Program (member of Army Reserve or National Guard and Army ROTC program) can earn more than \$6,500, depending on academic year. SMP students receive Reserve or Guard pay at the minimum level of Sergeant E-5 and \$100 a month from the ROTC advanced course.

At the completion of the second year of advanced ROTC, students are commissioned as second lieutenants, serving with a Reserve or Guard unit until completing their college degree. Upon graduation, a student may request to continue Reserve or Guard service or compete for active duty.

### SCHOLARSHIPS

Army ROTC currently has 12,000 scholarships in effect, which pay tuition, incidental fees, laboratory fees and other educational expenses. In addition, a tax-free subsistence allowance of \$100 per month is paid for up to 10 months of each academic year, plus a mileage allowance from home to college. The total value of a four-year Army ROTC scholarship can exceed \$12,000.

### ACADEMICS

UMC Army ROTC academics consists of two parts: (1) earning a degree in whatever field the student chooses, and (2) completing 18 credit hours (four-year program) or 12 credit hours (two-year program) of the military science curriculum. The courses in military science are college level academic courses, most of which receive full academic credit on cam-

pus and count on the student's grade point average.

The military science curriculum is designed to complement a student's baccalaureate degree course of study, but does not provide technical training in a job specialty or vocational training. The curriculum consists of classroom instruction and laboratory sessions each semester. Classroom instruction is supplemented each semester with a weekly leadership laboratory in which students are trained in applied leadership.

### GRADUATE STUDY

The Army realizes there is an increasing demand for graduate education among its personnel. Several programs have been established to provide this training. ROTC cadets are permitted to accept civilian fellowships, grants and other national international scholarships offered for graduate study by eligible donors. Regular Army ROTC graduates who accept one of these receive their full Army pay and allowances.

### QUALIFICATIONS

All students who desire to enter the Army ROTC program must be U.S. citizens, of sound, physical condition and of the highest moral character. Students must be at least 17 years old to enroll, but not more than 28 years of age upon graduation and commissioning. Additional qualifications for admittance into the final two years include an academic average of C or better; a satisfactory score on the Army Officers Qualifying Test, ACT, or SAT examinations; and successful completion of the Army medical examination.

### CADET ACTIVITIES

Army ROTC students may participate in many extra-curricular activities during the year. Participation is elective.

The cadets sponsor athletic teams in all major sports for competition in campus leagues. The National Society of the Pershing Rifles represents UMC in numerous local, state and regional drill and marksmanship competitions. The Pershing Rifles includes training in special skill areas such as mountaineering, camping and water crossing techniques. A small-bore rifle range, excellent international match quality rifles and auxiliary equipment are provided for rifle team participants. Students interested in journalism publish the cadet newspaper.

Social activities include the Tri-Service Ball, Ozark float trip, picnics and informal parties during the year. Army ROTC students support various campus and community service activities. They may volunteer to usher at varsity athletic events and receive free admittance.

### SPECIAL TRAINING

Selected volunteers may attend one of several special schools during the summer; the Airborne Course at Fort Benning, Ga.; Air Assault School at Fort Campbell, Ky.; Jungle Warfare School in Panama; or the Northern Warfare School in Alaska. Successful course completion earns the coveted badge (such as the jump wings or air assault wings) associated with each school.

Special Cadet Troop Leader Training is available on a limited basis. Students participating in the program live and work with an active

Army unit during part of one summer.

## MUSIC

### 140 Fine Arts Center, (314) 882-2640

The music department, an institutional member of the National Association of Schools of Music, offers instruction to those who wish professional training in music as well as those who wish to pursue music as an avocation. Applied music instruction in piano, organ, voice, string, wind, brass and percussion instruments is offered by the department for beginning as well as advanced students. Practice facilities for the students are available. Elementary and advanced courses are given in theory and composition. The appreciation, literature and history of music are covered by survey and specialized courses.

The department also offers the opportunity for all students of the University to participate (for credit or non-credit) in various performing groups. The University Philharmonic Orchestra, Marching Band, Symphonic and Concert bands, Choral Union, University Singers, Singations, Collegium Musicum, Chamber Singers, Concert Chorale, Opera Workshop, Brass Choir, and the string, percussion, and wind chamber ensembles give regular programs on campus and throughout the state. Membership in these groups is open to interested students by audition.

The bachelor of music degree is a professional degree and offers the maximum concentration in music. The student may emphasize instrumental, keyboard or vocal music; music theory; composition; music history, or music education. The specific requirements vary, but all students are required to have a minimum of 20 hours in individual performance study courses, 24 hours of theory and 8 hours of music history.

Detailed information on music instruction and programs, including courses in music education for teachers, is outlined in the departmental bulletin.

## PHILOSOPHY

### 438 General Classroom Bldg., (314) 882-2871

The philosophy department offers undergraduate and graduate courses in the main areas of philosophy: logic, ethics, epistemology (theory of knowledge) and metaphysics (theory of reality), and in the major periods of the history of philosophy (ancient, medieval, early modern, 19th century and contemporary). The department also offers courses in conjunction with the Honors College and such interdisciplinary programs as South Asia Area Studies, Latin American Studies, Linguistics and Peace Studies. The undergraduate program in philosophy leads to an AB degree; the graduate program offers both an MA and PhD.

Undergraduates pursuing an area of concentration in philosophy are required to complete 24 semester hours of philosophy courses and nine semester hours (including six hours in upperclass courses) in a related field. The philosophy courses must include the following survey of the field and its history.

One course in logic (10 or 314)

One course in ethics (5 or 135 or 213 or 317 or 327 or 331 or 332 or 366)

204 Ancient Western Philosophy

205 Early Modern Philosophy

206 Kant to Hegel or 207 19th Century Philosophy

208 Contemporary Philosophy

Philosophy majors supplement these required courses with six or more hours of upperclass electives in which they study an aspect of the field in greater detail. The nine semester hours of course work in a field related to philosophy may be done in one or more departments, but students are urged to concentrate on one department closely related to their main interest in philosophy, such as classical studies for students interested in ancient philosophy, mathematics for students interested in logic. The undergraduate offerings in philosophy also include six semester hours of Honors courses to supplement the regular requirements for philosophy majors. These courses coupled with the regular requirements lead to an AB degree with Honors in philosophy.

A major in philosophy offers students a liberal education, prepares them for graduate work in the field and for advanced work in other liberal arts. A major in philosophy has traditionally been an excellent preparation for advanced work in law or the ministry.

## PHYSICS

### 223 Physics Bldg., (314) 882-3434, 882-3335

Physics is the science which studies the structure and properties of matter and transformations of energy. With mathematics as the language and experimental verification as a guide, physical study has established the fundamental laws of nature that are the foundation of all natural science and technology. The study of physics includes learning the general principles and the phenomena which have been discovered and developing the skills which enable such knowledge to be advanced through research.

The study of physics is the starting point for many career opportunities; training in physics allows immense flexibility for the future not only in terms of additional study, but in terms of ability to fit into jobs and job training in many areas. A traditional path is to continue the study of physics in graduate school to earn a master of science or doctor of philosophy degree, a necessary achievement to be qualified to teach and continue research in a college or university. A background in physics is preparation for continued study in a wide variety of fields including geophysics, health physics, meteorology, all other sciences, as well as medicine, law, business, and many other professions. Other opportunities for both those with bachelor of science degrees or those with advanced degrees are to be found in a variety of industries and in state and federal laboratories and agencies.

Astronomy is the study of all phenomena outside the limits of our planet; as such it involves the application of physics to interpretation of observable phenomena from the near space environment surrounding the earth to the distant limits of the universe. Astronomical science is a smaller field than physical science, but employment opportunities at the bachelor's level exist in federal laboratories (NASA), at other institutions where technical management,

telescope and planetarium operation, and, in some cases, research projects are carried out, and in industry. More direct involvement in astronomical research and/or employment at the university level or at major astronomical research observatories requires a graduate degree.

The department offers two basic undergraduate degrees, the bachelor of arts and the bachelor of science. The AB degree requires fewer physics and mathematics courses (32 credit hours of physics and 21 credit hours of mathematics and other sciences) and is particularly suited for students who are planning to enter medical school or who wish to earn a life teaching certificate from the College of Education. Most physics majors will prefer to earn a BS degree (37 hours of physics and 27 hours of mathematics and chemistry) which gives the solid foundation for the further graduate studies necessary for most careers in physics and other sciences. The core courses for each of these degrees as well as for the astronomy option are given below:

#### Area of Concentration - AB

80, 123, 124 University Physics I, II and III (9)  
190 Undergraduate Seminar (1)  
215 Intermediate Modern Physics (3)  
304 Principles of Physical Measurements (3)  
310 Electricity and Magnetism I (3)  
314 Mechanics (3)  
380 Modern Physics I (3)  
Mathematics 80, 175, 201 Calculus I, II and III (13)  
Mathematics 304 Differential Equations (3)  
Chemistry 11 General Chemistry (5)

#### Area of Concentration - BS

80, 123, 124 University Physics I, II and III (9)  
180 Undergraduate Seminar (2)  
215 Intermediate Modern Physics (3)  
304 Principles of Physical Measurements (3)  
306, 307 Advanced Physics Laboratory I and II (6)  
310 Electricity and Magnetism I (3)  
314 Mechanics (3)  
380, 381 Modern Physics I and II (6)  
Mathematics 80, 175, 201 Calculus I, II and III (11)  
Mathematics 304 Differential Equations (3)  
Chemistry 11 General Chemistry (5)

#### AREA OF CONCENTRATION - ASTRONOMY

The curriculum requirements are basically the same as those for a BS degree in physics with the addition, as elective courses, of the following:

Astronomy 201 Introduction to Modern Astrophysics (3)  
Astronomy 202 Astronomical Observations and Measurements (2) and two or three of  
Astronomy 315 Solar System Astrophysics (3)  
Astronomy 320 Observational Astronomy (3)  
Astronomy 325 Stellar Astrophysics (3)  
Astronomy 340 Extragalactic Astronomy (3)

Students who expect to continue their studies at the graduate level should note that many universities require that master's degree and doctoral candidates have the ability to use a foreign language. However, the student who aims at a career in business or industry without the need for an advanced degree may wish to elect an emphasis area as an alternative to study of the optional foreign language. The emphasis area is a concentration of 12 or 13 hours in a subject other than physics or astronomy, typically four three-credit-hour courses in a single field. Depending upon the individual student's interests and career goals, the emphasis area elected may include any of the following: geology, chemistry, library science, radiation biology, health physics, computer science, electrical engineering, nuclear engineering, law, etc. The objective of the emphasis area is to enhance the employment opportunities for the graduate with a bachelor's degree. Each

student's emphasis area will be planned carefully under the direction of the departmental undergraduate adviser.

The physics department offers O.M. Stewart Scholarships to physics majors at the sophomore, junior and senior levels. The award is based on scholastic achievement and is renewed annually. It may be held in addition to University scholarships and other sources of financial assistance. Application is made to the departmental chairman of the O.M. Stewart Fund Committee.

Additional information on the requirements for undergraduate work and on the O.M. Stewart Scholarship is detailed in the brochure *Physics and Astronomy at the University of Missouri-Columbia* available from the department office.

The department also offers several courses designed for non-science students. These include Physics 3, Physical Science (5), as well as Astronomy 1, Introduction to Astronomy (4), Astronomy 2, Introduction to Laboratory Astronomy (2), and Astronomy 110, Archaeoastronomy (3). All satisfy the arts and science requirements for physical science course work.

## POLITICAL SCIENCE

### 114 Professional Building, (314) 882-2062

Political science is concerned with government, politics and public policies. In political science courses, students learn how the government operates and how to analyze and evaluate public policies and political ideas. This training can help students be more effective as active citizens, as political leaders and as government administrators.

Almost one-half of the political science graduates attend law school or attend graduate school studying political science, public administration, business administration, library science or other subjects. Other political science graduates are employed as budget analysts, legislative correspondents, military officers and teachers. Many public officials and government administrators have political science degrees.

**Internships.** The political science department offers four internship programs, with at least one internship being offered every semester. Students are encouraged to take one or two internships to gain practical experience. Student interns work with state legislators, administrative agencies, political candidates and lobbyists. A special intern is selected each semester to work with state elected officials and state political parties.

**Honors Program.** Students with a 3.3 grade point average may enter the department Honors program. Students who successfully complete Honors projects in three of their advanced political science classes will have the phrase "with Honors in Political Science" added to their diploma.

**Preparation for Graduate School.** Students who plan to enter graduate school are encouraged to enter the Honors program and to take the two methodological courses: 324, Survey Research Methods, and 326, Data Analysis in Survey Research. Students who plan to take the public policy option in the political science master's program at UMC also are encouraged

to consult with Professor Hardy about procedures that will allow the student to complete the BA and the Public Policy MA in five years.

**Government Service.** This area is designed especially for students who want political science training in order to become government administrators. The student must take the following courses:

102 State Government, or 306 Municipal Government  
150 Comparative Political Systems, or 262 Classical Political Thought, or 263 Modern Political Thought  
332 Administrative Agency Internship, or 333 Legislative Internship  
210 Current Issues in American Politics  
310 Introduction to Public Administration  
316 Congress and Legislative Policy, or 320 The American Constitution, or 340 The American Presidency  
330 Governmental Budgeting, or Public Administration  
354, Public Budgeting, or Accountancy 325, Governmental Accounting and Budgeting  
Economics 141, Evolution of Industrial Society, or Economics 215, Economics of Public Policy: Government Finance, or Economics 253, Macroeconomic Policy  
Management 310, Personnel Management  
Statistics 31, Elementary Statistics  
Accountancy 36, Accounting I  
Accountancy 37, Accounting II

**Public Information and Reporting.** Designed for students who want to be governmental press secretaries or public information specialists, interest group lobbyists or government reporters, this program combines a liberal arts background with some training in journalism. A GPA of 3.0 or above is required. The journalism courses also can be applied to a master's degree in journalism at UMC. Students must take the following courses:

332 Administrative Agency Internship, or 333 Legislative Internship, or 334 Campaign Internship, or 335 Lobbying Internship  
two of the following courses: 102 State Government, 306 Municipal Government, 310 Introduction to Public Administration, 311 Administrative Regulation of Business  
two of the following courses: 305 Political Parties, 307 Political Campaigns and Voter Behavior, 316 Congress and Legislative Policy, 325 Politics of Pressure Groups  
a 300-level course in international affairs or comparative government  
263 Modern Political Thought, 360 American Political Thought, or 364 Recent Democratic Theory  
Journalism 105, News  
Journalism 110, Editing  
Journalism 120, Advertising Principles and Practice  
Journalism 322, Public Relations  
Journalism 304, Communications Law

**Political Leadership.** This area is designed for students who want to serve in elected or appointive office. It combines training in techniques needed to win office with the principles of policy analysis needed by the person who is selected for office. Students must take the following courses:

332 Administrative Agency Internship, or 333 Legislative Internship, or 334 Campaign Internship, or 335 Lobbying Internship  
three of the following: 305 Political Parties, 307 Political Campaigns and Voter Behavior, 325 Politics of Pressure Groups, 340 American Presidency  
151 Politics and the Military, or 314 American Foreign Policies  
324 Survey Research Methods, or 326 Data Analysis in Political Research  
102 State Government, or 306 Municipal Government  
317 Public Policy, or 320 The American Constitution  
Sociology 210, Public Opinion and Communication  
Economics 215, Economics of Public Policy: Government Finance  
Psychology 260, Social Psychology  
Psychology 371, Attitude Change

**Public Policy.** This area is designed especially for students who wish to analyze and evaluate public policies for governmental bodies or private organizations. Students must take

the following courses:

- 332 Administrative Agency Internship, or 333 Legislative Internship, or 335 Lobbying Internship
- 310 Introduction to Public Administration, or 311 Administrative Regulation of Business
- 314 American Foreign Policies, or 360 American Political Thought
- 316 Congress and Legislative Policy, or 325 Politics of Pressure Groups
- 317 Public Policy
- 319 Public Policy Analysis
- 324 Survey Research Methods
- 326 Data Analysis in Political Research

In addition, students are required to take 12 hours outside the field of political science in some substantive area or areas of public policy such as agriculture, criminal justice, economics, energy, health, welfare and the like. (The selection of such courses should be carefully worked out with the student's adviser.)

## PSYCHOLOGY

### 210 McAlester Hall, (314) 882-6860

The undergraduate AB degree program in the psychology department stresses the scientific and experimental foundations of psychology. The department has prepared a brochure, available upon request, which describes its areas in greater detail. It contains recommended areas for students desiring a strong liberal education and background for people-oriented careers (personnel work, child development, etc.) and areas for those desiring to pursue graduate work in psychology (experimental, clinical, counseling, social) or other fields (medicine, law, ministry, etc.) A booklet describing each course offered in psychology is available for examination in the department office. There are many career options for people with education in psychology. A pamphlet describing these options is available for examination in the department office or in the CPPC.

The minimum requirements for an area of concentration in psychology are 24 hours (including statistics) and a minimum of eight hours in related departments for a total of 32 hours in the area. (At least 20 hours must be 100-level area courses or above.) The 13 hours of electives in psychology must be regularly scheduled courses with adequate representation of different subfields.

A student may select additional courses in psychology (up to 40 hours total) in order to prepare for a career in a specific specialty area. The eight-hour related department requirement may be met by taking courses in certain professional divisions on campus, or in other departments of Arts and Science. The dual major plan also is encouraged.

#### AREA OF CONCENTRATION

- 1 General Psychology (3) and 3 Experimental Psychology (2) or 2 General Experimental Psychology (5)
- Statistics 31 Elementary Statistics (3)
- 215 Research Methods in Psychology (3)
- Psychology electives (13). Six hours must be in 300-level courses. One course must be with lab or be a research course.
- Courses from related departments (8)

## ROMANCE LANGUAGES

### 27 Arts and Science Bldg., (314) 882-4874

The Romance Languages department offers language and literature courses in French, Italian, Portuguese, and Spanish. An area in general linguistics also is available. A student

may elect to prepare an area of concentration in French, Italian or Spanish. In French and Spanish, a student may choose between a language-centered area of concentration and literature-centered area.

Students may elect to have a double major (an AB degree with a major in French, Italian or Spanish and a degree in another college or school).

The department also offers, in cooperation with other departments, a special area in Latin American Studies, described under Interdisciplinary Areas of Concentration.

#### AREAS OF CONCENTRATION

**French (literature emphasis).** A student must include in the area of concentration a minimum of 30 hours of courses in the major language beyond the courses used to satisfy the basic skills requirement in foreign languages. The following courses or their equivalents must be included in the area:

- 106 French Composition (3)
- 109 French Conversation (3)
- 203 Masterpieces of French Literature (3)
- 206 Advanced French Composition (3)
- 209 Advanced French Conversation (3)
- 256 Stylistics (3)

Four 300-level courses, one of which must be in literature (excluding 350). A minimum of 12 hours beyond the elementary courses (9-10) in another foreign language: 3, 106, 109, and one 200-level course. These courses meet the eight-hour requirement outside the department.

**Spanish (literature emphasis).** A student must include in the area of concentration a minimum of 27 hours of courses in the major language beyond those used to satisfy the basic skills requirement in foreign languages. The following courses or their equivalents must be included in the area:

- 106 Spanish Composition (3)
- 109 Spanish Conversation (3)
- 203 Introduction to Hispanic Literature I (3)
- 204 Introduction to Hispanic Literature II (3)

Two 300-level courses in Spanish American literature (one early, one modern)

A 300-level course in literature or language, excluding 350.

Courses to meet the eight-hour requirement outside the department are recommended in anthropology, art history and archaeology, classical studies, English, geography, Germanic and Slavic literatures, history, linguistics, music history and literature, philosophy or political science.

**Spanish (language emphasis).** A student must include in the area of concentration a minimum of 33 hours of courses in the major language beyond those used to satisfy the basic skills requirement in foreign languages. The following courses or their equivalents must be included in the area:

- 106 Spanish Composition (3)
- 109 Spanish Conversation (3)
- 203 Introduction to Hispanic Literature I (3)
- 204 Introduction to Hispanic Literature II (3)
- 206 Advanced Spanish Composition (3)
- 209 Advanced Spanish Conversation (3)
- 256 Stylistics (3)

Four 300-level courses, one of which must be in literature (excluding 350), a minimum of 12 hours beyond the elementary courses (9-10) in another foreign language: 3, 106, 109, and one 200-level course. These courses meet the eight-hour requirement outside the department.

**Italian.** The area of concentration in Italian must include a minimum of 30 hours of courses in Italian beyond those used to satisfy the basic skills requirement in foreign languages. The following courses or their equivalents must be included in the area:

- 106 Italian Composition (3)
- 109 Italian Conversation (3)
- 110 Italian Civilization (3) (taught in English)
- 206 Advanced Italian Composition (3)

209 Advanced Italian Conversation (3)

311 Survey of Italian Literature I (3)

312 Survey of Italian Literature II (3)

At least nine hours in other 300-level literature courses. Candidates for the AB with an area of concentration in Italian are encouraged to take the eight required hours of course work outside the major in another Romance Language or in linguistics.

## SOCIOLOGY

### 109 Sociology Bldg., (314) 882-8331

The study of sociology gives students insights into the social relationships among humans, the changes occurring in values and institutions, and the social problems facing contemporary society.

The department requires the following five courses:

- 1 Introduction to Sociology (3)
- 180 Social Research I (3)
- 282 Senior Seminar (3)
- 298 The Rise of American Sociology (3)
- 299 Recent Theories in Sociology (3)

Three additional courses in sociology are required, although a student may take more, up to a maximum of 40 hours. Choice of the three additional courses depends upon a student's interests and goals. The student may elect a liberal arts option which involves selection of three courses suited to a student's unique needs. In addition, the department offers seven special emphasis course sequences in the following areas (faculty advisers for each sequence are listed in parentheses after each area): business and society (Benson, Jenkins), prelaw/justice studies (Gallagher, McCartney), health care management (Twaddle, Hessler), health/premedical (Twaddle, Hessler), social welfare (T. Vaughan, Woodard), social research applications (Brent, Altergott), sociology with journalism emphasis (P. Hall, Granberg, and J. Hall), and sociology with information science emphasis (Bank). The student who elects a specialized emphasis will be required to take three sociology courses in the specialized sequence and an outside area of concentration that complements this sequence.

Care in advising students is an important priority of the department. Students planning to major in sociology should seek departmental advisement as soon as possible. A brochure, prepared by the department, describes the undergraduate major in greater detail.

## SPEECH AND DRAMATIC ART

### 115 Switzler Hall, (314) 882-4431

The speech and dramatic art department offers programs leading to the AB degree in three areas of concentration.

Speech communications is elected by students who intend to enter law, public relations, business management or sales. The theater area offers courses which provide graduates with an appreciation of theater as a fine art, and prepares them for careers in theater and other fields. Radio-television-film courses prepares students both for critical understanding of mass media and careers in broadcasting and film.

#### AREAS OF CONCENTRATION

A student's program for a bachelor of arts in speech and dramatic art must include five hours of the basic requirements in speech, not more than 35 hours in one of the three fields of specialization, and eight hours in courses from other departments.

#### Theater

##### All students:

- 2 Voice and Articulation (2) or 233 Oral Interpretation of Literature (3)
- 20 Principles of Technical Theatre Production (2)
- 60 Principles of Script Analysis (2)
- 75 Introduction to Speech Communication (3)
- 120 University Theatre Workshop (1-3)
- 251 Beginning Theatrical Costume Design (3) or 252 Stagecraft (3)
- 261 Theatrical Directing (4)



Theater history, dramatic literature, dramatic criticism, dramatic theory, or playwriting in courses numbered 300 or above (6)

**Students specializing in performance:**

- 4 Stage Movement for the Actor (2)
- 243 Acting I (3)
- 244 Acting II (3)
- 320 Theatre Practicum (1-3)

Electives, such as 266 Musical Theatre Performance

**Students specializing in technical theater:**

- 251 Beginning Theatrical Costume Design (3) or 252 Stagecraft (3)
  - 220 Technical Theatre Practicum (1-3)
  - 320 Theatre Practicum (1-3)
- Plus three of the following:
- 253 Design Techniques (3)
  - 352 Scene Design (3)
  - 353 Advanced Costume Design (3)
  - 354 Stage Lighting Design (3)

**Students specializing in theater history and dramatic literature:**

Electives including six semester hours in theater history, dramatic literature, dramatic theory, dramatic criticism, and playwriting beyond the core requirement.

To meet the eight-hour requirement outside the department, theater students are encouraged to take courses in art, classics, English, home economics, or music.

Additional programs related to theater include an endorsement in dance and concentration in Fashion Design—Theater Costume Design.

**Speech Communication**

Students who wish a concentration in speech communication must have a 2.5 GPA to file an area of concentration, and they must maintain a minimum GPA of 2.5 to be graduated in this area of emphasis.

- 2 Voice and Articulation (2)
- 75 Introduction to Speech Communication
- 110 Great Speakers (2)
- 141 Nonverbal Communication (3)
- 161 Interpersonal Communications (3)
- 171 Group Communications (3)
- 173 Argument and Advocacy (3)
- 270 Culture and Communication (3)
- 276 Persuasive Speaking (3)
- 283 Contemporary American Speakers (3)
- 312 Psychosocial Aspects of Speech (3)
- 374 Persuasion (3)
- 376 Communication in Organizations (3)
- 381 Principles of Rhetoric (3)
- 382 Process of Speech Communication (3)

Courses to meet the eight-hour requirement outside the department are recommended in history, English, political science, psychology, sociology, journalism, marketing or management.

**Radio-Television-Film**

For a radio-television-film concentration, a minimum 2.3 GPA is required before students can declare themselves majors. This minimum GPA requirement must be maintained throughout the course of studies.

- 2 Voice and Articulation (2)
- 75 Introduction to Speech Communication (3)
- 105 Basic Audio Production and Performance (3)
- 205 Performance in the Visual Media (3)
- 206 Advanced Audio Production (3)
- 210 Introduction to Radio-Television-Film Writing (3)
- 302 Experimental Film and Video (3)
- 303 Film Production (3)
- 304 Radio and Television Programming and Management (3)
- 305 Television Studio Production (3)
- 307 Broadcast Regulation and Responsibility (3)
- 308 Television Program Analysis and Criticism
- 310 Film and Television Documentary (3)
- 325 Television Field Production (3)
- 330 Professional Practicum (1-6)
- 335 Television Technology (3)
- 336 Contemporary Issues in Telecommunications (3)
- 395 Professional Seminar in Television Production (3)
- 396 Professional Seminar in Film Production (3)

Electives from other speech communication, theater courses and Journalism 357 Station Management. Courses to meet the eight-hour requirement outside the department are

recommended in psychology, political science, history, English, film studies, marketing and management.

**STATISTICS**

**222 Mathematical Sciences Bldg., (314) 882-6376**

The statistics department offers undergraduate programs leading to a bachelor of arts degree in statistics.

Students interested in majoring in statistics should contact the department as early as their senior year in high school. Early admission into the undergraduate program will permit adjusting the program so that the proper mathematics and statistical prerequisites can be taken in an orderly sequence.

**REQUIREMENTS FOR THE BACHELOR'S DEGREE**

The minimum mathematics requirements are a complete calculus sequence such as Mathematics 80, 175 and 201, and Mathematics 231 Elementary Matrix Theory. The statistics requirements may vary, depending whether or not additional courses in mathematics and/or computing are taken. Statistics majors are strongly encouraged to take computer-oriented courses such as Computer Science 104 and 203, or Mathematics 323 or 324.

The statistics requirements vary from a minimum of 18 to a maximum of 24 hours. In some emphasis areas it is possible to take one or more of the above listed courses in mathematics or computing in lieu of a statistics course. The undergraduate program is very flexible and has only a minimal number of fixed requirements. It allows students to concentrate on statistics or focus their attention on a combined program of statistics and mathematics. In either case the students may develop an outside area wherein statistical methodology is useful. These areas of application normally include economics, biology, accounting, finance, marketing, management, psychology, sociology, engineering, agriculture and atmospheric science.

**INTERDISCIPLINARY AREAS OF CONCENTRATION**

Interdisciplinary areas of concentration provide for the special interests and motivations of individual students. Normally, the student who prepares an interdisciplinary area has a particular career or interest in mind, the study program for which may be broader than would be available in any one department. The departments involved in such an area may include some outside the College of Arts and Science. Usually, the student is advised by staff members from more than one department who are well acquainted with the specific aims of the student.

Interested students should consult the arts and science dean's office for assignment to the appropriate member of the Interdisciplinary Advising Committee to discuss possible programs of study. After a program for the area has been completed, it must be approved by a representative of the Interdisciplinary Advising Committee.

Existing interdisciplinary areas of concentration and information about each are included below.

**BLACK STUDIES AREA**

**420 General Classroom Bldg. (314) 882-6060**

An interdisciplinary program of specialization in black studies may be arranged as a minor area of concentration.

The black studies program is open to all students. Requirements of the program are:

1. Satisfaction of the basic skills and general education requirements in the College of Arts and Science. In selecting a language to meet those requirements, students are encouraged to consider Spanish, French or Portuguese.
2. Completion of an area of concentration in another Arts and Science program or department.
3. Completion of an interdisciplinary area of concentration of at least 32 hours in black studies and related courses.

**FILM STUDIES AREA**

**210 Jesse Hall, (314) 882-6411**

The interdisciplinary area of concentration in film studies is administered by a committee of faculty members who teach film in various UMC departments. The program is open to all undergraduate students. Anyone interested in film studies should consult the chairman of film studies who will appoint an adviser for the student. The adviser then meets with the student to design a course of studies. Each student must take a minimum of 32 hours of course work, of which at least 20 must be in upperclass courses. The only required courses are English 91 and 92, Introduction to Film. With the adviser's consent, a student may take film courses in the School of Journalism (provided the requirements for those courses are met). Other film courses are offered in the Departments of Education, English, History, German, Romance Languages, and Speech and Dramatic Art.

**GERMAN AREA STUDIES**

**451 General Classroom Bldg., (314) 882-4328**

This interdisciplinary area of concentration offers an interdisciplinary approach to the study of the language, literature, civilization, history and politics of Germany, combined with subjects selected by the student to fit with career plans. It is designed primarily to prepare the student for work with governmental agencies and with companies doing business with or in the two Germanies. It also can provide preparation for graduate work in German.

To be eligible for the program a student must have completed the basic skills and general education requirement of the College of Arts and Science, have completed the foreign language requirement of the College of Arts and Science, have completed the foreign language requirement in German, and have a 2.75 GPA.

**Requirements**

- Language and Literature (12)
- 106 German Conversation and Composition I
- 203 Advanced German Reading
- Civilization (3)
- 110 German Civilization Beginning to 1850 or 111 German Civilization 1850 to Present
- History (3)
- History 231 Contemporary Europe or History 334 Germany in the 20th Century

Political Science (3)  
Political Science 354 Western European Political Systems or  
Political Science 355 Western Europe's Foreign Policy  
Electives (15)

Courses in this category are to be chosen by the student according to the area of interest, in consultation with an adviser in the applicable area. Areas might include accountancy, anthropology, art history, computer science, economics, finance, geography, history, management, marketing, philosophy, political science, 300-level German language or literature courses, as well as relevant courses offered by other departments, with a view of working out a cohesive program suited to the student's goals.

A total of 36 hours is required. The study of another foreign language and/or additional courses in German may be recommended particularly to those students who are interested in graduate work.

## HONORS INTERDISCIPLINARY AREA

**612 Kuhlman Court, (314) 882-3893**

A special student-designed area of concentration is available to students who qualify for departmental Honors programs. The required grade point average for participation in the program is outlined in the Honors College section of the Arts and Science section of this catalog.

This area permits Honors students to pursue subject matter fields or broad programs of study not regularly offered in traditional areas of concentration.

The requirements for this area stipulate that:

1. A student must take at least 32 hours of courses in at least three departments (30 hours must be in courses at the 200 level or above; however, all GH 100 courses, including GH101-104, may be substituted).

2. Must take at least four courses at the 200 level or above in one department.

3. Must have the area of concentration approved by two Honors directors of departments in which the student will be studying.

4. Must secure the final approval of the area of concentration by the program coordinator.

## LATIN AMERICAN STUDIES AREA

**27 Arts and Sciences Bldg.,  
(314) 882-4874**

This interdisciplinary area of concentration is designed to provide a broad background in language, literature, philosophy and social science for students anticipating careers in government service, teaching or business in the Latin American field. Sufficient concentration in one discipline also is incorporated into the area to provide a good foundation for advanced graduate study in any one of several fields.

Since a number of the prescribed courses have prerequisites, interested students are advised to begin planning their work toward the area as early as the second semester of the freshman year.

Study abroad in an approved program is highly desirable. Students contemplating study abroad should consult their advisers before choosing programs and courses.

### Requirements

Spanish: Beyond the 13-hour basic skills requirement, a student must take six hours in Spanish language, including at least one 200-level course.

Portuguese 207 (3) Must be taken after completing 10 hours of another Romance language.

Spanish 331 or 332 Survey of Spanish American Literature I or II (3)

Economics 260 Economic Development (3)

History 167 Colonial Latin America (3) and History 168 Latin America Since Independence (3) or six hours in other Latin American history courses acceptable to the adviser.

Geography 340 Mexico and the Caribbean (3) or Geography 341 South America (3)

Political Science (3) Courses must be acceptable to the adviser. As an alternative students may take either Anthropology 334 Cultures of Mexico and Guatemala (3) or Anthropology 358 Cultures of the Caribbean (3).

All candidates for the degree in Latin American studies must take 12 hours of additional work in one of the following departments: anthropology, economics, geography, history, political science or romance languages (Spanish and Portuguese). The courses to be taken in this area of concentration are chosen by the student in consultation with the adviser.

## PEACE STUDIES

**101 Professional Bldg., (314) 882-7565**

The College of Arts and Science offers a program leading to a bachelor of arts degree with an interdisciplinary area of concentration in peace studies.

The peace studies program draws from a wide variety of courses which deal with the issue of peace. The interdisciplinary nature of the program enables a student to pursue areas of peace studies such as international agencies of world law and world order; strategies of transition to global cooperation; theories of conflict resolution; understanding and channeling aggression; disarmament logistics; non-violent methods of social change; economics of war and peace; war and peace in literature and the humanities; peace education and peace planning; anticipation and prevention of armed conflict; social, political and cultural roots of war; value assumptions underlying war and peace; and history of pacifism and non-violent resistance.

### Area of Concentration Requirements

A student concentrating in peace studies is required to fulfill the general educational requirements for a bachelor of arts degree in the College of Arts and Science, and 33 hours in peace studies, as follows:

50 Introduction to Peace Studies (3)

Two of the following seminars:

180 Seminar I: Conflict Resolution in Theory and Practice (3)

181 Seminar II: Contemporary International Conflict (3)

182 Seminar III: The History and Theory of Nonviolent Action (3)

183 Seminar IV: Images of War and Peace (3)

188-189 Senior Thesis (3-6) All must complete at least three hours.

Twenty one additional hours are to be selected from a list of 41 recommended and cross-listed courses in consultation with the program director and the student's adviser.

## RELIGIOUS STUDIES

Religious studies seeks to understand the role of religion in human life and culture. Religious expression, from all cultures in every period of history, is within its field of study. Systematic study of this rich world of expression employs the widest range of academic tools and competencies, from the skill of the literary critic and historian to the analytic abilities of the social scientist and anthropologist. Because

of this broad base, study in the department promotes fundamental academic skills and critical judgment in their use. The study of religious phenomena further provides deeper understanding of national and international culture. Students concentrating in religion are, therefore, well prepared for careers in business, government, counseling, law, medicine and journalism, as well as advanced professional study in religion itself.

Until its own degree program is established, a formal degree in religious studies is available through interdisciplinary studies. Students also may pursue an Honors major in religious studies. A minimum of 18 hours of religious studies courses is required, including RS 1, Introduction to Religion, and RS 111, Ways of Understanding Religion. At least eight hours in related areas also are required. Students are encouraged to pursue dual majors that combine religion with another interest.

## RUSSIAN AREA STUDIES

**433 General Classroom Bldg.,  
(314) 882-4328**

This interdisciplinary area of concentration is designed to provide students with an interdisciplinary approach to Russian and Soviet studies. While providing a broad background in Russian history, culture and ideology, the flexibility of the program allows for concentration within a discipline to suit the interests of the individual and provides the foundation for specialized graduate study.

Since several required courses have prerequisites, students are encouraged to begin planning their program during the freshman year and, unless they plan formal course work in the language during the summer, they should begin their language courses no later than the sophomore year.

### Requirements (33 hours)

Russian Language (6)

106 Composition and Conversation

203 Advanced Reading

Russian Literature in Translation (6)

Two of the following courses:

251 From the Beginnings to Turgenyev

252 Tolstoy and Dostoevsky

253 Russian Modernism

254 Contemporary Russian Literature

History (6)

History 138 Foundations of Russian History

History 139 Russian in Modern Times

Political Science

One of the following courses:

Political Science 356 Comparative Communist Systems

Political Science 358 Soviet Foreign Policy

Philosophy or Economics (3)

One of the following courses:

Philosophy 341 Marxism

Economics 261 Introduction to the Soviet Economy

Electives

Nine hours are to be chosen in consultation with the student's adviser from upperclass courses in Russian language, literature, history, political science, or other courses relevant to the student's interests and related to the Russian area.

## SOUTH ASIAN STUDIES

**437 General Classroom Bldg.,  
(314) 882-3065**

The area of concentration in South Asia provides the undergraduate with a firm grounding in the area along with major concentration in a specific discipline. Since language prepara-

tion is fundamental to a study of culture, the student is required to take at least three semesters of elementary Hindi. Students who wish to use Hindi to fulfill the foreign language requirement need one additional semester of Hindi. Arrangements for language study should be made early in the student's academic career. The area of concentration comprises 34 credits. Students are assigned to advisers on the basis of their disciplinary interests and should consult with the advisers in preparing a program.

#### Requirements (34 hours)

Language: Three semesters (9 hours) of elementary Hindi  
Social and Behavioral Sciences: 12 hours of courses pertaining to South Asia in two or more of the following fields: anthropology, geography, history, political science, social work or sociology

Humanistic Studies and Fine Arts: 6 hours of South Asia courses in art, art history, philosophy or South Asia studies (either Indian civilization or Asian civilization required)

Electives: 7 hours of any courses relating to South Asia, including courses on religions of India.

## WOMEN STUDIES

Students can receive a bachelor of arts degree in the College of Arts and Science with an interdisciplinary area of concentration in women studies. The women studies curriculum is composed of core and departmental courses which examine the nature, condition and experience of women. Students designing this area of concentration must take 12 hours of core courses, 12 hours of cross-listed courses, and eight hours in a related area. A listing of the core courses can be found in the description of courses section of this catalog. Current listings of the cross-listed courses can be found in the *Women Studies Courses* flyer distributed each semester prior to preregistration. Copies of this flyer can be obtained in 207 Jesse Hall.

Advising of students and aid in designing an area of concentration in women studies are available through the women studies office, 207 Jesse Hall.

#### Requirements (32 hours)

12 hours of core courses, including the following:

Women Studies 215 American Feminism

Women Studies 220 Comparative Feminist Ideologies

Women Studies 390 Senior Research Seminar

12 additional hours in departmental cross-listed courses

Eight additional hours in a related area

## FACULTY

### ADMINISTRATION

**Milton D. Glick**, dean and professor, PhD, University of Wisconsin

**Thomas B. Harris**, associate dean, MA, University of Missouri-Columbia

**David G. McDonald**, associate dean and professor, PhD, Washington University (St. Louis)

**Elmer Ellis**, president, dean and professor emeritus, PhD, University of Missouri-Columbia

**Theodore Tarkow**, associate dean and professor, PhD, University of Michigan-Ann Arbor

### ANTHROPOLOGY

**H. Clyde Wilson**, chairman and professor, PhD, University of California-Los Angeles

**Robert A. Benfer**, professor, PhD, University of Texas

**Robert T. Bray**, assistant professor, MA, University of Missouri-Columbia

**Carl H. Chapman**, professor, PhD, University of Michigan

**Richard A. Diehl**, professor, PhD, The Pennsylvania State University

**Louanna Furbee**, associate professor, PhD, University of Chicago

**Peter M. Gardner**, professor, PhD, University of Pennsylvania

**James A. Gavan**, professor, PhD, University of Chicago

**James W. Hamilton**, associate professor, PhD, University of Michigan

**Michael J. O'Brien**, assistant professor, PhD, University of Texas

**Michael C. Robbins**, professor, PhD, University of Minnesota

**Ralph M. Rowlett**, professor, PhD, Harvard University

**Robert F.G. Spier**, professor, PhD, Harvard University

**Samuel D. Stout**, associate professor, PhD, Washington University

### ART

**Frank Stack**, professor and chairman, MA, University of Wyoming

**Donald Bartlett**, professor, MFA, Cranbrook Academy of Art

**Jerry D. Berneche**, professor, MFA, University of Ohio

**William Berry**, professor, MFA, University of Southern California

**Robert Bussabarger**, professor, MA, Michigan State University

**Brooke Cameron**, professor, MA, University of Iowa

**Jean Garrett**, assistant professor, MFA, School of the Art Institute of Chicago

**Larry Kantner**, professor, EdD, The Pennsylvania State University

**Stephen Lahr**, assistant professor, EdD, University of Nebraska

**Robert M. Pringle**, assistant professor, MFA, University of Kansas

**Lawrence Rugolo**, professor, MFA, University of Iowa

**Erica Rutherford**, professor, University of London (England)

**Oliver Schuchard**, associate professor, MFA, Southern Illinois University

### ART HISTORY AND ARCHAEOLOGY

**Vera Townsend**, associate professor and chairman, PhD, Emory University

**Edzard Baumann**, associate professor, PhD, Vienna

**William Biers**, professor, PhD, University of Pennsylvania

**Patricia Crown**, assistant professor, PhD, University of California-Los Angeles

**Norman Land**, associate professor, PhD, University of Virginia

**Albert Leonard Jr.**, associate professor, PhD, University of Chicago

**Osmund Overby**, professor, PhD, Yale University

**Kathleen Slane**, assistant professor, PhD, Bryn Mawr College

**Homer Thomas**, professor, PhD, Edinburgh

### BIOLOGICAL SCIENCES

**Warren R. Fleming**, director and professor, PhD, University of Oregon

**Paul F. Agris**, associate professor, PhD, Massachusetts Institute of Technology

**Robert P. Breitenbach**, professor, PhD, University of Wisconsin

**Allan B. Burdick**, professor, PhD, University of California-Berkeley

**James E. Carrel**, associate professor, PhD, Cornell University

**Stephen J. Chaplin**, assistant professor, PhD, Cornell University

**Linda F. Chapman**, associate professor, PhD, University of California-Los Angeles

**Billie G. Cumbie**, professor, PhD, University of Texas

**John D. David**, associate professor, PhD, Vanderbilt University

**Roger M. deRoos**, professor, PhD, University of California-Berkeley

**David B. Dunn**, professor, PhD, University of California-Los Angeles

**Abraham Eisenstark**, professor, PhD, University of Illinois

**John R. Faaborg**, associate professor, PhD, Princeton University

**H. Carl Gerhardt**, professor, PhD, University of Texas

**Miriam Golomb**, assistant professor, PhD, University of California-Berkeley

**Charles S. Gowans**, professor, PhD, Stanford University

**Donald H. Hazelwood**, associate professor, PhD, Washington State University

**Philip H.S. Jen**, associate professor, PhD, Washington University (St. Louis)

**Gary Y. Kikudome**, associate professor, PhD, University of Illinois

**Clair L. Kucera**, professor, PhD, Iowa State University

**Dan Mertz**, professor, PhD, University of Texas

**Dean E. Metter**, professor, PhD, University of Idaho

**C. Donald Miles**, professor, PhD, Indiana University

**Donald L. Riddle**, associate professor, PhD, University of California-Berkeley

**Louis A. Sherman**, associate professor, PhD, University of Chicago

**George Smith**, associate professor, PhD, Harvard University

**William S. Stark**, associate professor, PhD, University of Wisconsin

**Gerald Summers**, assistant professor, PhD, University of Illinois

**Jack Twente**, associate professor, PhD, University of Michigan

**Frederick Vom Saal**, assistant professor, PhD, Rutgers University

**Richard Wang**, associate professor, PhD, University of Colorado

**Joseph M. Wood**, professor, PhD, Indiana University

**Armon F. Yanders**, professor, PhD, University of Nebraska

### CHEMISTRY

**John E. Bauman Jr.**, professor and chairman, PhD, University of Michigan

**John Ewart Adams**, assistant professor, PhD, University of California-Berkeley

**Glenn Richard Clark**, assistant professor, PhD, Cornell University

**Milton D. Glick**, professor, PhD, University of Wisconsin

**Robert E. Harris**, associate professor, PhD, University of California-Berkeley

**Edwin M. Kaiser**, professor, PhD, Purdue University

**Hyunyoung Kim**, professor, PhD, University of California-Berkeley

**S. Roy Koirtyohann**, professor, PhD, University of Missouri-Columbia

**Robert R. Kuntz**, professor, PhD, Carnegie Institute of Technology

**Richard N. Loeppky**, associate professor, PhD, University of Michigan

**Stanley E. Manahan**, professor, PhD, University of Kansas

**John P. McCormick**, associate professor, PhD, Stanford University

**R. Kent Murmann**, professor, PhD, Northwestern University

**Jerome W. O'Laughlin**, associate professor, PhD, Iowa State University

**Norman Rabjohn**, professor, PhD, University of Illinois

**Elmer O. Schlemper**, professor, PhD, University of Minnesota

**Scott Searles Jr.**, professor, PhD, University of Minnesota

**Richard C. Thompson**, professor, PhD, University of Maryland

**David E. Troutner**, professor, PhD, Washington University

**Tuck Chuen Wong**, associate professor, PhD, University of Michigan

### CLASSICAL STUDIES

**Eugene N. Lane**, chairman and professor, PhD, Yale University

**Charles F. Saylor**, professor, PhD, University of California-Berkeley

**Theodore A. Tarkow**, professor, PhD, University of Michigan-Ann Arbor

**John C. Thibault**, professor, PhD, University of Illinois-Urbana

**Barbara P. Wallach**, assistant professor, PhD, University of Illinois-Urbana

**Victor A. Estevez**, associate professor, PhD, University of Wisconsin

### COMPUTER SCIENCE

**Donald Shurtleff**, chairman and professor, PhD, Worcester Polytechnic Institute

**Paul Blackwell**, professor, PhD, Syracuse University

**Sushil Jajodia**, assistant professor, PhD, University of Oregon

**Peter Ng**, associate professor, PhD, University of Texas-Austin

**Gordon Springer**, associate professor, PhD, The Pennsylvania State University

**Frederick Springsteel**, associate professor, PhD, University of Washington-Seattle

### ECONOMICS

**Ronald A. Ratti**, associate professor and chairman, PhD, Southern Methodist University

**Steven G. Buckles**, associate professor, PhD, Vanderbilt University

**Eun Kwan Choi**, assistant professor, PhD, University of Iowa

**John P. Doll**, professor, PhD, Iowa State University

**Charles G. Geiss**, associate professor, PhD, University of North Carolina

**Floyd K. Harmston**, professor, PhD, University of Missouri-Columbia

**W. Whitney Hicks**, professor, PhD, Stanford University  
**Stanley R. Johnson**, professor, PhD, Texas A&M University  
**Walter L. Johnson**, associate professor, PhD, Duke University  
**John M. Kuhlman**, professor, PhD, University of Wisconsin  
**Maw Lin Lee**, professor, PhD, University of Wisconsin  
**Wayne A. Leeman**, professor, PhD, University of Wisconsin  
**David J. Loschky**, professor, PhD, Harvard University  
**Richard J. McHugh**, assistant professor, PhD, Syracuse University  
**Carmen F. Menezes**, professor, PhD, Northwestern University  
**Douglas K. Pearce**, associate professor, PhD, University of Wisconsin  
**Donald J. Schilling**, associate professor, PhD, University of North Carolina  
**Paul E. Smith**, professor, PhD, University of Michigan  
**David W. Stevens**, professor, PhD, University of Colorado  
**Robert J. Strom**, assistant professor, PhD, University of Cincinnati  
**Richard L. Wallace**, professor, PhD, Vanderbilt University  
**Thomas O. Wisley**, assistant professor, PhD, Purdue University  
**Michael A. Viren**, associate professor, PhD, University of California

## ENGLISH

**Robert J. Barth**, professor, PhD, Harvard University  
**Donald Anderson**, professor, PhD, Duke University  
**Robert Bender**, professor, PhD, University of Michigan  
**Martin Camargo**, assistant professor, PhD, University of Illinois  
**Thomas Cooke**, professor, PhD, University of Pittsburgh  
**Donald Crowley**, professor, PhD, The Ohio State University  
**Walter Daniel**, professor, PhD, Bowling Green State University  
**Albert Devlin**, associate professor, PhD, University of Kansas  
**John Foley**, associate professor, PhD, University of Massachusetts  
**Howard Fulweiler**, professor, PhD, University of North Carolina  
**Howard Hinkel**, associate professor, PhD, Tulane University  
**C. Haskell Hinnant**, professor, PhD, Columbia University  
**Richard Hocks**, professor, PhD, University of North Carolina  
**William Holtz**, professor, PhD, University of Michigan  
**James Holleran**, professor, PhD, Louisiana State University  
**Winifred Horner**, associate professor, PhD, University of Michigan  
**William Jones**, professor, PhD, Northwestern University  
**Mary Lago**, professor, PhD, University of Missouri-Columbia  
**Donald Lance**, professor, PhD, University of Texas  
**Timothy Materer**, professor and chairman, PhD, Stanford University  
**Russell Meyer**, associate professor, PhD, University of Minnesota  
**Speer Morgan**, associate professor, PhD, Stanford University  
**Ben Nelms**, associate professor, PhD, University of Iowa  
**Catherine Parke**, associate professor, PhD, Stanford University  
**Gilbert Porter**, professor, PhD, University of Oregon  
**Tom Quirk**, assistant professor, PhD, University of New Mexico  
**John R. Roberts**, professor, PhD, University of Illinois  
**Robert Sattelmeyer**, associate professor, PhD, University of New Mexico  
**Gilbert Youmans**, assistant professor, PhD, University of Wisconsin

## GEOGRAPHY

**Walter A. Schroeder**, chairman and instructor, MA, University of Chicago  
**Robert F. Austin**, assistant professor, PhD, University of Michigan  
**John Beets**, instructor, MA, University of Kansas  
**J. Trenton Kostbade**, professor, PhD, University of Michigan  
**Gail S. Ludwig**, assistant professor, DA, Northern Colorado University  
**William A. Noble**, associate professor, PhD, Louisiana State University  
**Jesse H. Wheeler Jr.**, professor, PhD, University of Chicago

## GEOLOGY

**Raymond L. Ethington**, professor, PhD, University of Iowa  
**Thomas J. Freeman**, professor, PhD, University of Texas  
**Glen R. Himmelberg**, professor, PhD, University of Minnesota  
**David W. Houseknecht**, assistant professor, PhD, The Pennsylvania State University  
**William D. Johns**, professor, PhD, University of Illinois  
**James H. Stitt**, professor, PhD, University of Texas  
**George W. Viele**, professor, PhD, University of Utah

## GERMANIC AND SLAVIC STUDIES

**Ruth Firestone**, chairman and associate professor, PhD, University of Colorado  
**Ernst Braun**, professor, PhD, University of Wisconsin  
**James Curtis**, professor, PhD, Columbia University  
**John Lalande**, assistant professor, PhD, Pennsylvania State University  
**Dennis Mueller**, professor, PhD, Washington University (St. Louis)  
**James Peters**, associate professor, PhD, University of Washington-Seattle  
**Naomi Ritter**, professor, PhD, Harvard University  
**Adolf Schroeder**, professor, PhD, The Ohio State University  
**Luverne Walton**, associate professor, PhD, Indiana University

## HISTORY

**Arvarh E. Strickland**, chairman and professor, PhD, University of Illinois  
**Thomas B. Alexander**, professor, PhD, Vanderbilt University  
**N. Gerald Barrier**, professor, PhD, Duke University  
**Richard T. Bienvu**, professor, PhD, Harvard University  
**John L. Bullion**, assistant professor, PhD, University of Texas-Austin  
**Winfield J. Burggraaff**, professor, PhD, University of New Mexico  
**Gerard H. Clarfield**, professor, PhD, University of California-Berkeley  
**Robert M. Collins**, associate professor, PhD, Johns Hopkins University  
**Noble E. Cunningham Jr.**, professor, PhD, Duke University  
**Susan L. Flader**, professor, PhD, Stanford University  
**Claudia Kren**, professor, PhD, University of Wisconsin  
**John Lankford**, professor, PhD, University of Wisconsin  
**T.J. Jackson Lears**, associate professor, PhD, Yale University  
**Kerby A. Miller**, assistant professor, PhD, University of California-Berkeley  
**Fordyce W. Mitchel**, professor, PhD, Yale University  
**Charles G. Nauert Jr.**, professor, PhD, University of Illinois  
**Robert J. Rowland Jr.**, professor, PhD, University of Pennsylvania  
**Robert M. Somers**, associate professor, PhD, Yale University  
**David P. Thelen**, professor, PhD, University of Wisconsin  
**J. Michael Thorn**, assistant professor, PhD, University of Wisconsin  
**Charles E. Timberlake**, professor, PhD, University of Washington  
**William M. Wiecek**, professor, PhD, University of Wisconsin  
**Russell Zguta**, professor, PhD, The Pennsylvania State University

## MATHEMATICS

**Calvin D. Ahlbrandt**, associate professor, PhD, University of Oklahoma  
**John K. Beem**, professor, PhD, University of Southern California  
**Robert P. Carmignani**, associate professor, PhD, Rice University  
**Carmen C. Chicone**, assistant professor, PhD, University of Wisconsin  
**Joseph G. Conlon**, assistant professor, PhD, Oxford University  
**Richard M. Crownover**, associate professor, PhD, Louisiana State University  
**Paul E. Ehrlich**, professor, PhD, State University of New York-Stony Brook  
**Richard Fedder**, assistant professor, PhD, University of Michigan  
**James A. Huckaba**, professor, PhD, University of Iowa  
**Marc Q. Jacobs**, professor, PhD, University of Oklahoma  
**Nigel J. Kalton**, professor, PhD, Trinity College, Cambridge  
**Jerome L. Lange**, associate professor, PhD, University of Colorado

**Ira J. Papick**, associate professor, PhD, Rutgers University  
**Dix H. Petty**, associate professor, PhD, University of Utah  
**Clinton M. Petty**, professor, PhD, University of Southern University  
**John H. Reeder**, associate professor, PhD, Northwestern University  
**Elias Saab**, assistant professor, PhD, University of Illinois, Urbana-Champaign  
**Keith W. Schrader**, professor, PhD, University of Nebraska  
**Dennis F. Sentilles**, professor and chairman, PhD, Louisiana State University  
**Richard C. Swanson**, assistant professor, PhD, University of California  
**Roy W. Utz**, professor, PhD, University of Virginia  
**Joseph L. Zemmer**, professor, PhD, University of Wisconsin

## MILITARY SCIENCE

**Forest Lanning**, professor, MEd, DePaul University  
**Clinton Tennill**, associate professor, BJ, University of Missouri-Columbia

## MUSIC

**Donald McGlothlin**, chairman and professor, PhD, University of Iowa  
**James Burk**, associate professor, D Med, University of Oklahoma  
**John Cheetham**, professor, DMA, University of Washington  
**Duncan Couch**, professor, PhD, University of Kansas  
**George DeFoe**, associate professor, MA, Columbia Teacher's College  
**Steven Geibel**, assistant professor, MM, University of Missouri-Columbia  
**Helen Harrison**, associate professor, MA, University of Iowa  
**Bob Henry**, instructor, M Ed, University of Missouri-Columbia  
**Raymond Herbert**, professor, MM, Eastman School of Music (University of Rochester)  
**Richard Hills**, professor, PhD, University of Iowa  
**Carolyn Kenneson**, associate professor, MM, University of Texas  
**Frank Krager**, assistant professor, MM, University of Michigan  
**William McKenney**, associate professor, PhD, Eastman School of Music (University of Rochester)  
**John McLeod**, assistant professor, MM, Manhattan School of Music  
**James Middleton**, professor, D Med, University of Oklahoma  
**Harry Morrison**, professor, MFA, University of Iowa  
**Charles Nick**, associate professor, PhD, University of Indiana  
**Perry Parrigin**, associate professor, MM, University of Indiana  
**Alexander Pickard**, associate professor, DMA, Eastman School of Music (University of Rochester)  
**Ira Powell**, associate professor, D MEd, University of Oklahoma  
**Virginia Pyle**, associate professor, D Mus, Florida State University  
**Charles Sherman**, professor, PhD, University of Michigan  
**Eva Szekely**, assistant professor, MS, The Juilliard School of Music  
**Edward Thaden**, associate professor, D Mus, Florida State University  
**Janice Wenger**, assistant professor, MM, Eastman School of Music (University of Rochester)  
**Barbara Wood**, associate professor, MA, University of Missouri-Columbia

## PHYSICS

**G.P. Allredge**, associate professor, PhD, Michigan State University  
**H.R. Chandrasekhar**, associate professor, PhD, Purdue University  
**D.L. Cowan**, associate professor, PhD, University of Wisconsin-Madison  
**H.R. Danner**, professor, PhD, The Pennsylvania State University  
**B. DeFazio**, associate professor, PhD, Texas A&M University  
**T.W. Edwards**, associate professor, PhD, University of Wisconsin-Madison  
**E.B. Hensley**, professor, PhD, University of Missouri-Columbia  
**L.V. Holroyd**, professor, PhD, Notre Dame University  
**J.C. Huang**, associate professor, PhD, Michigan State University  
**R.A. Hultsch**, associate professor, PhD, Iowa State University

**R.R. Hurst**, associate professor, PhD, The Pennsylvania State University  
**K.H. Lee**, associate professor, PhD, Iowa State University  
**C.J. Peterson**, assistant professor, PhD, University of California-Berkeley  
**P.W. Schmidt**, professor, PhD, University of Wisconsin-Madison  
**G. Schupp**, associate professor, PhD, Iowa State University  
**H. Taub**, associate professor, PhD, Cornell University  
**C.W. Thompson**, professor, PhD, University of Missouri-Columbia  
**S.A. Werner**, professor, PhD, University of Michigan  
**H.H. White**, associate professor and acting chairman, PhD, University of California-Riverside  
**J. E. Willett**, professor, PhD, Pennsylvania State University

## PHILOSOPHY

**Joseph Bien**, chairman and professor, PhD, University of Paris  
**Arthur Berndtson**, professor, PhD, University of Chicago  
**William Bondeson**, professor, PhD, University of Chicago  
**Bina Gupta**, associate professor, PhD, Southern Illinois University  
**John Kultgen**, professor, PhD, University of Chicago  
**Peter Markie**, associate professor, PhD, University of Massachusetts  
**Donald Sievert**, professor, PhD, University of Iowa  
**Alexander Von Schoenborn**, associate professor, PhD, Tulane University

## POLITICAL SCIENCE

**Gregory Casey**, associate professor, PhD, Georgetown University  
**Soon Sung Cho**, professor, PhD, University of Michigan  
**Richard R. Dohm**, associate professor, PhD, University of Minnesota  
**Wayne L. Francis**, professor, PhD, University of Indiana  
**Stanley T. Gabis**, professor, PhD, University of Chicago  
**Richard J. Hardy**, assistant professor, PhD, University of Iowa  
**Arthur L. Kalleberg**, professor, PhD, University of Minnesota  
**David A. Luthold**, professor, PhD, University of California-Berkeley  
**Patrick N. Peritore**, associate professor, PhD, University of California-Santa Barbara  
**Robin A. Remington**, professor, PhD, University of Indiana  
**Marvin L. Rogers**, associate professor, PhD, University of California-Berkeley  
**Sandra Schneider**, assistant professor, PhD, State University of New York-Binghamton  
**Frederick C. Spiegel**, professor, PhD, University of Illinois  
**Herbert K. Tillema**, associate professor, PhD, Harvard University  
**Paul Wallace**, professor and chairman, PhD, University of California-Berkeley  
**Richard A. Watson**, professor, PhD, University of Michigan  
**Lloyd M. Wells**, professor, PhD, Princeton University  
**David M. Wood**, professor, PhD, University of Illinois  
**Dean L. Yarwood**, professor, PhD, University of Illinois

## PSYCHOLOGY

**Sam C. Brown**, professor and chairman, PhD, University of Virginia  
**Wayne P. Anderson**, professor, PhD, University of Missouri-Columbia  
**Douglas G. Anger**, associate professor, PhD, Harvard University  
**Robert M. Arkin**, associate professor, PhD, University of Southern California  
**Bruce J. Biddle**, professor, PhD, University of Michigan  
**Charles H. Brown**, assistant professor, PhD, Michigan State University  
**June E. Chance**, professor, PhD, The Ohio State University  
**Harris M. Cooper**, associate professor, PhD, University of Connecticut  
**Robert S. Daniel**, professor, PhD, Indiana University  
**Robert Dolliver**, professor, PhD, The Ohio State University  
**Russell Geen**, professor, PhD, University of Wisconsin  
**Alvin G. Goldstein**, professor, PhD, Clark University  
**Punky P. Heppner**, assistant professor, PhD, University of Nebraska  
**Donald H. Kausler**, professor, PhD, Washington University (St. Louis)  
**Charles J. Krauskopf**, professor, PhD, The Ohio State University  
**Marjorie Marlin**, associate professor, PhD, University of Illinois  
**Melvin H. Marx**, research professor, PhD, Washington University (St. Louis)

**David G. McDonald**, professor, PhD, Washington University (St. Louis)  
**John H. Mueller**, professor, PhD, St. Louis University  
**Lizette Peterson-Homer**, assistant professor, PhD, University of Utah  
**Richard E. Petty**, associate professor, PhD, The Ohio State University  
**C. Steven Richards**, associate professor, PhD, State University of New York-Stonybrook  
**Timothy A. Salthouse**, assistant professor, PhD, University of Michigan  
**Kenneth Sher**, assistant professor, PhD, Indiana University  
**Esther Thelen**, assistant professor, PhD, University of Missouri-Columbia  
**Mark H. Thelen**, professor, PhD, Michigan State University  
**Joseph S. Thorpe**, professor, PhD, University of Texas-Austin  
**Barbara Uehling**, professor, PhD, Northwestern University  
**Dennis Wright**, associate professor, PhD, University of California-Berkeley

## RELIGIOUS STUDIES

**Jill Raitt**, chairman and professor, PhD, University of Chicago  
**Joel Brerton**, assistant professor, PhD, Yale University  
**Robert Robinson**, assistant professor, PhD, Yale University  
**Lawrence Sullivan**, associate professor, PhD, University of Chicago

## ROMANCE LANGUAGES

**Edward Mullen**, chairman and professor, PhD, Northwestern University  
**Albert Brent**, professor, PhD, Princeton University  
**Ebion DeLima**, professor, PhD, Catholic University of Sao Paulo  
**Richard Dixon**, assistant professor, PhD, University of Colorado  
**Magdalena Garcia-Pinto**, assistant professor, PhD, University of Texas-Austin  
**Daniel Gulstad**, professor, PhD, University of Illinois  
**Ben Honeycutt**, associate professor, PhD, The Ohio State University  
**Donna Kuizenga**, associate professor, PhD, City University of New York  
**Howard Mancing**, associate professor, PhD, University of Florida  
**Bonner Mitchell**, professor, PhD, The Ohio State University  
**Simone Parks**, instructor, AA, University of Dijon  
**Margaret Peden**, professor, PhD, University of Missouri-Columbia  
**Mary Ricciardi**, assistant professor, PhD, Indiana University  
**Daniel Scroggins**, associate professor, PhD, University of Michigan  
**Margaret Sommers**, associate professor, PhD, Stanford University  
**Alain Swietlicki**, assistant professor, MA, University of Texas-Austin  
**O. Allen Thiher**, professor, PhD, University of Wisconsin  
**Michael Ugarte**, assistant professor, PhD, Cornell University  
**James K. Wallace**, associate professor, PhD, Vanderbilt University  
**Vern G. Williams**, professor, PhD, University of Missouri-Columbia

## SOCIOLOGY

**Barbara J. Bank**, chairman and associate professor, PhD, University of Iowa  
**Karen Altergott**, assistant professor, PhD, University of Iowa  
**J. Kenneth Benson**, professor, PhD, University of Texas  
**Bruce J. Biddle**, professor, PhD, University of Michigan  
**Edward E. Brent**, assistant professor, PhD, University of Minnesota  
**John E. Galliher**, professor, PhD, University of Indiana  
**Derek G. Gill**, associate professor, PhD, Aberdeen (Scotland)  
**Donald O. Granberg**, professor, PhD, The Pennsylvania State University  
**Robert W. Habenstein**, professor emeritus, PhD, University of Chicago  
**John R. Hall**, assistant professor, PhD, University of Washington  
**Peter M. Hall**, professor, PhD, University of Minnesota  
**Richard M. Hessler**, associate professor, PhD, University of Pittsburgh  
**Craig J. Jenkins**, assistant professor, PhD, State University of New York-Stony Brook

**James L. McCartney**, professor, PhD, University of Minnesota  
**Mary Jo Neitz**, assistant professor, PhD, University of Chicago  
**Andrew C. Twaddle**, professor, PhD, Brown University  
**C. Edwin Vaughan**, associate professor, PhD, University of Minnesota  
**Ted R. Vaughan**, professor, PhD, University of Texas

## SPEECH AND DRAMATIC ART

**Stephen Archer**, professor, PhD, University of Illinois  
**Patrick Atkinson**, designer/technical director, MFA, Illinois State University  
**Larry Clark**, professor, PhD, University of Illinois  
**Clifton Cornwell**, professor, PhD, University of Missouri-Columbia  
**Weldon Durham**, associate professor, PhD, University of Iowa  
**Theodore Eldredge**, instructor, MA, University of Missouri-Columbia  
**James Gibson**, professor, PhD, The Ohio State University  
**Barton Griffith**, professor, PhD, University of Michigan  
**Richard Klepac**, assistant professor, PhD, University of Missouri-Columbia  
**Jolene Koester**, assistant professor, PhD, University of Minnesota  
**James Miller**, assistant professor, MFA, University of Southern Mississippi  
**Michael Porter**, assistant professor, PhD, University of Iowa  
**Edward Small**, associate professor, PhD, University of Iowa  
**Mary-Jeanette Smythe**, associate professor, PhD, Florida State University  
**Carla Waal**, professor and chairman, PhD, Indiana University  
**Joseph Wolfe**, associate professor, PhD, University of Iowa

## STATISTICS

**Asit P. Basu**, chairman and professor, PhD, University of Minnesota  
**Wallace E. Franck**, associate professor, PhD, University of New Mexico  
**John E. Hewett**, professor, PhD, University of Iowa  
**James E. Holstein**, associate professor, PhD, University of Iowa  
**Shrinivas K. Katti**, professor, PhD, Iowa State University  
**Richard W. Madsen**, associate professor, PhD, Iowa State University  
**William A. Thompson**, professor, PhD, University of North Carolina  
**Robert K. Tsutakawa**, professor, PhD, University of Chicago  
**Frederick Williams**, professor, PhD, Northwestern University



# COLLEGE OF BUSINESS AND PUBLIC ADMINISTRATION

The College of Business and Public Administration, established in 1914 as a senior professional school, offers curricula which emphasize educating students for their growing responsibility in business, government and the society as a whole.

The College includes the School of Accountancy, the School of Business—which is composed of the Departments of Finance, Management and Marketing—and the Department of Public Administration.

The School of Accountancy was the first such school at a major state university and was among the first group of accounting programs to be separately accredited by the American Assembly of Collegiate Schools of Business. The School also is a charter member of the Federation of Schools of Accountancy. The School of Business, which offers curricula in business logistics, economics, finance, general business, management, marketing, real estate, and risk and insurance, has been accredited by the American Assembly of Collegiate Schools of Business since 1926. The Department of Public Administration is a member of and has established programs in accordance with the National Association of Schools of Public Administration and Affairs.

The faculty of the College seek to:

1. stimulate the student's thought processes and intellectual curiosity to promote continued learning after formal education ceases;
2. encourage disciplined imagination to enable the student to come to grips with problems in a changing world;
3. emphasize intellectual awareness which will help the student relate general education to education for business and public administration;
4. emphasize intellectual integrity;
5. develop the student's capacity to reason objectively, precisely and creatively as an aid to decision making.

The College also has the responsibility to enlarge the existing body of knowledge covering the theoretical structure and operational principles of private and public enterprise. Faculty members are engaged in a wide variety of research projects in these areas, an activity which serves to enrich the educational experience of the students.

Finally, the College has the responsibility for providing continuing educational services for those who have entered the fields of accountancy, business or government. Therefore, the College participates through the Institute for Executive Development with the University Extension Division in conducting conferences, seminars and short courses for those who have completed their formal education. It also initiates and carries out educational programs designed to improve public policy analysis.

## ADMISSION

To be eligible for admission to B&PA, a student must have completed at least 54 semester hours of college credit with a 2.600 cumulative grade point average for all work attempted. These 54 hours must include all general education and basic skills requirements. In extenuating circumstances, a maximum of 12 semester hours in general education courses may be lacking at the time of admission. However, Accy 36, Engl 1, Math 60, Math 61, and Stat 150 must be completed before admission. Accountancy majors must also have completed Engl 60. Any exceptions must be approved by the B&PA dean's office.

Students eligible for the College of Business and Public Administration who would be placed on probation if they remained in their former division, will be admitted to the College but placed on probation.

**Probationary Admission.** In exceptional circumstances the dean may admit students who do not meet the regular admissions requirements. Students who are admitted under this provision are on scholastic probation and are subject to dismissal unless they earn a minimum GPA of 2.600 for at least 12 hours of specified credit during their first regular semester.

**Special Admission of Disadvantaged Students.** The College of Business and Public Administration makes a special effort to attract disadvantaged groups. In exceptional circumstances the dean may admit students who do not meet the regular admissions requirement of a 2.600 GPA, and may prescribe a three-year rather than two-year period in the College with a reduced academic load.

**Credit by Examination.** The College accepts CLEP subject examinations, departmental exams and Advanced Placement (College Board). Students wishing additional information should contact an academic adviser in the College of B&PA.

**Transfer Students.** Coursework completed with a grade of C or better at an accredited four-year institution will be accepted if the courses are appropriate equivalents of the required UMC courses.

Credits transferred from accredited community/junior colleges are limited to general education, basic skills and unrestricted elective courses completed with a grade of C or better. The College of Business and Public Administration will accept a maximum of 64 hours of coursework from a junior college. A degree-seeking student with 64 or more semester hours of acceptable college credit generally may, beyond those hours, apply toward graduation only those hours earned in a four-year institution.

Students are encouraged to have their transcripts evaluated by an academic adviser in the College of Business and Public Administration prior to their enrollment at UMC.

## STUDENT SERVICES

### ADVISING

Entering students are assigned a faculty member from the major field of study to work with the student in determining the area of concentration and coursework needed to complete a degree. In addition, there are full-time academic advisers available to assist students.

Students have the responsibility of determining an appropriate schedule of courses each semester. The faculty adviser must approve the courses scheduled.

### PLACEMENT

The Placement Office facilities of the College of Business and Public Administration are available to graduating seniors and alumni. Each year representatives from more than 200 local, national and international business organizations and public accounting firms, as well as state and national government agencies, visit the campus to interview prospective personnel.

### STUDENT ORGANIZATIONS

**B&PA Student Council.** The Student Council is composed of 16 members elected by the students in the College of Business and Public Administration. Some of the council's activities include publishing the newsletter, organizing graduation ceremonies and B&PA Week.

**Alpha Kappa Psi.** A national professional business fraternity whose goals are to enhance the business student's opportunities in the varied fields of business through student-teacher interaction and contact with business executives.

**Association of Accounting Students.** This association encourages communication among accounting students and faculty, and informs students of the opportunities available to them within the field of accountancy.

**Beta Alpha Psi.** An honorary accounting fraternity which promotes student involvement in professional accounting activities.

**Beta Gamma Sigma.** The national scholastic honorary society for outstanding students in business and management.

**Black Business Student Association.** An organization to promote and encourage the involvement of minorities in the field of business. Several special activities are planned each year.

**Business Logistics Association.** This association promotes student-faculty-business interaction in business logistics. Several meetings and field trips are planned each year.

**Delta Sigma Pi.** A national professional business fraternity which seeks to encourage the study of business and the advancement of the commercial world.

**Finance Students Association.** An organization to further professionalism in the field of finance and to provide professional interaction among students, faculty and business executives.

**Marketing Forum.** A collegiate chapter of the American Marketing Association. To further professionalism in marketing, the group sponsors industrial tours, professional speakers, research and work projects.

**Phi Chi Theta.** A national professional business fraternity established to promote women in business. A variety of meetings and small professional trips are planned each year.

**Pi Alpha Alpha.** A national honorary society for public affairs and administration. Its purpose is to encourage and

recognize outstanding scholarship in the field of public administration.

**Rho Epsilon.** A fraternity open to anyone interested in real estate. Promotes the exchange of ideas between real estate practitioners and students.

**Student Society of Personnel Administrators of Columbia.** (Affiliated with ASPA). An organization open to anyone interested in personnel administration. Special activities include Columbia area speakers and tours.

## SCHOLARSHIPS IN THE COLLEGE OF BUSINESS AND PUBLIC ADMINISTRATION

Applications and information available in the undergraduate advising office.

**Mary E. and Martha J. Briegel Scholarship:** This fund is specifically designed to support women students in the College of Business and Public Administration. Selection will be made on the basis of scholarship and financial need.

**Harry Gunnison Brown Alpha Kappa Psi Loan and Scholarship:** This scholarship is awarded annually to undergraduate students and is based primarily upon participation in College of Business and Public Administration activities. Financial need and scholastic achievements also are considered.

**Henry Hatch Green Memorial Scholarship Fund in Administration:** Students considered for this award will be juniors or seniors in the School of Business or graduate students in one of the professional programs of the College. Recommendation is based upon academic excellence, character, citizenship and leadership.

**Edward D. Jones & Co. Internship:** The firm underwrites annually an internship in its Columbia office. A recipient is selected on the basis of character, aptitude, education and interest. This internship is concurrent with the academic year and a stipend is provided per semester.

**Lela Kidwell Nolen Memorial Scholarship:** This scholarship is provided for deserving students in the College of Business and Public Administration.

**Noel William Palmett Memorial Award:** This annual stipend is awarded to a junior enrolled in any four-year Reserve Officer Training Corp program. Selection is based on personal integrity, devotion to duty and scholarship.

**H.R. and Alberta B. Ponder Scholarships:** These scholarships are open to undergraduate and graduate College of Business and Public Administration students. Selection will be made on the basis of scholarship and financial need.

### Scholarships in the School of Accountancy

Students considered for these awards will be attending full time, majoring in accountancy, and will have completed Accountancy 136 or 236, and one additional accounting course. These students will have at least a 3.5 cumulative grade point average or financial need. Application information is available from the director of the School of Accountancy.

**Alumni with Arthur Andersen & Co. Fund in Accountancy:** These scholarships are based on scholastic achievement, personal characteristics and promise for professional success.

**AMOCO Foundation Scholarships:** These awards are established for outstanding minority accounting students.

**Arthur Young & Company Foundation Fund in Accountancy:** The criteria for these awards includes outstanding academic performance and campus involvement.

**Baird, Kurtz & Dobson School of Accountancy Grant:** Awarded to accounting students showing academic excellence, leadership and character.

**Coopers & Lybrand Accountancy Grant:** This grant is given to students showing academic excellence, leadership and character.

**Deloitte Haskins & Sells Scholarship in Accountancy:** Outstanding accounting majors are awarded this scholarship each year.

**Ernst & Whinney Accountancy Grant:** This grant is awarded to students who show academic achievement, participate in campus activities and display promise for future success.

**George Keepers Memorial Scholarship:** Designated for an outstanding accountancy student who has financial need.

**Monsanto Company Accountancy Education Grant:** Monsanto awards this grant to students with a good scholastic record, character and promise for future success in the accounting profession.

**Peat, Marwick Foundation Accountancy Grants:** These grants are awarded to accountancy students who show scholastic and professional excellence and future promise.

**Price Waterhouse Foundation Fund in Accountancy:** These annual awards are given based on professional promise, academic achievement and leadership.

**John W. Rader Accountancy Scholarship:** This award

for accountancy students is determined on the basis of academic record, financial need and promise of future success.

**John Schweitzer Accountancy Grant:** This grant is based on academic performance, leadership and future promise as an accountant.

**DR Scott Memorial Scholarship:** This scholarship is awarded to an outstanding accountancy student.

**Touche Ross and Co. Accountancy Grant:** Touche Ross awards this grant annually to an outstanding student who has demonstrated academic excellence and campus involvement.

### Scholarships in the School of Business

Applications and information are available in the departmental offices.

#### Finance

**College Risk and Insurance Scholarship:** This award is given to a junior or senior majoring in risk and insurance on the basis of his/her scholastic record.

**J.F. Dean Scholarship:** Established by a contribution from the Commercial Union Insurance Co. in memory of J.F. Dean. This scholarship is awarded each year to a student enrolled in the risk and insurance program. Selection is based on a recommendation by the finance department faculty and the dean's office.

**Mason L. Dean Scholarships:** Established in honor of Oliver H. Dean, one scholarship is awarded to an outstanding junior finance major and one to an outstanding senior interested in a banking career.

**Harry Hall Trice Jr. Memorial Scholarship Fund:** This stipend is given to an undergraduate student enrolled in the risk and insurance program who ranks in the upper one-third of the class and has financial need.

**Missouri Association of Realtors Educational Foundation Scholarship Fund:** This stipend is available for two juniors whose major study is the field of real estate. Recipient is recommended by the dean.

**C.L. Williams Memorial Scholarship:** Two scholarships are provided each year by the Missouri Alpha Chapter of Phi Kappa Psi Fraternity. Students selected will have at least a 3.0 grade point average and will have demonstrated leadership qualities, good moral character and financial need.

#### Scholarships in Marketing

**Business Logistics (Thompson) Award:** This award is given annually to a student in business logistics.

**Eisenhart Brokerage Company Scholarship:** At the beginning of the winter semester, this award is given to a marketing major who has demonstrated academic excellence in the fall semester.

**Mid-Missouri Traffic Club Business Logistics Scholarship:** This scholarship is awarded annually to a business logistics major.

**Missouri Chapter of American Society of Traffic and Transportation Scholarship:** This annual award is given to a business logistics major and is based on scholarship, service and need.

**W.C. Tingle Scholarship:** This award is presented annually to a senior whose area of concentration is marketing, business logistics or general business.

**Samuel G. Wennberg Marketing Scholarship:** The marketing major who has the highest scholastic average at the time of graduation is awarded this annual scholarship.

### SCHOLARSHIPS IN THE DEPARTMENT OF PUBLIC ADMINISTRATION

**The Bryant Award:** This award goes to an undergraduate student majoring in Public Administration. The criteria for selection is overall performance, including academic excellence, leadership and character.

## SPECIAL SERVICES

### ADMINISTRATIVE BEHAVIOR LABORATORY

Recognizing that the availability of a behavioral laboratory is a necessary condition for rigorous and scientific inquiry into the behavioral dimensions of administration, the College of Business and Public Administration established an Administrative Behavior Laboratory in 1974. The laboratory is used for research and instructional activities of the College. The laboratory is equipped with a complete audio and videotape system and observation booths which permit a wide variety of experimentation on individual and small group activities such as

decision making, problem solving, conflict resolution and communication.

## BUSINESS AND PUBLIC ADMINISTRATION RESEARCH CENTER

The Research Center is a computer-based research support facility of the College of Business and Public Administration. The Center provides data and data management services, data analysis, software development, consultation on data applications, statistical analysis, and instruction in the use of various data sets and associated retrieval software to University faculty, staff and students; federal, state and local government agencies; private enterprises; and the public.

In addition, the Research Center maintains a large and varied data base of financial, economic and demographic information describing characteristics of the nation, the states and their subdivisions. Major data holdings include the 1970 Census, Bureau of Economics Analysis Regional Economic Information System, National Bureau of Economic Research Time Series Data Bank and COMPUSTAT. Much of these data pertain to Missouri and the Midwest.

Technical assistance is available at cost to research organizations or individual researchers at all stages of their projects on a contractual basis. These services are provided free for the unfunded research projects of the faculty and students in the College of Business and Public Administration at Columbia.

## INSTITUTE FOR EXECUTIVE DEVELOPMENT

The College of Business and Public Administration, in cooperation with the University's Extension Division, recently formed the Institute for Executive Development. The Institute provides programs in management education for persons in various fields. These external programs not only serve the needs of the professional community but also provide close contact between faculty and students in the College and persons working in accountancy, business and government. Examples of Institute programs are the CPA Review, the University of Missouri Management Development Program, and the annual conference for city clerks and finance officers.

## ACADEMIC STANDING OF UNDERGRADUATE STUDENTS

Students are on academic probation for any semester if:

1. The UMC GPA for the previously completed semester was less than 2.0 but not less than 1.0.

2. The cumulative UMC GPA is from 1 to 15 grade points below a 2.0.

3. The cumulative GPA for courses offered by the College of Business and Public Administration is from 1 to 15 grade points below a 2.0. This includes all on-campus Business and Public Administration courses regardless of whether the courses are completed before or after admission to the College of Business and Public Administration.

Students are dismissed from enrollment in the College of Business and Public Administration for one calendar year if:

1. The UMC GPA for the previously com-

pleted semester was less than 1.0.

2. The cumulative UMC GPA is 16 grade points or more below a 2.0.

3. The cumulative GPA for courses offered by the College of Business and Public Administration is 16 grade points or more below a 2.0 (This includes all on-campus Business and Public Administration courses regardless of whether the courses are completed before or after admission to the College of Business and Public Administration.)

4. The student fails to remove probationary status at the completion of the second consecutive semester on probation.

A student who has been dismissed may be readmitted after the end of the one-year period. The second dismissal is permanent.

## GRADUATION REQUIREMENTS

The undergraduate degree requirements include stipulations about number of credit hours, courses taken and grades earned.

### HOURLY REQUIREMENTS

Satisfactory completion of a minimum of 120 semester hours from accredited colleges or universities is required. In completing the 120 semester hours of credit for graduation, students may count no more than 30 hours of credit in courses within their major field of study.

The last 30 hours of courses must be completed in residence at UMC enrolled in the College of Business and Public Administration. Students lacking 3 hours or less may, with the permission of the dean, complete the requirement by correspondence or transfer credit.

A student who has one bachelor's degree may receive a degree from the College of Business and Public Administration upon completion of the requirements of any curriculum, provided the courses completed include at least 24 hours in addition to the minimum hours required for the first degree.

### COURSE REQUIREMENTS

#### BS in Accountancy

General education and basic skills

requirements .....51-60 hrs.  
Core courses .....21 hrs.  
Requirements in an approved professional curriculum .....33 hrs.  
Unrestricted electives .....6-15 hrs.

#### BS in Business Administration

General education and basic skills

requirements .....47-57 hrs.  
Core courses .....21 hrs.  
Requirements in an approved professional curriculum.....30-36 hrs.  
Unrestricted electives .....6-22 hrs.

#### BS in Public Administration

General education and basic skills

requirements .....47-57 hrs.  
Requirements in approved professional curriculum .....48 hrs.  
Unrestricted electives .....15-25 hrs.

These course requirements are designed to ensure that 40 percent of a student's coursework is earned in divisions other than B&PA.

### GPA REQUIREMENTS

A minimum of a 2.0 GPA for all courses attempted must be met for each of the following 54

categories:

1. All courses offered by the College of Business and Public Administration. This includes all on-campus Business and Public Administration courses regardless of whether the courses are completed before or after admission to the College of Business and Public Administration.

2. All UMC campus courses.

3. All courses attempted at any college or university.

## GENERAL EDUCATION AND BASIC SKILLS REQUIREMENTS

Courses which satisfy general education and basic skills requirements are recommended for the freshman and sophomore years. Students who lack certain courses when admitted to the College must complete these courses as soon as possible after admission.

Ordinarily, freshman and sophomore courses are taken while students are registered in the College of Arts and Science, but a student may take this work while enrolled in other divisions.

The following courses are basic requirements for all undergraduate programs in the College of Business and Public Administration. Students majoring in accountancy should carefully note exceptions or special requirements for the accountancy major.

Accountancy 36, 37 or 136GH,  
137GH .....6 hrs.  
Economics 51 .....5 hrs.  
English 1 and 60 or 65GH .....3-6 hrs.

Students whose placement test scores exempt them from English 1 receive no extra credit. For those who enroll in the School of Accountancy, English 161 must be taken as an additional requirement.

Political Science 1 or 11 .....3-5 hrs.  
Mathematics 60 and 61 or Math 80 ..5-6 hrs.

Math 80 must be completed with a grade of C or better to substitute for Math 60 and 61. Students who are weak in mathematics may be required to take Mathematics 10 College Algebra, before enrolling in Mathematics 60 Finite Mathematics. No credit is given for testing out of Mathematics 10, but general elective credit (3 hours) is given to those who take and successfully complete the course.

Statistics 150 and 250 .....6 hrs.  
It is important that students start the mathematics-statistics sequence as early as possible.

Humanistic Studies .....6 hrs.  
Humanistic studies include such subjects as art, literature, music, philosophy, and religion, but do not include applied courses in these fields. Courses in foreign languages numbered 103 or under do not fulfill this requirement. For students who enroll in the School of Accountancy, the humanities requirement is 3 hours of humanistic studies (Philosophy 1.5 or 10 are recommended) and 3 hours of oral communication (Speech 75 or 173).

Natural Science .....5 hrs.  
The following are considered natural science courses: laboratory courses in astronomy, biology, chemistry, geology, physics, zoology and general experimental psychology (Psychology 2).

Additional Social Sciences .....9 hrs.  
Social science courses must be selected from at least two of the following fields: anthropology, economics, geography, history, political science, psychology and sociology. Students who enroll in the School of Accountancy must satisfy this requirement by taking Political Science 55 or 155 and a first- and second-level course sequence (6 hours) in either psychology or sociology. For the degree in Public Administration, the requirement is Speech 75 and 6 hours of social sciences.

Total .....49-54 hrs.

## SCHOOL OF ACCOUNTANCY

The Bachelor of Science in Accountancy degree is designed for the student interested in a career as a professional accountant in business, government or public accounting. Students completing this degree are actively recruited. The strength of the existing program is reflected in the annual honor roll of students passing the CPA examination, the number of graduates who are partners and managers with international accounting firms, and those who are chief financial officers in industry.

### BS IN ACCOUNTANCY

The BSAcc degree can be completed in four years and includes the basic technical and professional training of the common body of knowledge for the professional accountant. Students are encouraged to continue for a fifth year to study the advanced professional training included in the Master of Arts-Accountancy degree.

#### Required Core Courses to be Completed on Campus in the Junior Year

Accountancy 258 Computer-Based Data Systems (3)  
Economics 229 Money and Banking (3)  
Management 202 Fundamentals of Management (3)  
Finance 203 Corporation Finance (3)  
Marketing 204 Principles of Marketing (3)  
Management 254 Introduction to Business Law (3)

#### Required Core Courses to be Completed on Campus in the Senior Year

Business Administration 376 Business Policy (3)  
**Required Courses**  
236 Financial Accounting I (3)  
237 Cost Accounting (3)  
246 Financial Accounting II (3)  
268 Accounting Information Systems (3)  
273 Introduction to Taxation (3)  
325 Governmental Accounting and Budgeting (3)  
337 Managerial Accounts and Statistics (3)  
384 Auditing (3)  
336 Advanced Financial Accounting or  
358 EDP Systems Analysis and Design or  
368 EDP Systems Management and Control or  
373 Intermediate Taxation (3)  
Management 255 Legal Aspects of Business  
Organization and Operations or  
Management 356 The Law of Commercial Credit  
Transactions (3)  
Economics 351 Intermediate Price Theory (3)

#### Total: 54 credit hours

A student may count a maximum of 30 semester hours of accountancy, exclusive of data processing and income tax courses, to meet accountancy major requirements for the undergraduate degree.

## SCHOOL OF BUSINESS

### BS in Business Administration

The Bachelor of Science in Business Administration degree is awarded to a student who completes one of these curricula: general business, business logistics, economics, finance, administrative management, operations management, personnel management, marketing, real estate or risk and insurance. All of these curricula have a common core of required courses designed to cover the common body of knowledge in business and administration.

#### Required Core Courses to be Completed on Campus in the Junior Year

Accountancy 258 Computer-Based Data Systems (3), or  
Computer Science 104 Computers and Programming I (3)\*  
Economics 229 Money and Banking (3), or Economics  
251 Theory of the Firm (3)\*  
Management 202 Fundamentals of Management (3)  
Finance 203 Corporation Finance (3)  
Marketing 204 Principles of Marketing (3)  
Management 254 Introduction to Business Law (3) or  
Political Science 311 Administrative Regulation of Business (3)\*

#### Total: 18 credit hours



\*Finance students are required to take Computer Science 104, Economics 229 and Management 254; Economics students are required to take Economics 229.

**Required Core Courses to be Completed on Campus in the Senior Year**

Business Administration 376 Business Policy (3)

**Total: 3 credit hours**

**GENERAL BUSINESS**

This curriculum provides a broad program in business administration

**Required Courses: 21 credit hours**

Economics 210 Labor Economics (3)

Finance 218 Risk and Insurance (3)

Accountancy 305 Financial Accounting Concepts (3)

Management 254\* Introduction to Business Law (3) or Political Science 311\* Admin. Regulation of Business (3)

Marketing 309 Marketing Management (3)

Finance 323 Financial Management (3) or Finance 333 Investments (3)

Management 310 Personnel Management (3)

Professional Electives: 9 credit hours

**Total: 30 credit hours**

\*Whichever has not been completed in satisfaction of core course requirements is required in this curriculum.

**BUSINESS LOGISTICS**

This curriculum is designed for those interested in professional education leading to a variety of careers with carriers, government and industrial users of transportation service, federal and state regulatory commissions, trade associations, consulting firms and public authorities concerned with the planning and use of transportation facilities.

**Required Courses: 15 credit hours**

Marketing 206 Distribution Systems (3)

Marketing 347 Channel Management (3)

Marketing 373 Distribution Management (3)

Marketing 381 Transportation Policy (3)

Accountancy 358 EDP Systems Analysis and Design (3)

**Three of the Following: 9 credit hours**

Marketing 313 Marketing Research (3)

Marketing 314 Consumer Behavior (3)

Marketing 358 Purchasing (3)

Marketing 371 World Marketing (3)

Marketing 390 Marketing Policy (3)

Management 308 Operations Management (3)

**Professional Electives: 12 credit hours**

Computer Science 104 Computers and Programming (3)\*

Computer Science 201 Programming as a Research Tool (3)

Economics 210 Labor Relations (3)

Economics 265 Economics of Location (3)

Finance 323 Financial Management (3)

Geography 100 Economic Geography (3)

Management 310 Personnel Management (3)

Management 311 Collective Bargaining (3)

Management 375 Management Policies and Problems (3)

Marketing 336 Sales Management (3)

Marketing 350 Marketing, Society and Government (3)

Political Science 311 Administrative Regulation of Business (3)\*

Statistics 307 Nonparametric Statistics (3)

Statistics 375 Operations Research (3)

**Total: 36 credit hours**

\*If not taken as a core course.

**ECONOMICS**

The sequence of courses in this area introduces the student to the tools of economic analysis and to their use in decision making in such areas as investment, optimal product mixes, budget allocations, locational decisions and competitive strategies. It also may provide training in internal and external forecasting. Such analytical techniques are appropriate for industrial, commercial and financial organizations, as well as governmental units and agencies. In addition to this emphasis in economics, students complete their area of concentration with work from one or a combination of the following areas: accounting, behavioral science, business management or quantitative techniques (mathematics and statistics).

**Required Courses: 27 credit hours**

351 Intermediate Price Theory (3)

353 Intermediate Income Analysis (3)

At least three additional courses in economics at the 300 level selected in consultation with the area adviser (9-12)

Courses in accountancy, finance, management, marketing, mathematics, statistics or behavioral sciences (9-12)

**Professional Electives 3 credit hours**

**Total: 30 credit hours**

**FINANCE**

This curriculum is designed for the student anticipating a career in a bank or other financial institution, an investment management firm or in the financial division of a nonfinancial business or government.

**Required Courses: 18 credit hours**

323 Financial Management (3)

333 Investments (3)

343 Financial Intermediaries and Markets (3)

Economics 251 Theory of the Firm or Economics 351 Intermediate Price Theory (3)

Accountancy 305 Financial Accounting Concepts or Accountancy 236 Financial Accounting I or Accountancy 237 Cost Accounting (3)

Management 308 Operations Management (3)

**From the following (at least 6 hours):**

326 Financial Management Policy (3)

353 Security Analysis (3)

355 Portfolio Management (3)

363 Management of Financial Institutions (3)

**From the following (at least 6 hours):**

Accountancy 236 Financial Accounting I (3)\*

Accountancy 237 Cost Accounting (3)\*\*

Accountancy 246 Financial Accounting II (3)\*\*\*

Accountancy 258 Computer-Based Data Systems (3)

Accountancy 268 Accounting Information Systems (3)

Accountancy 273 Introduction to Taxation (3)

Accountancy 337 Managerial Accounts and Statistics (3)

Accountancy 358 EDP Systems Analysis and Design (3)

Accountancy 373 Intermediate Taxation (3)

Computer Science 203 Computers and Programming II (3)

Economics 315 Public Finance (3)

Economics 325 International Economics (3)

Economics 329 Banking System and Money Market (3)

Economics 353 Intermediate Income Analysis (3)

Economics 370 Introduction to Quantitative Economics (3)

Economics 371 Applied Econometrics (3)

English 161 Technical Writing (3)

Management 255 Legal Aspects of Business Organization and Operation (3)

Management 318 Management Science (3)

Management 319 Production Systems Analysis (3)

Management 356 The Law of Commercial Credit Transactions (3)

Marketing 313 Marketing Research (3)

Speech 75 Introduction to Speech Communication (3)

**Total: 30 credit hours**

\*If not taken as a required course and if Accountancy 305 has not been taken.

\*\*If not taken as a required course.

\*\*\*If Accountancy 305 has not been taken.

**MANAGEMENT (OPERATIONS, PERSONNEL, ADMINISTRATIVE)**

Professional education in management can lead to a variety of career opportunities in the private and public sectors. Students desiring a career in management should enroll in one of the three areas of emphasis: operations management, personnel management or administrative management.

**Required Courses for All Options: 15 credit hours**

308 Opns. Mgt. (3)

310 Pers. Mgt. (3)

329 Org. Beh. (3)

330 Org. Theory (3)

375 Mgt. Pol. & Prob. (3)

Option A. Operations Management: 9 credit hours

318 Mgt. Sci. (3)

319 Prod. Sys. Anal. (3)

345 Mgt. Ser. Opns. (3)

**Professional Electives: 9 credit hours**

Other management courses are suggested, especially:

311 Coll. Bar. (3)

383 Adv. Org. Beh. (3)

384 Adv. Org. Theory (3)

Any other course approved by adviser including:

Accountancy 237 Cost Account. (3)

Industrial Engineering 388 Indust. Sys. Simulation (3)

Industrial Engineering 398 Schedul. Sys. (3)

English 161 Technical Writing (3)

Speech 75 Introduction to Speech Communication (3)

**Total: 33 credit hours**

**Option B. Personnel Management: 12 credit hours**

311 Coll. Bar. (3)

320 Pers. Ad. Law (3)

347 Comp. Theory & Prac. (3)

353 Sel. Prob. Pers. Mgt. (3)

**Professional Electives: 6 credit hours**

Other management courses are suggested especially:

318 Management Science (3)

383 Adv. Org. Beh. (3)

384 Adv. Org. Theory (3)

Any other course approved by adviser including:

Psychology 304 Industrial Psych (3)

Economics 210 Labor Economics (3)

Social Work 315 Dynamics of Interviewing (3)

Sociology 260 Social Psychology (3)

Sociology 217 The Sociology of Work and Leisure (3)

English 161 Technical Writing (3)

Speech 75 Introduction to Speech Communication (3)

**Total: 33 credit hours**

**MARKETING**

The marketing curriculum attracts students interested in the administration and control of an organization's resources. Specific courses enable the student to emphasize marketing management, promotion, sales management or logistics management.

**Required Courses: 12 credit hours**

206 Distribution Systems (3)

313 Marketing Research (3)

314 Consumer Behavior (3)

390 Marketing Policy (3)

**From the following: 12 credit hours**

335 Management of Promotion (3)

336 Sales Management (3)

347 Channel Management (3)

350 Marketing, Society and Government (3)

355 Contemporary Issues in Marketing (3)

358 Purchasing (3)

360 Quantitative Analysis in Marketing (3)

371 World Marketing (3)

373 Distribution Management (3)

381 Transportation Policy (3)

**Professional Electives: 12 credit hours**

Accountancy 305 Financial Accounting Concepts (3)

Accountancy 358 EDP Systems Analysis and Design (3)

Finance 218 Risk and Insurance (3)

Finance 323 Financial Management (3)

Finance 333 Investments (3)

Management 330 Organizational Theory (3)

Management 318 Management Science (3)

Management 329 Organizational Behavior (3)

Management 310 Personnel Management (3)

Management 345 Management of Service Operations (3)

Management 375 Management Policies and Problems (3)

Economics 229 Money and Banking (3)\*

Economics 251 Theory of the Firm (3)\*

Economics 256 Economics of Public Policy: Antitrust Economics (3)

Economics 325 International Economics (3)

Journalism 120 Advertising Principles and Practices (3)

Journalism 328 Retail Advertising (3)

Journalism 332 Public Relations (3)

Philosophy 135 Ethics and the Professions (3)

Political Science 311 Administrative Regulation of Business (3)

Sociology 260 Social Psychology (3)

Sociology 218 Industrial Sociology (3)

Sociology 333 Comparative Sociology (3)

Psychology 212 Human Learning (3)

Psychology 230 Individual Differences (2)

Psychology 304 Industrial Psychology (3)

Statistics 307 Nonparametric Statistics (3)

Public Administration 205 Managing the Public Sector (3)

Public Administration 354 Public Budgeting (3)

Public Administration 371 Business, Society and Government (3)

**Total: 36 credit hours**

\*If not taken as a core course.

**REAL ESTATE**

This curriculum provides a basic education for students contemplating a career in real

estate, real estate management or associated fields.

**Required Courses: \* 18 credit hours**

Finance 323 Financial Management (3)  
Finance 333 Investments (3)  
Finance 343 Financial Intermediaries and Markets (3)  
Finance 340 Principles of Real Estate (3)  
Finance 341 Real Estate Appraisal (3)  
Finance 342 Real Estate Finance and Investment (3)  
**From the following: 6 credit hours**  
Finance 218 Risk and Insurance (3)  
Finance 326 Financial Management Policy (3)  
Finance 318 Property and Liability Insurance (3)  
Finance 355 Portfolio Management (3)  
Accountancy 273 Introduction to Taxation (3)  
Agricultural Economics 338 Rural Real Estate Appraisal (3)  
Forestry 253 Light Construction (3)  
Home Economics 344 Architectural Design II (3)  
Home Economics 346 Contract Design II (3)  
Home Economics 349 Housing Fundamentals (3)  
Management 356 The Law of Commercial Credit Transactions (3)  
Marketing 336 Sales Management (3)  
Economics 251 Theory of the Firm (3)

**Professional Electives: 6 credit hours**

**Total: 30-33 credit hours**

**RISK AND INSURANCE**

This curriculum is designed to provide a basic education for the student contemplating a career in the insurance industry or in the risk management division of a non-insurance enterprise.

**Required Courses: \* 18 credit hours**

Finance 218 Risk and Insurance (3)  
Finance 313 Personal Insurance (3)  
Finance 318 Property and Liability Insurance (3)  
Finance 323 Financial Management (3)  
Finance 333 Investments (3)  
Finance 343 Financial Intermediaries and Markets (3)

**From the following: 6 credit hours**

Finance 363 Management of Financial Institutions (3)  
Economics 317 Social Insurance (3)  
Management 329 Organizational Behavior (3)  
Management 330 Organizational Theory (3)  
Marketing 336 Sales Management (3)  
Marketing 314 Consumer Behavior (3)

**Professional Electives: 6 credit hours**

**Total: 30-33 credit hours**

\*Management 254 is required unless it has been selected as a core course.

## DEPARTMENT OF PUBLIC ADMINISTRATION BS IN PUBLIC ADMINISTRATION

The Bachelor of Science in Public Administration program is designed to prepare students for careers related to governmental and public service. The program provides a strong component of analytical and management skills relevant to the field of public management, as well as a broad background and understanding of the political, social and economics environment in which public programs are developed and administered.

In addition to 39 hours of required courses, students are required to take nine hours of professional electives. Professional electives must be approved by the student's adviser. In choosing professional electives, the student is encouraged to select courses that relate to each other and to established career patterns, for instance, in areas such as budgeting, personnel administration, social services administration, and energy and environment.

No more than six hours of internship courses may be offered for the degree program, and no more than three of these hours may be credited toward fulfilling the requirement for professional electives.

**Required Courses: 39 credit hours**

Public Administration 205 Managing the Public Sector (3)  
56

Accountancy 258 Computer-Based Data Systems (3)  
Accountancy 325 Governmental Accounting and Budgeting (3)  
Economics 215 Economics of Public Policy: Governmental Finance (3)  
Economics 251 Theory of the Firm (3)  
Economics 253 Macroeconomic Policy (3)  
Management 202 Fundamentals of Management (3)  
Management 308 Operations Management (3)  
Management 310 Personnel Management (3)  
Management 329 Organizational Behavior (3)  
Political Science 102 State Government (3) or Political Science 306 Municipal Government (3)  
Political Science 311 Administrative Regulation of Business (3) or Political Science 317 Public Policy (3)  
Public Administration 354 Public Budgeting (3)  
**Professional Electives: 9 credit hours**  
**Total: 48 credit hours**

## FACULTY

### ADMINISTRATION

Stanley J. Hille, dean, professor, PhD, University of Minnesota  
Robert B. Denhardt, associate dean, professor, PhD, University of Kentucky  
Ronald E. King, assistant dean, instructor, PhD, University of Missouri-Columbia

### ACCOUNTANCY

Rick Elam, director, professor, PhD, University of Missouri-Columbia  
Royal D.M. Bauer, professor emeritus, MBA, Northwestern University  
Raymond C. Dockweiler, associate professor, PhD, University of Illinois

Jere Francis, assistant professor, PhD, University of New England

Wilber C. Haseman, professor, PhD, Syracuse University  
Thomas P. Howard, assistant professor, DBA, Arizona State University

Paul A. Kohler, professor emeritus, PhD, University of Iowa

Robert L. Kvam, professor, PhD, Louisiana State University

James C. Lampe, associate professor, PhD, University of Michigan

Charles Litecky, associate professor, PhD, University of Minnesota

Loren A. Nikolai, professor, PhD, University of Minnesota  
James E. Parker, professor, PhD, Michigan State University

Joseph A. Silvano, professor, PhD, University of Missouri-Columbia

Ralph E. Skelly, associate professor, PhD, University of Alabama

James C. Stallman, associate professor, PhD, University of Illinois

Jenice P. Stewart, assistant professor, PhD, University of Alabama

Earl R. Wilson, assistant professor, PhD, University of Missouri-Columbia

Eugene L. Zieha, professor, PhD, University of Illinois

### BUSINESS ADMINISTRATION

Rodney C. Sherman, associate professor, resident director, PhD, Georgia State University

Janet S. Adams, instructor, MBA, Berry College

Van Dyke Gray, instructor, MBA, North Texas State University

Barry T. Lewis, assistant professor, PhD, University of Missouri-Columbia

Glenn N. Pettengill, associate professor, PhD, University of Arkansas

### FINANCE

Gary L. Trennepohl, chairman, associate professor, DBA, Texas Tech University

Robert E. Bray, associate professor emeritus, MA, University of Missouri-Columbia

Douglas R. Emery, associate professor, PhD, University of Kansas

Adam K. Gehr Jr., associate professor, PhD, The Ohio State University

Paul L. Gronewoller, assistant professor, MBA, University of Nebraska-Lincoln

Arnold D. Johnson, instructor, MBA, Washington University

Raymond T. Lansford, professor, EdD, New York University

John J. Pascucci, professor, PhD, Stanford University  
Melville Peterson, associate professor emeritus, PhD, University of Illinois

John D. Stowe, associate professor, PhD, University of Houston

Francis L. Stubbs, professor, PhD, University of Wisconsin  
David A. West, professor, PhD, University of Arkansas

## MANAGEMENT

Earl F. Lundgren, chairman, professor, PhD, University of Wisconsin

Everett E. Adam Jr., professor, DBA, Indiana University

Russell S. Bauder, professor emeritus, PhD, University of Wisconsin

Allen Bluedorn, assistant professor, PhD, University of Iowa

Earl Cecil, professor, DBA, Indiana University

Robert G. Cook, professor emeritus, DBA, Indiana University

Thomas W. Dougherty, assistant professor, PhD, University of Houston

Ronald J. Ebert, professor, DBA, Indiana University

Myron L. Erickson, associate professor, JD, University of Wisconsin

Donald S. Holm Jr., professor, PhD, Indiana University

Thomas L. Keon, assistant professor, PhD, Michigan State University

Ronald E. King, instructor, PhD, University of Missouri-Columbia

Robert C. Manhart, professor emeritus, PhD, The Ohio State University

James H. Patterson, professor, DBA, Indiana University

Robert V. Penfield, associate professor, PhD, Cornell University

Dale E. Rude, assistant professor, PhD, University of Iowa

E. Allen Slusher, associate professor, PhD, University of Iowa

James A. Wall Jr., professor, PhD, University of North Carolina

## MARKETING

Donald L. Shawver, chairman, professor, PhD, University of Illinois

Carl E. Block, professor, PhD, University of Iowa

S. Watson Dunn, professor, PhD, University of Illinois

Nylen W. Edwards, professor, DBA, Indiana University

Stanley J. Hille, professor, PhD, University of Minnesota

Robert D. Schooler, professor, PhD, University of Texas

John W. Vann, assistant professor, PhD, University of Florida-Gainesville

William B. Wagner, associate professor, PhD, The Ohio State University

Don R. Webb, professor, PhD, University of Illinois

Samuel G. Wennberg, professor emeritus, PhD, Northwestern University

Albert R. Wildt, Bailey K. Howard professor of marketing, PhD, Purdue University

## PUBLIC ADMINISTRATION

Edward T. Jennings Jr., chairman, associate professor, PhD, Washington University (St. Louis)

Stanley B. Botner, associate professor, PhD, University of Missouri-Columbia

Robert B. Denhardt, professor, PhD, University of Kentucky

Michael A. Diamond, assistant professor, PhD, University of Maryland

Brenda S. Gardner, instructor, MPA, University of Southern California

Robert F. Karsch, professor emeritus, PhD, University of Missouri-Columbia

Robert W. Patterson, professor emeritus, PhD, University of Virginia

Michael J. Sabbath, assistant professor, PhD, University of Pittsburgh

J.D. White, assistant professor, PhD, George Washington University



# COLLEGE OF EDUCATION

The College of Education was established in 1868 with the specific responsibility to prepare teachers for Missouri public schools. Today's graduates of the College are employed in a wide variety of non-school settings as well as in educational institutions.

The College has the following specific purposes:

1. To design and provide adequate programs of general, preprofessional and professional education for men and women who plan to make a career of teaching, school administration, school supervision, other specialized school work or educational work in non-school settings.

2. To provide an appropriate foundation for graduate study and research in the undergraduate program.

3. To provide assistance to the schools of the state in the nature of research studies, in-service training, extension teaching, surveys and consultation on educational problems.

The College of Education is a member of the American Association of Colleges for Teacher Education. All programs are fully accredited by the North Central Association of Secondary Schools and Colleges and by the National Council for Accreditation of Teacher Education.

The College of Education is organized into the Departments of Educational and Counseling Psychology, 9 Hill Hall, 882-7731; Curriculum and Instruction, 212 Education Building, 882-6572; Educational Administration, 211 Hill Hall, 882-8221; Health and Physical Education, 20 Rothwell Gymnasium, 882-7601; Higher and Adult Education and Foundations, 301 Hill Hall, 882-8231; Practical Arts and Vocational-Technical Education, 405 General Classroom Building, 882-8391; and Special Education, 515 S. Sixth St., 882-3741.

## ADMISSION

Undergraduate students may enter the College of Education as freshmen. For information on the admissions procedures, see Admission in the general information section of this catalog.

The College of Education offers two baccalaureate degrees: the bachelor of science in education (BS Ed) and the bachelor of educational studies (BES). Approximately 36 semester hours of college credit is required before students may expect to gain admission to a specific program leading to an undergraduate degree in education.

## HONORS PROGRAM

The College maintains an honors program for the academically talented student. First-semester freshmen may apply for the education honors program if they qualify on the Missouri Freshman Placement Test Battery. Second-semester freshmen may apply if they earn a 3.3 (A=4.0) or higher grade point average for the first enrollment of 15 semester hours or more

on the UMC campus. Transfer students may apply for the program following the first semester on campus if they have earned a minimum grade point average of 3.3 in 15 or more semester hours and have been recommended by the director of the honors program.

Students must maintain the minimum grade standard to remain eligible.

## ADMISSION CRITERIA

### Bachelor of Science in Education (Teacher Education Program)

Admission to a specific program is a prerequisite to upperclass field experiences (including student teaching) and, ultimately, certification to teach.

Students may expect to gain admittance to a specific program when the following criteria have been met as long as quotas have not been filled. Students must have:

1. At least 36 semester hours of college credit.

2. A grade point of at least 2.5 for all work completed on the UMC campus.

3. An area of specialization and an approved degree/certification program.

4. A successfully completed field experience.

5. Satisfactory completion of S35 Perspectives in Education. (Transfers with 60 hours or more are exempt.)

6. Completion of the appropriate orientation course at the program level.

7. Evidence of a satisfactory level of competence in oral and written communication and mathematics as indicated by SAT or ACT scores or an equivalent measure of scholastic aptitude.

8. Possession of characteristics associated with effective performance in a professional role at the level(s) and in the emphasis area (major) selected.

9. A notarized Affidavit of Moral Character.

A student admitted to a professional program must maintain the standards met at the time of admission to the program. Continued assessment will be made of the characteristics associated with effective performance in the role of a professional at the level(s) and in the emphasis area (major) selected.

Individuals who possess a baccalaureate degree and desire to meet Missouri teacher certification requirements through the College of Education must meet the above criteria.

A student recommended for teacher certification must have a cumulative grade point average of 2.5—based upon all course work completed at the University of Missouri-Columbia—as well as an overall grade point average of 2.5 based upon all college course work completed.

### Bachelor of Educational Studies

Procedures for admission to candidacy for the bachelor of educational studies degree parallel and approximate those for the Bachelor

of Science in Education degree.

In order to qualify for admission, the applicant must:

1. Be regularly admitted to the College of Education.

2. Have at least 36 semester hours of college credit.

3. Have a grade point of at least 2.5 for all work completed on the UMC campus.

4. Have satisfactorily completed S35 Perspectives in Education. (Transfers with 60 hours or more are exempt.)

5. Have evidence of a satisfactory level of competence in oral and written communication and mathematics.

6. Possess characteristics associated with effective performance in a professional role at the level(s) and in the emphasis area (major) selected.

7. Submit a formal application for the degree to the appropriate department and divisional Bachelor of Educational Studies Admission Committee.

8. Have program approved at least one semester or summer session prior to the semester of graduation.

## TRANSFER STUDENTS

Students transferring to UMC from a community/junior college or other accredited college or university are subject to the Academic Regulations established by the UMC Faculty Council concerning transfer of credit. Transfer of credit is described in the Academic Regulations section of this catalog.

Course work satisfactorily completed at an accredited four-year institution will be accepted without limitation except that the final 24 semester hours leading to the baccalaureate degree must be completed at the University of Missouri-Columbia. Course work satisfactorily completed at an accredited junior/community college generally will be accepted without limitation up to and including 64 semester hours except that non-college level (including remedial and developmental courses) and professional education course work will not be accepted as applicable to the baccalaureate degree. The transfer policy does not waive nor alter any course requirements for the Bachelor of Science in Education or the Bachelor of Educational Studies.

Grades received from other accredited institutions will be recorded on the University of Missouri transcript just as they were earned (A=A, etc.).

Advanced standing credit applicable toward a baccalaureate degree in education normally will be granted for college-level courses earned at an accredited institution, provided the grade was D or better. Advanced standing credit includes course work used to satisfy degree requirements, including the elective portion of the degree program.

UMC College of Education students who plan to take courses at another college or university should fill out the Transfer Credit Approval Form prior to enrollment. Copies of the approval form are available in 102 Hill Hall. Transcript evaluations prepared by other academic divisions of the University of Missouri-Columbia have no validity in the College of Education.

Questions regarding transfer credit should be addressed to the Coordinator of Transfer Credit, 102 Hill Hall, UMC, Columbia, Mo. 65211.

## STUDENT SERVICES

### ADVISING

Entering students in the College are assigned academic advisers, who assist them in planning their college programs. It is the student's responsibility to meet with the adviser as early as possible so that requirements may be met without losing credit or carrying excessively heavy loads during the junior and senior years.

### PLACEMENT

A professional educational placement service is maintained to assemble and disseminate information related to careers in education and to assist in securing positions. This service is available to all UMC graduates and to all former students who have attended the University as a full-time student a minimum of one semester. For more information, contact the Director of Educational Placement, 118 Hill Hall, UMC, Columbia, Mo. 65211.

### STUDENT ORGANIZATIONS

**Activators:** Activators is an organization for physical education majors. Its purpose is to encourage greater social and professional cooperation among all physical education majors, students, faculty and alumni.

**Alpha Tau Alpha:** Composed of students in vocational agriculture and agriculture education, the purposes of Alpha Tau Alpha are to develop a professional spirit and a positive attitude toward the teaching of vocational agriculture, to develop leadership in the field and to develop personal ideas.

**The Association of Childhood Education International,** open to all students, works for the education and well-being of children from two to 12 years old.

A chapter of **The Council of Exceptional Children,** affiliated with the National Education Association, is open to students enrolled in special education programs, as well as other students interested in exceptional children.

**The Council of Teachers of English** is an organization of students who are interested in the teaching of English as a profession. The purpose is to promote professionalism in the field.

The purpose of **DECA (Distributive Education Clubs of America)** is to develop, promote and execute a program of student activities which will contribute to the occupational competence of future marketing and distributive education teacher-coordinators.

**Education Ambassadors** assist the College of Education in public relations and recruitment activities. These undergraduate students must be recommended by the College of Education

faculty, with final selection made by the Office of External Relations staff.

The **Education Student Council** is a division of UMC student government for undergraduate students in education.

The **Educational and Counseling Psychology Student Association** promotes the professional development and collegiality of students enrolled in the undergraduate programs in Educational and Counseling Psychology.

The **Higher and Adult Education and Foundations Student Association** is open to all students who have taken some course work in the department and who are interested in the improvement of education. The organization facilitates an orientation to the field and to professional affiliations.

**Kappa Delta Pi,** open to undergraduate and graduate education students who are in the top 15 percent of their class, promotes and recognizes academic excellence in the College of Education.

The **Industrial Education Club,** designed for professional advancement and fellowship in industrial education, is for students in industrial education.

**Music Educators National Conference** is composed of students who are interested in the teaching of music as a profession. It allows the students to develop a high degree of musicianship; and it acquaints the students with the responsibilities and privileges associated with the music education profession.

**Phi Beta Lambda,** affiliated with the state and national FBLA-PBL, helps students prepare for their careers. Students enrolled in business, secretarial or business teacher education programs are eligible for membership.

**Pi Lambda Theta,** an honorary professional organization, is open to juniors and seniors in the College of Education. Members are elected on the basis of superior scholarship and professional promise in the field of education.

The **Student Missouri State Teachers Association,** affiliated with MSTA, promotes activities and experiences designed to assist students in their preparation for teaching careers. All education students are eligible for membership.

**Teachers of Home Economics** is for those students enrolled in home economics education or those anticipating a transfer into home economics education. Promoting professionalism in home economics education, meeting peers, sharing ideas and providing information are the major goals.

## SCHOLARSHIPS

The following scholarships are available through the Financial Awards Committee of the College of Education. The deadline for application for most of these scholarships is Feb. 1. Specific information and applications forms may be obtained in 107 Hill Hall.

**Aleppo Grotto Scholarships:** Awarded to undergraduate or graduate students who plan to teach orthopedically handicapped children. Preference is given students who are especially interested in the cerebral palsy field.

**Alumni Scholarship for Freshmen Stu-**

**dents.** Awarded to two entering freshmen (one minority and one non-minority) on the basis of promise as a future teacher, high school transcript and standardized test scores.

**Arthur Bitker Scholarship:** Awarded to female students who are active in golf.

**Joseph P. Blanton Scholarship:** Awarded to a student recommended by the dean.

**Isaac Hinton Brown Scholarship:** Awarded to a female Missouri high school graduate who intends to pursue the teaching profession.

**Carol Westerman Campbell Memorial Scholarship:** Awarded to a student enrolled in the College of Education who has earned at least 30 semester hours and who shows promise as a teacher.

**Ruby J. Cline Physical Education Scholarship:** Awarded to a junior female student specializing in the field of physical education. Selection is based on grade point average, leadership and promise.

**Flora E. Davidson Scholarship:** Awarded to a worthy undergraduate majoring in elementary education.

**Geraldine K. Fergen Scholarship:** Awarded to undergraduate or graduate students enrolled in special education.

**Pauline Gillette Garrett Award:** Given to students who plan to teach home economics.

**S.H. Ford Scholarship:** Awarded annually on the basis of scholarship and probable service in the field of education to a graduating student deemed most worthy.

**Albert Waldo Holman Memorial Award:** Given to a freshman student from Boone County, Mo. Preference will be given to a student who was active in 4-H and athletics.

**Theo W.H. Irion Memorial Scholarship:** Given to a senior or a first-year graduate student majoring in education on the basis of financial need, scholarship, leadership and probable service in education.

**Kappa Delta Pi Scholarship:** Awarded to a junior, senior or graduate student in the College who also is a member of Kappa Delta Pi.

**Friedel C. Maasdorf Foreign Language Education Scholarship:** Awarded to students who major in foreign language education.

**Mary R. McKee Physical Education Award:** Given to outstanding women students on the basis of participation in sports and/or dance, leadership, service and scholarship.

**Harry R. McMillan Memorial Scholarship Fund:** Awarded to outstanding students in the College of Education.

**Marvelle Michel Scholarship:** Given to entering freshmen with a cumulative high school GPA of at least a 3.2 on a 4.0 scale who intend to major in physical education. This scholarship may be renewed for four years providing the recipient maintains a 3.0 GPA.

**Missouri Federation of Women's Clubs Elizabeth Cushing Scholarship in Special Education:** Awarded to a student, recommended by the education faculty, who is preparing to teach mentally retarded or mentally superior children. Recipient must be a Missouri resident and agree to teach in Missouri within three years of graduation or repay the amount of the scholarship. It may be given to the same person for a second year.

**Loran G. Townsend Scholarship in Edu-**

**caution:** Selection of a senior or graduate student(s) shall be based upon recognized ability and professional promise in the field of education.

## SPECIAL SERVICES

**Instructional Materials Center.** Located in 311 Education Building, the center contains collections of textbooks, curriculum guides, tapes, films and models. Its equipment inventory includes projectors, recorders and study carrels. Staffed by personnel knowledgeable in the selection and use of instructional materials and equipment, the center is designed to serve both students and faculty of the College of Education.

**Instructional Media Laboratory.** The Instructional Media Laboratory in 314 Education Building, provides a training facility in the production and use of instructional materials and media. Students enrolled in methods courses use the laboratory to develop various types of audiovisual materials for use in student teaching.

**Education Abroad.** Since 1961, the College of Education has had a study abroad program with the School of Education of the University of Reading in England. This enables the College to provide unique offerings which carry academic credit. The Scholars Abroad program for upperclass students is offered the second semester of each academic year.

## PROFESSIONAL OPPORTUNITIES

A career in professional education offers many challenging opportunities. Although job opportunities vary from field to field, professional personnel who are well prepared and who can provide evidence of competence in their areas of specialization are in demand.

The professional education programs of the College of Education are organized and administered to make optimal use of all of the resources at the University of Missouri-Columbia which are applicable to the preparation of teachers and educational administrators as well as other educational and human services specialists.

Students who complete the requirements for the bachelor of science in education degree are eligible for a life certificate, issued by the University, to teach in Missouri public schools. Since the teacher education program at the University of Missouri-Columbia has been approved by the National Council for Accreditation of Teacher Education, graduates of the College experience little difficulty in meeting certification requirements in other states. The bachelor of educational studies degree provides programs for students interested in education as a discipline or who wish to prepare for educational work in a setting that does not require teacher certification.

## DEGREE REQUIREMENTS

The College of Education administers the bachelor of science in education degree and the bachelor of educational studies degree.

The course work necessary to complete the requirements for certificates issued by the

Missouri Department of Elementary and Secondary Education also may be completed in the College of Education.

### BSEd

The requirements for the bachelor of science in Education (BSEd) degree are specified in four areas: general education, preprofessional professional education and a teaching major. All students preparing to be elementary or secondary teachers, regardless of the major field, are required to complete the general education and preprofessional program. Students transferring from other institutions are required to fulfill the equivalencies of these courses.

To secure the degree of bachelor of science in education, the candidate must fulfill the following requirements:

1. Be admitted to a teacher education program in the College of Education.

2. Complete the professional courses in education listed in the various curricula, the courses required in the areas of specialization and the general education as well as the preprofessional requirements for all teachers.

3. Demonstrate satisfactory proficiency in English. This requirement may be met by making a grade of C or better in the second course in English composition or by being admitted to 65GH, Honors Exposition, and making a grade of C or better.

4. Demonstrate satisfactory proficiency in oral communication. This requirement may be met by making a grade of C or better in Speech 75, Introduction to Speech Communication, or T41, Classroom Communication.

5. Have completed 120 semester hours acceptable toward the degree of bachelor of science in education.

6. Have a cumulative grade point average of 2.5 based upon all course work completed at UMC as well as an overall grade point average of 2.5 based upon all college course work completed.

7. Be recommended for the degree by the College of Education faculty.

8. Meet the residence requirement.

### BES

The requirements for the bachelor of educational studies (BES) degree prepare students for careers in human services. The College of Education will not certify or recommend certification to teach in the public schools on the basis of the BES degree.

Graduation requirements for the BES degree are as follows:

1. All freshmen and sophomores must have successfully completed S35, Perspectives in Education.

2. The student must establish satisfactory proficiency in English. This requirement may be met by making a grade of C or better in the second course in English composition or by being admitted to 65GH, Honors Exposition, and making a grade of C or better.

3. The student must be admitted to and complete the program of studies as approved by the appropriate divisional and departmental Bachelor of Educational Studies Admissions Committee.

4. The student must complete a total of 120 semester hours of college credit acceptable

toward the degree of bachelor of educational studies, including the general education requirements of the BS in education degree: at least 24 semester hours of course work offered by the College of Education. [These 24 hours must include course work selected from at least four different College of Education areas. The course S35, Perspectives in Education, while required—cannot be used as one of the four areas—but may be included in the 24 semester hours total.]; and at least one support area totaling 24 or more semester hours selected in accordance with the candidate's educational objective.

5. The student must have a cumulative GPA of 2.5 based upon all course work completed on the UMC campus as well as an overall GPA of 2.5 based upon all college course work completed.

6. The student must meet the residence requirement.

7. Students entering with advanced standing must complete at least three courses in education on UMC's campus.

8. The student must be recommended for the degree by the faculty of the College of Education.

### RESIDENCE REQUIREMENT

Students must spend their senior year on the UMC campus in order to obtain the bachelor of science in education or bachelor of educational studies degrees. A minimum of three courses in education must be completed during this period. For the BS Ed, these courses shall include student teaching and a special methods course. In addition, three semester hours must be earned in the subject field of specialization. Work done in the summer sessions on the Columbia campus may be counted as work in residence.

### SENIOR PROFESSIONAL SEMESTER

Students completing a teacher preparation program on the Columbia campus are required to complete a senior professional semester. During the student's senior year, one semester is devoted to course work in teacher education, including student teaching. During one-half of the semester, the student is enrolled in six to eight semester hours of course work on campus. For the other half of the semester, the full day is devoted to the student's teaching assignment.

To qualify for student teaching, the applicant must:

1. Be admitted to a teacher education program.

2. Have a minimum of 90 semester hours.

3. Have spent at least the preceding semester in residence.

4. Have a minimum 2.5 GPA for all work completed at UMC and for all course work completed in professional education.

5. Meet specific prerequisite professional education course requirements for the level at which the student teaching is to be accomplished.

The senior professional semester for education majors will include student teaching and other courses designated by the department in which the student is majoring.

Student teaching assignments are available in the Columbia public schools, in several

surrounding towns and in the St. Louis area. Students whose homes are in the St. Louis area may make application to do their student teaching there. Applications are accepted in February and September for the following semesters. Any questions concerning student teaching should be directed to the Office of Education Field Experiences, 101 Hill Hall, UMC, Columbia, Mo. 65211.

## REQUIREMENTS FOR TEACHING MAJORS

Students preparing for elementary school teaching need preparation in a number of subject matter areas as well as a specialization in elementary education. Programs in elementary education are planned with the close supervision of an adviser.

Students preparing for secondary school teaching are required to have a teaching major. By careful program planning, it is possible in some instances to earn certification in more than one area.

While a student's program of study may be strengthened by taking certain elective courses, such election should be made only with the consent of the proper adviser(s).

## GENERAL EDUCATION REQUIREMENTS

All undergraduates in the College of Education must meet the general education requirements of 31 semester hours. Credit earned by examination may be applied toward these general education requirements. These requirements and the minimum hours are indicated below.

**Humanities (6 hours)** Must include courses from two of the following fields: music, foreign language, classical studies, philosophy, literature, humanities (General Honors), religion, theater and drama, and art. Early childhood majors and elementary majors must have two semester hours in art or music.

**Written Communication (6 hours)** Must include two English composition courses. Students excused from English 1, Composition (3) may satisfy the English requirement by completing English 60, Exposition (3) or its equivalent with a grade of C or better.

**Social Studies (9 hours)** Must include American history, American government and one additional course selected from geography, economics, sociology, anthropology or psychology.

**Natural Science (7 hours)** Must include courses in biological and physical or earth science, one of which has a laboratory.

**Mathematics (3 hours)** A college-level mathematics course(s) taught by a mathematics department. Elementary and early childhood majors must take Mathematics 7, Algebra for Elementary Teachers.

## PREPROFESSIONAL REQUIREMENTS

In addition to the general education requirements, BS Ed candidates in the College of Education must earn five to 14 semester hours in preprofessional courses. The areas of study and the minimum required semester hours are as follows:

**Early Childhood Education:** health and nutrition (3), Mathematics 8, Geometry for

Elementary Teachers (3), oral communication (3).

**Elementary Education:** economics (3), health (2), geography (3), Mathematics 8, Geometry for Elementary Teachers (3), oral communication (3).

**Secondary Education:** health (2), oral communication (3).

**Special Education (single major):** health (2), oral communication (3), Mathematics 8, Geometry for Elementary Teachers (3).

## COURSE LISTINGS KEY

- A. Educational Psychology
- B. Education Studies
- C. Educational Administration
- T. Curriculum and Instruction
- EH. Education (Educational Honors)
- F. Practical Arts and Vocational-Technical Education
- G. Counseling and Personnel Services
- H. Health and Physical Education (Professional Education Courses)
- K. Higher and Adult Education
- L. Special Education
- R. Educational Research and Statistics
- S. Admissions Seminar

## ELEMENTARY EDUCATION GRADES 1-8

Students majoring in elementary education are required to earn 21 semester hours in an area of concentration. Some of the semester hours earned to satisfy the general education and preprofessional requirements may be applied to the 21-semester-hour concentration. In addition to the general education requirements, preprofessional requirements and 21 semester hours in an area of concentration, students preparing to become elementary teachers are required to complete the core of courses listed below. Semester hours are in parentheses.

- A205 The Psychology of Learning and Instruction (2)
- A207 The Psychological and Educational Development of the Child (2)
- A240 Introduction to Educational Measurement and Evaluation (2)
- B350, B351, B352 or B353 Educational Foundations (3)
- C241 School Organization and Administration for Elementary Teachers (2)
- H127 P.E. Activities for Elementary School (2)
- L339 Education of Exceptional Children (3)
- S35 Perspectives in Education (1)
- T40 Advisory Seminar in Elementary Education (1)
- T162 Aiding (2) and T163 Aiding (2)
- T221 Teaching of Science in the Elementary School (2)
- T230 Art Activities in the Elementary School (2) or F101 Industrial Arts for Elementary Teachers (3)
- T255 Elementary School Music (2)
- T267 Mathematics in the Elementary School (3)
- T299 Student Teaching in the Elementary School (8)
- T309 Literature in the Elementary School (3)
- T312 Teaching of Language Arts in the Elementary School (2)
- T315 Teaching of Reading (3)
- T317 Diagnostic and Corrective Reading in the Classroom (3)
- T319 Practical Experiences in Reading (2)
- T350 Social Studies in the Elementary School (3)
- T371 Production of Instructional Media Materials (3)

## DUAL PROGRAM: ELEMENTARY/EARLY CHILDHOOD

Students completing elementary education certification requirements and wishing to add early childhood education and, hence, be certi-

fied prekindergarten through grade 8, may do so by completing all elementary education requirements except A207, The Psychological and Educational Development of the Child, and adding the following courses:

- H326 Motor Development in Early Childhood Education (3)
- T301 Child Study (Child and Family Development 160) (3)
- T303 Emerging Language in Early Childhood Education (3)
- T304 Early Childhood Education Family and Community Resources (3)
- T305 Early Childhood Education Curriculum and Methods (3)
- T306 Early Childhood Education Diagnosis and Interventions in Early Childhood Education (3)

In addition, students completing the dual program must have field experiences—either student teaching or aiding—at all four levels: nursery/day care, kindergarten, primary grades and intermediate grades.

## MIDDLE SCHOOL CERTIFICATION

Requirements for state certification as a middle school teacher can be fulfilled by completing the requirements for elementary education, a course in adolescent psychology, a course in reading in a content field, and an area of concentration appropriate to teaching in a middle school.

## EARLY CHILDHOOD EDUCATION

### PREKINDERGARTEN-GRADE 3

In addition to the general education and preprofessional requirements, students who plan to be certified as teachers of early childhood education are required to complete the core of required courses listed below. Students may work toward dual certification in elementary and early childhood education. In order to maximize their efforts, students desiring dual certification should plan carefully with the assistance of their advisers.

Semester hours are in parentheses.

- A205 The Psychology of Learning and Instruction (2)
- B350, B351, B352 or B353 Educational Foundations (3)
- C241 School Organization and Administration for Elementary Teachers (2)
- H326 Motor Development for Early Childhood (3)
- L339 Education of Exceptional Children (3)
- S35 Perspectives in Education (1-2)
- T160 Aiding or CFD 264 Child Development Lab (2-3)
- T161 Aiding (2)
- T221 Science in the Elementary School (2)
- T230 Art Activities in the Elementary School (2) or F101 Industrial Arts for Elementary Teachers (3)
- T255 Elementary School Music (2)
- T267 Mathematics in the Elementary School (3)
- T299 Student Teaching in the Elementary School (8)
- T301 Child Study or CFD 160 Early Childhood (3)
- T303 Emergent Language in Early Childhood (3)
- T304 Family and Community Resources for Early Childhood Education (3)
- T305 Early Childhood Education Curriculum and Methods (3)
- T306 Strategies for Screening Assessment and Intervention in Early Childhood Education (3)
- T309 Literature in the Elementary School (3)
- T312 Teaching the Language Arts in the Elementary School (2)
- T315 Teaching of Reading (3)
- T317 Diagnostic and Corrective Reading in the Classroom (3)
- T319 Practical Experiences in Reading (2)
- T350 Social Studies in the Elementary School (3)
- T371 Production of Instructional Media Materials (3)

Students must have field experience at three levels: primary grades, kindergarten, and nursery/day care. They must student teach at either primary or kindergarten level and schedule aiding experiences at the other levels.

## ART

### KINDERGARTEN-GRADE 9

Students preparing to become teachers of art in the elementary school must complete the general education and the preprofessional requirements. The required elementary education, art and art history courses are listed below. Semester hours are in parentheses.

#### Education Courses:

- A205 Psychology of Learning (2)
  - A207 Psychology of the Child or A208 Psychology of Adolescence (2)
  - B350, B351, B352 or B353 Educational Foundations (3)
  - C241 School Organization and Administration for Elementary Teachers (2)
  - L230 Art Activities in the Elementary School (2)
  - L339 Education of Exceptional Children (3)
  - S35 Perspectives in Education (1)
  - T40 Advisory Seminar in Art Education (1)
  - T161, T162, T163 or T164 Aiding (2)
  - T332 Organization of the Public School Art (2)
  - T299 Student Teaching in the Elementary School (8)
- Select two of the following:
- T221 Science in the Elementary School (2)
  - T309 Literature in the Elementary School (3)
  - T312 Teaching the Language Arts in the Elementary School (2)

#### Art and Art History Courses: 46 semester hours

- Art 2 Introduction to Art (3)
- Art 3 Appreciation of Art (2)
- Art 60 Beginning Drawing I (2)
- Art 20 Basic Design I (3)
- Art 21 Basic Design II (3)
- Art 160 Beginning Drawing II (3)
- Art 175 Beginning Water Color (3)
- Art 177 Beginning Painting (3)
- Art 285 Beginning Sculpture (3)
- Art 390 Printmaking I (3)
- Art 230 Ceramics I (3)
- Art 330 Ceramics II (3)
- Art 251 Jewelry I (3)
- Art 55 Artercraft Fundamentals (3)
- Art History 10 Introduction to Western Art (3)
- Art History 141 American Art and Architecture (3)
- Elective Studio Specialization. In addition to the minimum 46 semester hours of preparation in art and art history, the election of one in-depth studio area of specialization is recommended. With proper long-range planning, the in-depth courses can be scheduled within the regular four-year program and normal course loads. Philosophy 317, Aesthetics (3), is recommended as partial fulfillment of the general education humanities requirement.

### KINDERGARTEN-GRADE 12

The program for preparing to teach art in the elementary and secondary schools is described in the section Art, Grades 7-12.

## MUSIC

### KINDERGARTEN-GRADE 9

In addition to the general education and the preprofessional requirements, students preparing to teach classroom music K-9 are required to take the courses listed below. Semester hours are in parentheses.

#### Education Courses: 32 semester hours

- A205 Psychology of Learning and Instruction (2)
- A208 Psychological and Educational Development for Adolescents (2)
- B350, B351, B352 or B353 Educational Foundations (3)
- C241 School Organization & Administration for Elementary Teachers (2)
- L339 Education of Exceptional Children (3)
- S35 Perspectives in Education (1)
- T40 Advisory Seminar in Music Education (1)
- T256 Music Literature for Children (2)
- T257 Teaching Music in the Elementary School (3)
- T258 Teaching Secondary School Music (3)
- T299 Student Teaching in the Elementary School (8)
- T316 Teaching Reading in the Content Area (2)

#### General Music Courses: 48 semester hours

Applied music private lessons (20) All students must establish proficiency in piano and complete four semester hours in a 200-level course in applied music. Normally, all students complete seven semesters of ensemble credits.

- Music theory (18)
- Music history and literature (6)
- Conducting (4)

#### Endorsement in Instrumental Music

In addition to the general music requirements, the student preparing to teach instrumental music at the elementary school level is required to take nine semester hours in instrumental techniques.

### KINDERGARTEN-GRADE 12

The program for preparing to teach music at both the elementary level and secondary school levels is described in the section Music, Grades 7-12.

## PHYSICAL EDUCATION

### KINDERGARTEN-GRADE 9

Students planning to teach physical education in the elementary school are required to take the general education and the preprofessional courses as well as the following courses in professional education and physical education. Semester hours are in parentheses.

#### Education Courses: 29 semester hours

- A205 Psychology of Learning (2)
  - A207 The Psychological and Educational Development of the Child (3)
  - A240 Introduction to Educational Measurement and Evaluation (2)
  - B350, B351, B352 or B353 Educational Foundations (3)
  - C241 School Organization and Administration for Elementary Teachers (2)
  - H119 Teaching of Physical Education (2)
  - H299 Student Teaching in the Elementary School (8)
  - L339 Education of Exceptional Children (3)
  - S35 Perspectives in Education (1)
  - T161, T162, T163 or T164 Aiding (1)
  - T316 Teaching Reading in the Content Areas (2)
- #### Physical Education Courses: 53-54 semester hours
- H20 Introduction to Physical Education (2)
  - H50 Activity Proficiency (8)
  - H51 Underclass Practicum in Physical Education (1)
  - H58 First Aid (2)
  - H108 Introduction to Tests and Measurements in Physical Education (1)
  - H124 Dance for Elementary Schools (2)
  - H127 Physical Education Activities for Elementary School (2)
  - H133 Teaching of Gymnastics (1)
  - H300 Problems: Techniques of Swimming (1)
  - H300 Problems: Perceptual Motor (2)
  - H321 Health Education in Elementary School (3)
  - H327 Elementary School Physical Education (3)
  - H380 Kinesiology (3)
  - H382 Adapted Physical Education (2-3)
  - H383 Developmental Physical Activity (3)
  - H385 Psychology of Exercise (3)

- Elect two:
- H102, H103, H104, H105, H106 or H107 Coaching (2)
  - H162 Advanced Recreational Dance (2)
  - H172 Teaching of Individual and Dual Sports (2)
  - H173 Teaching of Team Sports (2)
- Other required courses:
- Physiology 201 Elements of Physiology (5)
  - Anatomy 201-202 Elementary Anatomy—Lecture and Lab (5)

## SPECIAL EDUCATION

The College of Education has undergraduate programs in the area of special education designed to prepare students to teach the educable mentally retarded, the trainable and severely handicapped, the behaviorally disordered and the orthopedically handicapped. The program in early childhood special education is offered only at the graduate level.

Students seeking certification to teach in an area of special education are encouraged to have their adviser assist them in planning their programs. After the completion of 45 semester hours of course work, students must submit to the department chairperson an application

form indicating their projected student teaching semester.

All students preparing to teach in special education are required to meet the general education, the preprofessional and the professional education requirements. Students majoring in special education have the choice of two options relative to their preparation programs. Option I requires a dual major—special education and elementary or secondary education. Option II requires a minimum of one special education major.

Students selecting Option I are required to fulfill all of the elementary or secondary education requirements (depending on the level at which they are preparing to teach), with a modification of the student teaching requirement. Students selecting Option II are required to take eight semester hours of student teaching within their area of specialization. In both Option I and Option II, all pertinent special education courses must be completed successfully before student teaching in special education is begun. (See requirements for student teaching.) The programs for Option I and Option II follow.

### OPTION I

#### Dual Major: Special Education and Elementary or Secondary Education

All students selecting the Option I program are required to complete the general education, the preprofessional requirements and a teaching major in elementary or a field of secondary education. In addition, students must complete the special education core and the requirements for one of the areas of specialization.

### OPTION II

#### Single Major in Special Education

The student selecting Option II must complete the general education and the preprofessional requirements (with the exception of economics and geography), the professional education requirements, the special education core and at least one of the majors in special education. Semester hours are in parentheses.

#### PROFESSIONAL EDUCATION REQUIREMENTS: 27-28 semester hours

- A205 Psychology of Learning and Instruction (2)
  - A207 Psychological and Educational Development of the Child (2)
  - A208 Psychology of Adolescence (2)
  - B350, B351, B352 or B353 Educational Foundations (3)
  - C240 or C241 School Organization and Administration (2)
  - S35 Perspectives in Education (1)
  - T162 Aiding: Primary Grades (1) or
  - T163 Aiding: Intermediate Grades (1)
  - T164 Aiding: Secondary Grades (1)
  - T267 Teaching Mathematics in the Elementary School (3)
  - T315 Teaching of Reading (3)
  - \*T318 Analysis and Correction of Reading Disabilities (3)
  - \*T319 Practical Experiences in Reading (2)
  - \*T360 Topics: Remedial Mathematics (2 or 3)
- #### Special Education Core: 29 semester hours
- L40 Advisory Seminar in Special Education (1)
  - L50 Freshman Readings in Special Education (1)
  - L101 Survey of Special Education (3)
  - L339 Education of Exceptional Students (3)
  - L346 Language Problems of Exceptional Students (3)
  - L360 Topics: Consultation and Conferencing in Special Education (3)
  - L361 Psychoeducational Assessment of Exceptional Students (3)
  - L363 Behavioral Management with Exceptional Students (3)
  - L365 Instructional Programming for Exceptional Students (3)
  - L367 The Use of Instructional Materials with Exceptional Students (3)
- \*\*One Special Education introductory course other than the requirement in the student's area of specialization (e.g.,

L321, L334, L342, L351, L371 or L381) (3)

#### **AREAS OF SPECIALIZATION**

##### **Behavioral Disorders: 24-26 semester hours**

L162 Field Experiences: Primary Special Education-Behavior Disorders (1-2) or  
L163 Field Experiences: Intermediate Special Education-Behavior Disorders (1-2)  
L164 Field Experiences: Secondary Special Education-Behavior Disorders (1-2)  
L351 Introduction to Education of Behaviorally Disordered Students (3)

L352 Teaching the Behaviorally Disordered (3)

L362 Psychoeducational Assessment of Exceptional Students-Lab (2)

L364 Behavioral Management with Exceptional Students-Lab (2)

L366 Instructional Programming for Exceptional Students-Lab (2)

L368 Instructional Materials with Exceptional Students-Lab (2)

L299 Student Teaching in Special Education: Behaviorally Disordered (8)

##### **Mild and Moderate Mental Retardation: 26-28 semester hours**

L162 Field Experiences: Primary Special Education—Mild and Moderate Mental Retardation (1-2) or

L163 Field Experiences: Intermediate Special Education—Mild and Moderate Mental Retardation (1-2)

L164 Field Experiences: Secondary Special Education—Mild and Moderate Mental Retardation (1-2)

L299 Student Teaching in Special Education—Mild and Moderate Mental Retardation (8)

L321 Introduction to Mental Retardation (3)

L322 Secondary Methods in Mental Retardation (3)

L330 Teaching the Mentally Retarded (2)

L362 Psychoeducational Assessment of Exceptional Students-Lab (2)

L364 Behavioral Management with Exceptional Students-Lab (2)

L366 Instructional Programming for Exceptional Students-Lab (2)

L368 Instructional Materials with Exceptional Students-Lab (2)

##### **Orthopedically Handicapped\*\*\*: 35-37 semester hours**

L162 Field Experiences: Primary Special Education—Orthopedically Handicapped (1-2) or

L163 Field Experiences: Intermediate Special Education—Orthopedically Handicapped (1-2)

L164 Field Experiences: Secondary Special Education—Orthopedically Handicapped (1-2)

L299 Student Teaching in Special Education: Orthopedically Handicapped (8)

L334 Introduction to Severely Handicapped and Multihandicapped (3)

L335 Managing Health Problems of the Handicapped (3)

L336 Education of the Multihandicapped (2)

L342 Introduction to Learning Disabilities (3)

L360 Topics: Alternative Approaches to Communication for the Handicapped (3)

L362 Psychoeducational Assessment of Exceptional Students-Lab (2)

L364 Behavioral Management with Exceptional Students-Lab (2)

L366 Instructional Programming for Exceptional Students-Lab (2)

L368 Instructional Materials with Exceptional Students-Lab (2)

H382 Adapted Physical Education (3)

##### **Severely Handicapped\*\*\* (37-39 semester hours)**

L162 Field Experiences: Primary Special Education—Severely Handicapped (1-2) or

L163 Field Experiences: Intermediate Special Education—Severely Handicapped (1-2)

L164 Field Experiences: Secondary Special Education—Severely Handicapped (1-2)

L299 Student Teaching in Special Education—Severely Handicapped (8)

L321 Introduction to Mental Retardation (3)

L323 Curriculum Development and Methods of Teaching the Severely Handicapped (4)

L324 Assessment of Functional Skills of Severely Handicapped Students (3)

L334 Introduction to Severely Handicapped and Multihandicapped (3)

L335 Managing Health Problems of the Handicapped (3)

L330 Teaching the Mentally Retarded (2)

H338 Perceptual Motor Development and the Severely Handicapped Child (3)

L360 Topics: Alternative Approaches to Communication for the Handicapped (3)

H382 Adapted Physical Education (3)

\*Not required of students majoring in severely handicapped.

\*\*Students having two or more areas of specialization in special education; i.e., double special education majors, shall be required to take the introductory courses in only their respective areas of specialization.

\*\*\*Students having a double major in orthopedically handicapped and severely handicapped shall not be required to take L362 and L368.

## **EDUCATIONAL AND COUNSELING PSYCHOLOGY**

The Department of Educational and Counseling Psychology offers several programs designed to prepare undergraduate students for careers in the helping professions. These programs provide a foundation for a graduate program in one or more of the specialty areas offered by the department. Since all of the programs have a controlled admission policy, students should contact the appropriate area coordinator regarding admission requirements.

### **BS IN EDUCATION DEGREE PROGRAM Elementary School Guidance Services**

Students preparing for graduate work in elementary school counseling and related areas are encouraged to complete the requirements for endorsement in elementary guidance services. In addition to the required general education, preprofessional education courses and courses in the elementary major, qualified applicants may obtain endorsement in guidance services (elementary) by completing the courses listed below. Semester hours are in parentheses.

G40 Advisory Seminar in Counseling and Personnel Services (1)

G60 Introduction to Counseling and Personnel Services (2)

G160 Field Experience in Counseling and Personnel Services (3)

G275 Internship in Counseling and Personnel Services (8)

G320 Planning and Implementing Guidance Programs (3)

G330 Parent Counseling and Consultation (3)

G395 Introduction to Helping Relationships (3)

G396 Group Procedures in Counseling (3)

G397 Career Development I: Theory, Materials and Techniques (3)

R370 Educational Statistics I (3)

One of the following:

L342 Introduction to Learning Disabilities (3)

T318 The Analysis and Correction of Reading Disabilities (3)

These courses also provide suitable preparation for other careers in the helping professions (e.g., child development, family services, career planning, mental health).

For further information about the program, contact Coordinator of Guidance Services—Elementary, 16 Hill Hall, UMC, Columbia, Mo. 65211.

### **Secondary School Guidance Services**

Students preparing for graduate work in secondary school counseling and related areas are encouraged to complete the requirements for endorsement in secondary guidance services. In addition to the required general education, preprofessional, secondary professional education courses and courses in the behavioral science major, qualified applicants may obtain endorsement in guidance services (secondary) by completing the courses listed below. Semester hours are in parentheses.

G40 Advisory Seminar in Counseling and Personnel Services (1)

G60 Introduction to Counseling and Personnel Services (2)

G160 Field Experience in Counseling and Personnel Services (3)

G275 Internship in Counseling and Personnel Services (8)

G320 Planning and Implementing Guidance Programs (3)

G396 Group Procedures in Counseling I (3)

G397 Career Development I: Theories, Materials and Techniques (3)

R370 Educational Statistics I (3)

Electives selected from courses offered by the Department of Educational and Counseling Psychology and approved by the student's adviser (9)

For additional information regarding the program, contact the Coordinator of Guidance Services—Secondary, 16 Hill Hall, UMC, Columbia, Mo. 65211.

### **Rehabilitation Services**

The rehabilitation services program prepares students with the competencies necessary for employment in agencies which assist handicapped and disadvantaged people in their career development. Students have two curriculum options: (1) a teaching certificate program in the secondary behavioral sciences teacher area; or (2) a non-teaching certificate program under the Bachelor of Educational Studies (BES) degree, Rehabilitation Services.

### **BS Ed**

Students selecting Option 1 must complete the general education, preprofessional, secondary professional education and behavioral science teaching major requirements, plus the rehabilitation services core listed below. Semester hours are in parentheses.

**Rehabilitation Services Core: 18 semester hours**

G40 Advisory Seminar in Counseling and Personnel Services (1)

G60 Introduction to Counseling and Personnel Services (2)

G152 Seminar in Counseling and Personnel Services (Program Evaluation) (1)

G160 Field Experience in Counseling and Personnel Services (1)

G335 Vocational Placement Methods (2)

G352 Psychological Aspects of Disability (3)

G354 Work Adjustment II (3)

G225 Introduction to Rehabilitation Services (2)

G397 Career Development: Theories, Materials and Techniques (3)

The courses F101, Industrial Arts for Elementary Teachers (3), and L321, Introduction to Mental Retardation (3), are recommended.

## **BACHELOR OF EDUCATIONAL STUDIES DEGREE PROGRAMS**

Students interested in counseling and personnel services preparation for non-school human services settings may select a program through the Bachelor of Educational Studies (BES) degree. In addition to the general education requirements, students are expected to complete the Educational and Counseling Psychology core requirements, a 12-semester-hour behavioral science foundation area, and at least one support area selected from student personnel services, correctional services, evaluation and adjustment services, marriage and family services, mental health services, personnel services or religious counseling. The program and the corresponding semester hours required are listed below.

### **Educational and Counseling Psychology Core Requirements: 24-29 semester hours**

G40 Advisory Seminar in Counseling and Personnel Services (1)

G60 Introduction to Counseling and Personnel Services (2)

G160 Field Experience in Counseling and Personnel Services (3)

G255 Introduction to Rehabilitation Services (2)

G275 Internship in Counseling and Personnel Services (3-8)

G395 Introduction to Helping Relationships (3)

G396 Group Procedures in Counseling I (3)

G397 Career Development I: Theory, Materials and Techniques (3)

R370 Educational Statistics I (3)

S35 Perspectives in Education (freshmen and sophomores only) (1)



**Behavioral Science Foundation: 12 semester hours**

Each program must include 12 semester hours of behavioral science courses selected from psychology, sociology and/or anthropology. The behavioral science foundation area must include at least one course above the introductory level. The 12 hours applicable to this area must be taken exclusive of general education and support area requirements.

**Educational and Counseling Psychology Support Area: 30 semester hours**

In consultation with the assigned academic adviser, students will be expected to develop a 30-semester-hour support area appropriate to their vocational/educational goal. Included are support areas in mental health services, religious counseling, marriage and family services, athletic counseling, correctional services, personnel services (business and industry), and evaluation and adjustment services. The courses required in each area are outlined below.

**STUDENT PERSONNEL SERVICES****Required:**

- A205 The Psychology of Learning and Instruction (2)
- B350, B351, B352 or B353 Educational Foundations (3)
- G320 Planning and Implementing Guidance Programs (3)
- G330 Parent Counseling and Consultation (3)
- Psychology 280 Psychology of Personality (3)
- One of the following:
- A240 Introduction to Educational Measurement and Evaluation (2)
- A302 Group Intelligence Testing (3)
- 376 Psychological Tests and Measurements (3)
- One of the following:
- Child and Family Development 363 Family Development (3)
- Sociology 214 The Family (3)
- Two of the following:
- G352 Psychological Aspects of Disability (2)
- G355 Introduction to Alcohol Abuse and Rehabilitation Programs (3)
- H361 Education in Human Sexuality (3)
- H396 Drug Education (3)
- One of the following:
- G392 Career Resources in Business and Industry (2)
- G398 Career Development II: Methods and Programs (3)
- K301 Foundations of Adult Education (3)
- One of the following:
- Psychology 20 Psychology of Personal Adjustment (3)
- A208 The Psychological and Educational Development of the Adolescent (3)

**CORRECTIONAL SERVICES****Required:**

- Sociology 50 Social Deviance (3)
- Sociology 211 Criminology (3)
- Sociology 212 Contemporary Corrections (3)
- Political Science 120 Judicial Process (3)
- Political Science 321 The Constitution and Civil Rights (3)
- One of the following:
- G355 Introduction to Alcohol Abuse and Rehabilitation Program (3)
- H396 Drug Education (3)
- Social Work 307 Delinquency and Social Treatment (2)
- Two of the following:
- Psychology 280 Psychology of Personality (3)
- Psychology 302 Theories of Personality (3)
- Psychology 180 Fundamentals of Abnormal Psychology (3)
- Psychology 345 Advanced Abnormal Psychology (3)
- Psychology 260 Social Psychology (3)
- Psychology 343 Advanced Social Psychology (3)
- One of the following:
- G330 Parent Counseling and Consultation (3)
- Sociology 214 The Family (3)
- Sociology 216 Urban Sociology (3)
- Child and Family Development 363 Family Development (3)
- One of the following:
- Psychology 342 Social Motivation (3)
- G325 Individual Vocational Assessment (3)
- G335 Vocational Placement Methods (2)

**REHABILITATION SERVICES**

- G325 Individual Vocational Assessment 1 (3)
- G335 Vocational Placement Methods (2)
- G353 Rehabilitation Facilities (3)
- G354 Work Adjustment I (3)
- G152 Program Evaluation (1)
- F101 Work Processes (3)
- One of the following:
- A240 Introduction to Educational Measurement and Evaluation (2)
- A302 Group Intelligence Testing (3)
- Psychology 376 Psychological Tests and Measurements (3)
- One of the following:
- Psychology 180 Abnormal Psychology (3)
- Psychology 280 Psychology of Personality (3)
- Psychology 345 Advanced Abnormal Psychology (3)

- Two of the following:
- L339 Education of Exceptional Children (3)
- L335 Medical Lectures Relating to Orthopedically Disabled (3)
- L321 Mental Retardation (3)
- L351 Introduction to Education of Emotionally Disturbed Children (3)
- L371 Vocational Education of the Handicapped (3)

- One of the following:
- G352 Psychological Aspects of Disability (2)
- G355 Introduction to Alcohol Abuse and Rehabilitation Programs (3)
- G392 Career Resources in Business and Industry (2)
- H361 Education in Human Sexuality (3)
- H396 Drug Education (3)

**MARRIAGE AND FAMILY****Required:**

- Child and Family Development 163 Interpersonal Relations, Marriage and the Beginning Family (3)
- G330 Parent Counseling and Consultation (3)
- Child and Family Development 363 Family Development (3)
- One of the following:
- Psychology 120 Human Sexuality (3)
- H361 Education in Human Sexuality (3)
- One of the following:
- G355 Introduction to Alcohol Abuse and Rehabilitation Programs (3)
- H396 Drug Education (3)
- One of the following:
- Child and Family Development 160 Early Childhood (3)
- A207 The Psychological and Educational Development of the Child (3)
- A208 The Psychological and Educational Development of the Adolescent (3)
- T301 Child Study (3)
- Two of the following:
- Psychology 180 Fundamentals of Abnormal Psychology (3)
- Psychology 260 Social Psychology (3)
- Psychology 280 Psychology of Personality (3)
- One of the following:
- A240 Introduction to Educational Measurement and Evaluation (2)
- A302 Group Intelligence Testing (3)
- Psychology 376 Psychological Tests and Measurements (3)

**MENTAL HEALTH SERVICES****Required:**

- Psychology 180 Fundamentals of Abnormal Psychology (3)
- Psychology 260 Social Psychology (3)
- Psychology 280 Psychology of Personality (3)
- G330 Parent Counseling and Consultation (3)
- G355 Introduction to Alcohol Abuse and Rehabilitation (3)
- One of the following:
- Psychology 120 Human Sexuality (3)
- H361 Education in Human Sexuality (3)
- One of the following:
- G356 Alcoholism: Assessment and Methods of Rehabilitation (3)
- H396 Drug Education (3)
- One of the following:
- Child and Family Development 163 Interpersonal Relations, Marriage and the Beginning Family (3)
- Child and Family Development 363 Family Development (3)
- Sociology 214 The Family (3)
- One of the following:
- A302 Group Intelligence Testing (3)
- Psychology 376 Psychological Tests and Measurements (3)
- One of the following:
- G325 Individual Vocational Assessment (3)
- G335 Vocational Placement Methods (2)
- G352 Psychological Aspects of Disability (2)
- G354 Work Adjustment I (2)

**PERSONNEL SERVICES****Required:**

- Psychology 30 Applied Psychology (3)
- Psychology 280 Psychology of Personality (3)
- Psychology 304 Industrial Psychology (3)
- Management 202 Fundamentals of Management (3)
- Management 310 Personnel Management (3)
- One of the following:
- G355 Introduction to Alcohol Abuse and Rehabilitation Programs (3)
- H396 Drug Education (3)
- One of the following:
- G335 Vocational Placement Methods (2)
- G352 Psychological Aspects of Disability (2)
- G353 Rehabilitation Facilities (3)
- One of the following:
- Sociology 214 The Family (3)
- K301 Foundations of Adult Education (3)
- H361 Education in Human Sexuality (3)

- Child and Family Development 363 Family Development (3)
- G330 Parent Counseling and Consultation (3)

**One of the following:**

- F137 Business Communications (2)
- F142 Filing Systems and Records Management (2)
- G320 Planning and Implementing Guidance Programs (3)
- G392 Career Resources in Business and Industry (2)
- Management 320 Personnel Administration Law (3)
- Management 329 Organizational Behavior (3)
- Management 330 Organizational Theory (3)

**One of the following:**

- Psychology 376 Psychological Tests and Measurements (3)
- A240 Introduction to Educational Measurement and Evaluation (2)
- A302 Group Intelligence Testing (3)

**RELIGIOUS COUNSELING****Required:**

- G330 Parent Counseling and Consultation (3)
- Two of the following:
- A207 Psychological and Educational Development of the Child (2)
- H361 Education in Human Sexuality
- Psychology 260 Social Psychology (3)
- Psychology 280 Psychology of Personality (3)
- One of the following:
- Sociology 214 The Family (3)
- Sociology 323 Death and Dying
- Child and Family Development 363 Child and Family Development (3)
- Two of the following:
- G352 Psychological Aspects of Disability (2)
- G355 Introduction to Alcohol Abuse and Rehabilitation Programs (3)
- H396 Drug Education (3)
- Additional course work:
- The student must select additional course work from the above and from the Department of Religious Studies in order to complete the 30-semester-hour support area in religious counseling. The additional course work must include at least four courses in religion.

**SECONDARY EDUCATION**

In addition to the prescribed general education and preprofessional education courses, students preparing to become secondary school teachers must complete the following professional education courses and the required courses of at least one teaching major.

**SECONDARY PROFESSIONAL EDUCATION:****32 semester hours**

- A208 The Psychological and Educational Development of the Adolescent (2)
- A205 The Psychology of Learning and Instruction (2)
- B350, B351, B352 or B353 Educational Foundations (3)
- C240 School Organization and Administration For Secondary Teachers (2)
- L339 Education of Exceptional Children (3)
- S35 Perspectives in Education (1)
- Departmental Advisory Seminar (1)
- T164 Aiding: Secondary Schools (2)
- T240 Teaching Skills (3)
- Special Methods Course(s) (3)
- T299 Student Teaching (8)
- T316 Teaching Reading in the Content Areas (2)

**ART****GRADES 7-12**

Students preparing to become teachers of art in the secondary school must complete the general education, the preprofessional and the secondary education requirements. They also must meet the following art education, art and art history requirements. Semester hours are in parentheses.

**Secondary Art: 52 semester hours**

- \*T233 Curriculum in Secondary Art Education (3)
- T234 Secondary Art Methods, Media and Materials (3)

**Art and Art History Core**

- Art 2 Introduction to Art (3)
- Art 55 Aircraft Fundamentals (3)
- Art History 10 and 141 or the equivalent approved by the adviser

**Electives:** 34 semester hours selected from the following courses or the equivalent approved by the adviser

- Art 3 Art Appreciation (2)

Art 20 Basic Design I (3)  
 Art 21 Basic Design II (3)  
 Art 60 Beginning Drawing I (3)  
 Art 160 Beginning Drawing II (3)  
 Art 175 Beginning Watercolor (3)  
 Art 177 Beginning Painting (oils) (3)  
 Art 220 Beginning Spatial Design (3)  
 Art 230 Beginning Ceramics (3)  
 Art 250 Beginning Metals (3)  
 Art 285 Beginning Sculpture (3)  
 Art 290 Relief Printmaking (3)  
 Art 330 Intermediate Ceramics (wheel throwing) (3)  
 Art History 10 Introduction to Western Art (3)  
 Art History 141 American Art and Architecture (3)

**Elective studio specialization.** In addition to the minimum 46 hours of preparation in art and art history, the election of one in-depth studio area of specialization beyond the 46 hours is highly recommended. With proper long-range planning, the in-depth courses can be scheduled within the regular four-year program and normal course loads.  
 \*Meets special methods requirement.

## KINDERGARTEN-GRADE 12

Students who complete the following courses and requirements in general education, preprofessional education and art may obtain certification to teach art at both the elementary and secondary school levels.

T230 Art Activities in the Elementary School (2)  
 T332 Organization of Public School Art (2)

Students who wish to teach on the elementary and secondary level normally pursue the BS Ed degree. AB and BFA candidates may acquire elementary and/or secondary art teaching certification by completing the additional art education requirements not already completed in the AB or BFA programs.

## BEHAVIORAL SCIENCES

### Grades 7-12

Students who desire to teach behavioral sciences in the secondary school must take 38 to 40 semester hours in the behavioral sciences courses listed below, some of which meet the general education, the preprofessional and the secondary professional education requirements. This program provides a foundation for graduate work in educational psychology as well as counseling and personnel work.

Since employment in this field is extremely limited for people who have not completed graduate work, students specializing in the teaching of behavioral sciences are strongly encouraged to complete the requirements of a second teaching major or complete the endorsement in secondary guidance services or rehabilitation services (see Educational and Counseling Psychology).

#### Required Courses: 38-40 semester hours

Psychology 2 General Experimental Psychology (5)\* Psychology 1 (3) and Psychology 3 (2) may be taken in place of Psychology 2.  
 Psychology 20 Psychology of Personal Adjustment (3)  
 Sociology 1 Introduction to Sociology (3)\*  
 A205 Psychology of Learning and Instruction (2)\*\*  
 G395 Introduction to Helping Relationships (3)  
 T251 Teaching of Social Studies in the Secondary Schools (3)\*\*\*\*  
 Anthropology 1 Introduction to Anthropology (3)  
 One of the following:  
 A208 Adolescent Growth and Development (3)\*\*  
 Psychology 280 Psychology of Personality (3)\*\*  
 One of the following:  
 A240 Introduction to Educational Measurement and Evaluation (2)  
 Psychology 376 Psychological Tests and Measurements (3)  
 One of the following:  
 A315 Essentials of Learning (3)  
 Psychology 230 Individual Differences (2)\*\*\*  
 One of the following:  
 Psychology 120 Human Sexuality (3)  
 H361 Education in Human Sexuality (3)

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One of the following:  
 Psychology 260 Social Psychology (3)  
 Psychology 345 Advanced Abnormal Psychology (3)\*\*\*  
 Anthropology 153 Cultural Anthropology (3)

One of the following:  
 H396 Drug Education (3)  
 G355 Introduction to Alcohol Abuse and Rehabilitation Programs (3)  
 Sociology 50 Social Deviance (3)  
 One of the following:  
 Sociology 214 The Family (3)  
 Child and Family Development 363 Family Development (3)  
 G330 Parent Counseling and Consultation (3)

\*One of these courses may be taken in partial fulfillment of the general education requirement in social studies.

\*\*Meets the secondary professional education requirements.

\*\*\*Recommended for students receiving an endorsement in either guidance services or rehabilitation services.

\*\*\*\*Meet special methods requirement.

## ENGLISH AND LANGUAGE ARTS

### GRADES 7-12

The language arts program is designed to certify a graduate to teach general language arts and English in junior and senior high schools. The program is comprised of a core of required courses in the teaching major, exclusive of the general education, the preprofessional and the professional education requirements. Required courses are listed below. Semester hours are in parentheses.

\*English 1 Composition (3) or English 65GH Honors Exposition (3)

English 2 Introduction to Poetry (3)

\*English 60 Exposition (3) or English 65GH Honors Exposition (3)

English 210 (3)

\*Humanities (6) Choose from among the following courses:  
 English 91, 92 Introduction to Film (3); General Humanities 101, 102, 103 or 104 (3 hours each); Art History and Archaeology 10 Introduction to Western Art (3); Art History and Archaeology 141 American Art and Architecture (3); Music 21 Introduction to Music Literature (3); Philosophy I Introduction to Philosophy (3); Classical Studies 60 Classical Mythology (3)

English 175 American Literature (3)  
 English 201 The Tradition of English Literature: Beginnings to 1784 (3)

English 202 The Tradition of English Literature: Romanticism to the Present (3)

English 319 The Structure of American English (3)

English 320 History of the English Language (3) or English 322 Regional and Social Dialects of American English (3).

At least 12 additional hours in English to be selected from four of the following categories:

English 135, 325, 335, 336, 345

English 326, 331, 333, 351, 352, 355, 356, 357

English 365, 366, 367, 368, 369

English 104, 375, 377, 378

English 189, 304, 389, 391, 392, 393, 394, 395, 396

English 108, 110, 185, 301, 385

\*\*\*T211 Teaching Grammar and Usage (3)

\*\*\*T313 Literature in Secondary Schools (3)

\*\*\*T314 Teaching of Composition (3)

\*Fulfills the general education requirement in communication skills.

\*\*Fulfills the general education requirement in humanities.

\*\*\*Meets special methods requirement.

Majors in English/language arts are encouraged but not required to select a teaching minor. The following areas are recommended not only for their intrinsic value but because they will enhance the student's preparation as a teacher of English: instructional media, journalism, Romance languages, school library, speech and theater, and reading. Students with particular interest in creative writing or linguistics should consult with the English education adviser for approval of courses in those areas to fulfill certain requirements in the English/language arts major.

## FOREIGN LANGUAGES

### GRADES 7-12

Students who intend to teach a foreign language must complete the general education, the preprofessional and the secondary professional education requirements, plus a core of required courses in the chosen language. If one high school unit has been earned by the student, the requirement in the foreign language is 32 semester hours. If a student presents two high school units, the requirement is 30 semester hours and the student should enroll in the second course of the language sequence.

#### FRENCH

A student beginning the study of French in college must complete the courses listed below or their equivalents. Semester hours are in parentheses.

##### Language

1 Elementary French I (5)

2 Elementary French II (5)

103 French Reading (3)

106 French Composition (3)

109 French Conversation (3)

203 Masterpieces of French Literature (3)

206 Advanced French Composition (3)

209 Advanced French Conversation

256 Stylistics (3)

A student with one year of high school French normally enrolls in French 2 but may take French 1 for full credit. A student with three years of high school French usually enrolls in 103 but may take 1 or 2 for credit. A student with four years of high school French usually enrolls in 106, 109 or 203.

##### Civilization

110 French Civilization (3) required of French majors.

Satisfies general education requirement, but cannot be counted toward requirements for French.

##### Recommended French Courses

304 Phonetics (3)

378 Structure of Modern French (3)

Any 300-level course(s) in French literature

Special methods requirement

T280 Teaching of Romance Languages in the Secondary School (3)

#### GERMAN

In consultation with the adviser, the student arranges a program of study by selecting courses from the following list. Semester hours are in parentheses.

##### Language

1 Elementary German I (3)

2 Elementary German II (3)

3 Elementary German III (3)

4 Elementary German IV (3)

106 German Conversation and Composition I (3)

203 Advanced German Reading (3)

206 German Conversation and Composition II (3)

306 German Conversation and Composition III (3)

381 Advanced Grammar, Syntax and Stylistics (3)

382 Contrastive Phonology and Syntax (3)

383 Internship in German (3)

##### Literature

275 German Classics (3)

312 German Drama of the 19th Century (3)

313 The German Novelle (3)

315 Faust (3)

333 German Drama I (3)

334 German Drama II (3)

336 German Prose (3)

338 German Poetry (3)

351 German Romanticism (3)

360 Recent German Literature (3)

375 Medieval German Literature, 1170-1210 (3)

T380 Studies in the Techniques of Teaching German (3)

Special methods requirement

#### ITALIAN

A student who is beginning the study of Italian in college must complete the following courses or their equivalents. Semester hours are in parentheses.

Since employment opportunities in this field may be limited, it is recommended that students

specializing in the teaching of Italian complete a second area of specialization.

#### Language

- 1 Elementary Italian I (5)
- 2 Elementary Italian II (5)
- 103 Italian Reading (3)
- 106 Italian Composition (3)
- 109 Italian Conversation (3)
- 206 Advanced Italian Composition (3)
- 209 Advanced Italian Conversation (3)

#### Literature

- 301 Topics in Literature (3)
- 311 Survey of Italian Literature I (3)
- 312 Survey of Italian Literature II (3)
- 319 19th Century Italian Literature (3)
- 321 Dante (3)
- 350 Special Readings (1-3)

#### Civilization

- 110 Italian Civilization (3) recommended, but may not be counted toward minimum requirements.

#### Special methods requirement

- T280 Teaching of Romance Languages in the Secondary School (3)

## LATIN

In consultation with the adviser, the student arranges a program of study by selecting courses from the following list. Semester hours are in parentheses.

#### Language

- 1 Elementary Latin I (5)
- 2 Elementary Latin II (5)
- 103 Latin Reading (3)
- 203 Latin Poetry (3)
- 207 Intensive Beginning Latin I (3)
- 208 Intensive Beginning Latin II (3)
- 300 Problems (1-3)
- 303 Latin Stylistics (2)
- 305 Age of the Scipios (3)
- 310 Age of Cicero (3)
- 320 Augustan Literature (3)
- 335 Neronian Literature (3)
- 340 Age of Pliny and Tacitus (3)
- 350 Special Readings (1-3)
- 376 Medieval Latin (3)
- 399 Survey of Latin Literature (3)

#### Classical Studies

- 10 The Greek and Roman Achievement (3)
- 50 Greek and Latin in English Usage (3)
- 60 Classical Mythology (3)
- 115 Greek Culture (3)
- 116 Roman Culture (3)
- 224 Roman Classics in Translation (3)
- 225 Greek Classics in Translation (3)
- 226 Greek Drama (3)

Special methods course requirement met on an individual basis.

## SPANISH

A student who is beginning the study of Spanish in college must complete the following courses or their equivalents.

Semester hours are in parentheses.

#### Language

- 1 Elementary Spanish I (5)
- 2 Elementary Spanish II (5)
- 103 Spanish Reading (3)
- 106 Spanish Composition (3)
- 109 Spanish Conversation (3)
- 203 Introduction to Hispanic Literature I (3)
- 204 Introduction to Hispanic Literature II (3)
- 206 Advanced Spanish Composition (3)
- 209 Advanced Spanish Conversation (3)

The policy on the placement of students who have studied Spanish at the high school level is the same as that for students who have studied French.

#### Civilization

- 110 Hispanic Civilization (3) or 112 Latin American Civilization (3) required of Spanish majors. Satisfies the general education requirement but cannot be counted toward requirements for Spanish.

#### Recommended Spanish Courses

- 331 Survey of Spanish-American Literature I (3)
  - 332 Survey of Spanish-American Literature II (3)
  - 360 Phonetics (3)
  - 379 Structure of Modern Spanish (3)
- Special methods requirement
- T280 Teaching of Romance Languages in the Secondary School (3)

## HEALTH

### GRADES 7-12

In addition to general education, the preprofessional and the secondary professional education requirements, students preparing to teach health are required to take the courses prescribed below. This interdisciplinary program is comprised of 41 semester hours, some of which count toward the general and the preprofessional requirements. Semester hours are in parentheses.

#### Health Education

- Psychology 20 Psychology of Personal Adjustment (3)
- H58 First Aid (2)
- \*H65 Elements of Health Education (2)
- \*\*\*H165 Teaching of Health (2)
- HNF & FSM 34 Nutrition - Current Concepts and Controversies (3)
- Anatomy 202 Elementary Anatomy (5)
- \*\*Physiology 201 Elements of Physiology (5)
- Microbiology 205 Fundamentals of Medical and Public Health Microbiology (4)
- H391 Organization and Administration of Health Education Programs (3)
- H361 Education in Human Sexuality (3)
- H396 Drug Abuse Education (3)
- Electives (6) to be selected in consultation with adviser
  - \*Meets preprofessional education requirement.
  - \*\*Meets general education requirements.
  - \*\*\*Meets special methods requirement.

## MATHEMATICS

### GRADES 7-12

Students preparing to be mathematics teachers must complete the general education, the preprofessional and the secondary professional education requirements in addition to a core of required courses in the content area. It is assumed that a prospective mathematics teacher will have earned three units of credit in high school mathematics. The courses required for mathematics teachers are listed below. Semester hours are in parentheses.

- Mathematics 80 Analytic Geometry and Calculus I (5)
- Mathematics 175 Calculus II (5)
- Mathematics 201 Calculus III (3)
- Mathematics 250 Survey of Mathematics (3)
- Computer Science 104 Computers and Programming I (3)
- \*T268 Teaching of Mathematics in the Secondary School (3)
- \*T368 Teaching of Algebra in Secondary Schools (3)
- \*T369 Teaching of Geometry in Secondary Schools (3)

One of the following:

- Mathematics 331 Matrix Theory (3)
- Mathematics 333 Higher Algebra (3)
- Mathematics 340 Introduction to Abstract Algebra I (3)

One of the following:

- Mathematics 362 Projective Geometry (3)
- Mathematics 366 Foundations of Geometry (3)
- Mathematics 367 Introduction to Non-Euclidean Geometry (3)
- Mathematics 372 Introduction to Topology (3)

One of the following:

- Statistics 320 Introduction to Mathematical Statistics (3)
- Statistics 325 Introduction to Probability Theory (3)

#### Electives in Mathematics:

Math courses at the 300-level or other courses approved by adviser (6-8)

#### Other required courses:

- Physics 11 Elementary College Physics (5) or Physics 80 University Physics I (3) and Physics 123 University Physics II (3)

#### Recommended course:

- Chemistry 11 General Chemistry (5)
- \*Meets special methods requirement
- The required courses listed above should be considered minimum preparation for secondary school teachers whose major area is mathematics. To provide a more comprehensive background and a basis for graduate work in mathematics, additional electives should be selected from those listed above. Other appropriate mathematics courses include 301 Topics (History of Mathematics); 304 Differential Equations; 310 Advanced Calculus I; 323 Numerical Analysis;

335 Theory of Numbers; 358 Mathematical Logic; and 330 Theory of Equations.

Consideration also should be given to the courses T267 Mathematics in the Elementary School and/or T367 Teaching Techniques and Curriculum in Elementary School Mathematics.

## MUSIC

### GRADES 7-12

Students specializing in music education must complete the general education, the preprofessional and the secondary education professional requirements. In planning a major in music education, students choose one of the following three areas:

1. The general curriculum designed to prepare a student to teach both vocal and instrumental music. This program is practical for many school situations.

2. The instrumental curriculum which concentrates on preparation for the teaching of bands and orchestras.

3. The vocal music curriculum which prepares a student to teach vocal music in grades 7 through 12.

All students must establish proficiency in piano and complete four semester hours in a 200-level course in applied music. Normally, all students complete seven semesters of ensemble credits. Major requirements in music include:

- Applied Music (allocated according to the needs of the individual student) (20 hours)
- Music Theory (18 hours)
- Conducting (4 hours)
- Music History and Literature (7 hours)
- Ensembles (7-10 hours)

\*T258 Teaching of Secondary School Music (3)

General curriculum and instrumental majors take approximately 12 semester hours of instrumental techniques. Wind and percussion instrumental majors complete four semesters of band ensemble.

Vocal certification requires two hours of instrumental techniques. Instrumental certification requires two hours of vocal techniques.

\*Meets special methods requirement.

## KINDERGARTEN-GRADE 12

For certification to teach music in both the elementary and secondary grades, the following courses, in addition to the secondary music major, are required. Semester hours are in parentheses.

T257 Teaching Music in the Elementary School (3)

One of the following:

- T301 Child Study (3)
- Child and Family Development 160 Early Childhood (3)
- A207 The Psychological and Educational Development of the Child (2)
- T256 Music Literature for Children (2)

## NATURAL SCIENCE

### GRADES 7-12

The College of Education offers teacher education programs in five of the natural sciences. Each program requires a core of required courses beyond the general education, the preprofessional and the secondary professional education courses.

## BIOLOGY

The core of required courses is listed below. Semester hours are in parentheses.

Biological Science 21-22 General Biology Lecture and Lab (10)

Biological Science 202 General Genetics (3)

Biological Science 105 Introductory Microbiology (3)

\*T224 Teaching of Science in the Secondary School (3)

One of the following:

Biological Science 250 Community Biology (3)

Forestry, Fisheries and Wildlife 60 Ecology of Wildlife and Man (3)

Biological Science 6 Basic Environmental Studies (3)

Two of the following:

Biological Science 203 Introduction to Cell Biology (3)

Biological Science 205 Developmental Biology (3)

Biological Science 214 Plant Taxonomy (4)

Anatomy 202 Elementary Anatomy (5)

Physiology 201 Elements of Physiology (5)

Biology Electives to complete 32 hours in biology selected in consultation with adviser.

Students preparing to teach biology are required to take Physics 11, Chemistry 11 and 12 (General Chemistry), Chemistry 205, or 210 and 211 (Organic Chemistry) and Math 80 or 207 (Calculus).

Each student must elect at least one laboratory course beyond Biological Science 22. The lab may be a part of a lecture course or taught separately.

\*Meets special methods requirement.

## CHEMISTRY

A core of required courses in mathematics, physics and chemistry courses, exclusive of the general education, the preprofessional and the secondary professional education requirements, is required of the student preparing to teach chemistry. The required courses are listed below. Semester hours are in parentheses.

Mathematics 80 Analytic Geometry and Calculus I (5)

Mathematics 175 Calculus II (5)

Computer Science 104 Computers and Programming I (3)

Physics 11 Elementary College Physics (5)

Physics 12 Elementary College Physics (3)

Chemistry 11 General Chemistry (5)

Chemistry 12 General Chemistry (5)

Chemistry 150 Undergraduate Research (3)

Chemistry 221 Quantitative Instrumental Analysis (4)

Chemistry 329 Environmental Chemistry (3)

\*T224 Teaching of Science in the Secondary School (3)

One of the following:

Chemistry 205 Organic Chemistry (5)

Chemistry 210/211 Organic Chemistry Lecture and Lab (5)

\*Meets special methods requirement.

## EARTH SCIENCE

A core of required courses in earth science, mathematics and related sciences, exclusive of the general education, the preprofessional and the secondary professional education requirements is required of students preparing to be teachers of earth science. The required courses are listed below. Semester hours are in parentheses.

Geology 1 Principles of Geology (5) or Geology 2 Physical Geology (3)

Geology 127 Surficial Earth Processes and Products (4)

Geology 128 Internal Earth Processes and Products (4)

Geology 220 Geology of Missouri (3)

Geology 224 Historical Geology (3)

Geology 331 Introduction to Paleontology (5)

Geography 111 Physical Geography I (3) or Geography 112 Physical Geography II (3)

Atmospheric Science 50 Introductory Meteorology (3)

Astronomy 1 Introduction to Astronomy (4)

Chemistry 11 General Chemistry (5)

Physics 11 Elementary College Physics (5)

Biological Science 1 General Biology (5)

Mathematics 80 Analytic Geometry and Calculus I (5) or Math 207 Calculus for Social and Natural Sciences I (3)

\*T224 Teaching of Science in the Secondary School (3)

One of the following:

Biological Science 250 Community Biology (3)

Forestry, Fishery and Wildlife 60 Ecology of Wildlife and Man (3)

Biological Science 6 Basic Environmental Studies (3)

It is recommended that math, physics and chemistry be taken early in the program before Geology 127 and 128.

\*Meets special methods requirement.

\*Meets special methods requirement.

\*Meets special methods requirement.

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\*Meets special methods requirement.

Biological Science 21-22 General Biology (10)

Chemistry 11-12 General Chemistry (10)

Physics 11-12 Elementary College Physics (8)

\*T224 Teaching of Science in the Secondary School (3)

One of the following:

Mathematics 207 Calculus for Social and Natural Sciences II (3)

Mathematics 80 Analytic Geometry and Calculus I (5)

One of the following:

Biological Science 6 Basic Environmental Studies (3)

Biological Science 250 Community Biology (3)

\*Meets special methods requirement.

The courses listed above should be considered minimum preparation for secondary school teachers of general science. For a more comprehensive background and a basis for graduate work in science, additional elective courses are recommended.

## PHYSICS

A core of required courses in mathematics, physics and related science courses, exclusive of the general education, the preprofessional and the secondary professional education courses, is required of the student preparing to teach physics. The required courses are listed below. Semester hours are in parentheses.

Mathematics 80 Analytic Geometry and Calculus (5)

Mathematics 175 Calculus II (5)

Computer Science 104 Computers and Programming I (3)

Chemistry 11 General Chemistry (5)

Physics 80 University Physics I (3)

Physics 123 University Physics II (3)

Physics 124 University Physics III (3)

Physics 201 Introduction to Modern Astrophysics (3)

Physics 205 Environmental Physics (3)

Physics 310 Electricity and Magnetism I (3)

Physics 314 Mechanics (3)

\*T224 Teaching of Science in the Secondary School (3)

Physics Elective

Physics 225/226 Fundamentals of Physics for High School Teachers I and II (4)

One of the following:

Physics 304 Principles of Physical Measurements (3)

Physics 305 Applied Electronics Circuits (3)

Physics 306 Advanced Physics Lab I (3)

Physics 307 Advanced Physics Lab II (3)

\*Meets special methods requirement.

## PHYSICAL EDUCATION

### GRADES 7-12

Students preparing to teach physical education in the secondary schools must complete the general education, the preprofessional and the secondary professional education requirements as well as the courses in physical education listed below. The requirements for special endorsements to teach other specialized areas of physical education also are listed. Semester hours are in parentheses.

H20 Introduction to Physical Education (2)

H50 Activity Proficiency (10)

H51 Underclass Practicum in Physical Education (1)

H58 First Aid (2)

H108 Introduction to Tests and Measurements in Physical Education (2)

\*H119 Teaching of Physical Education (2) meets two hours of professional education requirements.

H133 Teaching of Gymnastics (2)

H152 Principles of Physical Education (2)

H172 Teaching of Individual Sports (2)

H173 Teaching of Team Sports (2)

H199 Organization and Administration of Physical Education (2)

H299 Student Teaching in Physical Education (8)

H380 Kinesiology (3)

H382 Adapted Physical Education (2-3)

H385 Physiology of Exercises (3)

Physiology 201 Elements of Physiology (5)

Anatomy 202 Elementary Anatomy (5)

**Elect One:**

H102 Coaching of Volleyball (2)

H103 Coaching of Individual and Dual Sports (2)

H104 Coaching of Baseball and Softball (2)

H105 Coaching of Basketball

H106 Coaching of Football (2)

H107 Coaching of Track and Field (2)

**Elect two:**

H68 Water Safety Instructor (2)

H135 Teaching of Modern Dance (1)

H147 Fundamentals of Outdoor Education (3) or H347 Outdoor Education (2)

H162 Advanced Recreational Dance (2)

H170 Psychological-Sociological Perspectives of Sports (2)

H181 Care and Prevention of Athletic Injuries (2)

H320 Administration of Interscholastic Athletics (3)

H327 Physical Education in the Elementary School (3)

H366 Intramural Sports (2)

\*Meets special methods requirement.

**Endorsement in Adapted Physical Education.** Students who meet the requirements for teaching physical education at either the elementary or secondary level may obtain a special endorsement to teach adapted physical education by completing the following requirements. Semester hours are in parentheses.

L321 Introduction to Mental Retardation (3)

L334 Introduction to Severely Handicapped and Multi-handicapped (3)

L342 Introduction to Learning Disabilities (3)

L351 Introduction to Education of Behaviorally Disordered Children (3)

## SOCIAL STUDIES

### GRADES 7-12

Students preparing to become teachers of secondary school social studies need a broad background in history and the social sciences. In addition to general education, preprofessional and secondary professional education requirements, all secondary social studies education majors must complete the courses in the areas listed below. Semester hours are in parentheses.

**Social Studies Education: 43 semester hours**

Economics (3)

Geography (6)

Political Science (including American Government I) (6)

Sociology or Anthropology (3)

Psychology (3)

American History (12)

World History (including History I) (10)

\*T251 Teaching of Social Studies in the Secondary School

\*Meets special methods requirement.

## SPEECH

### GRADES 7-12

The program for teachers of speech requires a minimum of 33 semester hours in speech and dramatic art courses as well as fulfillment of the general education, the preprofessional and the secondary professional education requirements. The required speech and dramatic art courses are listed below. Semester hours are in parentheses.

2 Voice and Articulation (2)

20 Principles of Technical Theatre Production (2)

60 Principles of Script Analysis (2)

75 Introduction to Speech Communication (3)

171 Group Communication (3)

222 Communicative Disorders in the Classroom (3)

233 Oral Interpretation of Literature (3)

243 Acting I (3)

173 Argument and Advocacy (3)

276 Persuasive Speaking (3)

311 American Phonetics (3)

381 Principles of Rhetoric (3)

\*T213 Teaching of Speech in the Secondary School (3)

\*Meets special methods requirement.

In addition to the above courses, students are advised to select one of the following options in speech and dramatic art:

**Option I** 244 Acting (3), 252 Stagecraft (3) or 253 Production Design (4) and 361 Theatrical Directing (4)

**Option II** 374 Persuasion (3) and 376 Communication in Organizations (3)

Students planning to teach speech are en-

couraged to participate in dramatics and forensic activities at UMC. The direction of public speaking, oral interpretation, and dramatic activities is often required of the high school teacher of speech. University experience in dramatics, oral interpretation and forensics is helpful to teachers of speech in securing placement and in maintaining a standard of excellence in teaching.

## PRACTICAL ARTS AND VOCATIONAL-TECHNICAL EDUCATION PROGRAMS

The College of Education offers teacher preparation programs in agricultural education, business education, distributive education, home economics education and three areas of industrial education.

## VOCATIONAL AGRICULTURE

### GRADES 9-12

The agricultural education program prepares students to become teachers of vocational agriculture. The program is listed under the professional area of emphasis in the College of Agriculture section of this catalog.

Course F100, Foundations, is prerequisite to all courses in agricultural education and should be taken during the sophomore or junior year. A series of courses in education must be completed during the semesters prior to student teaching. Those courses are: B351, Historical Foundations of American Education; T316, Teaching Reading in the Content Areas; A205, Psychology of Learning and Instruction; and L339, Education of Exceptional Children.

During one of the last two semesters on the Columbia campus (usually the last semester), students in agricultural education enroll for a block of professional courses. This includes 12 semester hours of course work on the campus and six semester hours of student teaching. Under the supervision of an experienced teacher, students spend six weeks in student teaching.

Students at other Missouri colleges planning to transfer to UMC to earn a certificate to teach vocational agriculture should contact the Coordinator of Agricultural Education, 435 General Classroom Building, UMC, Columbia, Mo. 65211, prior to registration.

### BUSINESS EDUCATION GRADES 7-12

In addition to the general education, the professional and the secondary professional education requirements, students preparing to teach general business subjects at the secondary level must complete the courses specified under the general business core. To teach shorthand and secretarial practice, a student must meet the requirements for the endorsement in stenography. Students not electing to qualify for the endorsement in stenography must complete a comparable number of semester hours in additional business courses approved by the adviser.

Students transferring from junior colleges or other accredited institutions of collegiate rank may have their credits in business transferred to count toward the Bachelor of Science in Education degree. A maximum of four semester hours in typewriting and a maximum of eight

semester hours in stenography may be transferred. Students in the business education program normally complete at least one course in typewriting at UMC. Those qualifying for endorsement in stenography are likewise expected to complete a minimum of one stenography course at UMC.

#### General Business Core: 37 semester hours

\*Economics 51 General Economics (5)  
Economics 210 Labor Economics (3)  
Management 254 Introduction to Business Law (3)  
Management 255 Legal Aspects of Business Organization and Operation (3)  
Accountancy 36 Accounting I (3)  
Accountancy 37 Accounting II (3)  
Accountancy 258 Computer-Based Data Systems (3)  
Computer Science 75 Introduction to Computer Science (3)  
F33 Intermediate Typewriting (3)  
F34 Advanced Typewriting (3)  
F35 Office Machines (3)  
F137 Business Communications (2)  
F142 Filing Systems and Records Management (2)

One of the following:

Mathematics 4 Business Mathematics (3)  
Mathematics 155 The Mathematics of Finance (3)

In addition to the secondary professional education requirements, business education majors must complete the following courses:

F100 Foundations (1)  
\*\*\*F251 Teaching Basic Business Subjects (2)  
\*\*\*F252 Teaching Business Skills Subjects (2)  
**Endorsement in Stenography: 15 semester hours**  
\*\*F36 Elementary Stenography (3)  
F37 Intermediate Stenography (3)  
F38 Advanced Stenography (3)  
F138 Touch Shorthand (3)  
F139 Secretarial Office Procedures and Administration (3)

\*Meets general education requirements.

\*\*A student with high school or other non-collegiate training in stenography will be excused from the elementary course upon demonstration of satisfactory performance in the intermediate course.

\*\*\*Meets special methods requirement.

#### Bachelor of Educational Studies Degree Program

The following program, with varied options, is available for students interested in business and/or secretarial studies but not in a professional program directed toward teacher certification. Students must complete the following general education, educational studies, and two support area requirements.

#### General Education: 37 semester hours

Humanities (6)  
Communication Skills (9)  
Social Studies (9)  
Natural Science (7)  
Mathematics (3)  
Psychology (3)

#### Education: 24 semester hours (to be selected from the following:)

F100 Foundations (1)  
A205 Psychology of Learning and Instruction (2)  
A208 The Psychological and Educational Development of the Adolescent (2)  
B350, B351, B352 or B353 Educational Foundations (3)  
F138 Touch Shorthand (3)  
F321 Vocational Guidance (3)  
G397 Career Development I: Theory, Materials and Techniques (3)  
H65 Elements of Health Education (2)  
L339 Education of Exceptional Children (3)  
S35 Perspectives in Education (1)  
T371 Production of Instructional Media Materials (3)  
T372 Selection, Utilization and Evaluation of Media Resources (3)

#### Academic Support Area I: 28 semester hours

Accountancy 36 Accounting I (3)  
Management 254 Introduction to Business Law (3)  
F33 Intermediate Typewriting (3)  
F34 Advanced Typewriting (3)  
F35 Office Machines (3)  
F37 Intermediate Stenography (3)  
F38 Advanced Stenography (3)  
F137 Business Communications (2)  
F139 Secretarial Office Procedures and Administration (3)  
F142 Filing Systems and Records Management (2)

In addition to Academic Support Area I, each enrollee must complete an Academic Support Area II comprised of a minimum of 15 semester hours of business, secretarial or related courses approved by the adviser. Suggested options for fulfilling the requirements of Academic Support Area II are the following:

#### General Business: 15 semester hours (to be selected from the following list)

Economics I Fundamentals of Economics I (3)  
Accountancy 37 Accounting II (3)  
Mathematics 60 Finite Mathematics (3)  
Finance 123 Principles of Finance (3)  
Management 202 Fundamentals of Management (3)  
Marketing 204 Principles of Marketing (3)  
Management 255 Legal Aspects of Business Organization and Operation (3)

F175 Directed Occupational Experience (1)\*  
Elected general business related course (3)

#### Educational Secretary: 15 semester hours (to be selected from the following list)

Computer Science 75 Introduction to Computer Science (3)  
Finance 123 Principles of Finance (3)  
Mathematics 155 The Mathematics of Finance (3)  
C240 School Organization and Administration for Secondary Teachers (2) or C241 School Organization and Administration for Elementary Teachers (2)

T351 Teaching Legal Rights and Responsibilities of Citizenship (3)

F175 Directed Occupational Experience (1)\*  
Elected educational secretary related course (3)

#### Legal Secretary: 15 semester hours (to be selected from following list)

Mathematics 155 The Mathematics of Finance (3)  
English 161 Technical Writing (3)  
Sociology 211 Criminology (3)  
Management 255 Legal Aspects of Business Organization and Operation (3)

Management 356 The Law of Commercial Credit Transactions (3)

F175 Directed Occupational Experience (1)\*  
Elected legal secretary related course (3)

#### Bilingual Secretary: 19 semester hours (to be selected from the following list)

Romance Language of choice to include: elementary courses in a specific language (or equivalent to) (10), a course in reading (3), a course in composition (3) or a course in conversation (3)

F175 Directed Occupational Experience (1)\*  
Elected bilingual secretary related course (3)

#### Certified Professional Secretary: 15 semester hours (to be selected from following list)

Economics I Fundamentals of Economics I (3)  
Accountancy 37 Accounting II (3)  
Computer Science 75 Introduction to Computer Science (3)  
Mathematics 155 The Mathematics of Finance (3)  
Management 202 Fundamentals of Management (3)  
Elected certified professional secretary related course (3)

#### Data Processing: 15 semester hours (to be selected from following list)

Computer Science 75 Introduction to Computer Science (3)  
Computer Science 104 Computers and Programming I (3)  
Computer Science 203 Computers and Programming II (3)  
Accountancy 258 Computer-Based Data Systems (3)

F175 Directed Occupational Experience (1)\*  
Elected data processing related course (3)

#### Banking and Finance: 15 semester hours (to be selected from the following list)

Accountancy 37 Accounting II (3)  
Computer Science 75 Introduction to Computer Science (3)  
Finance 123 Principles of Finance (3)  
Finance 218 Risk and Insurance (3)  
Economics 229 Money and Banking (3)

F175 Directed Occupational Experience (1)\*  
Elected banking and finance related course (3)

Electives: 12-16 semester hours

\*Students who have had appropriate occupational experience are not permitted to enroll.

## DISTRIBUTIVE EDUCATION GRADES 7-12

Students preparing to teach marketing and distributive education must complete general education, the preprofessional and the secondary professional education requirements, as well as the required courses prescribed below. The program is tailor-made to each student's

program of study. Students may select a major portion of curriculum based upon their particular interest and occupational goals. University experience in DECA and internship opportunities in marketing and distributive education and business are available. Semester hours are in parentheses.

**PAVTE: 31 semester hours\***

- F25 Principles of Salesmanship (3)
- F75 Principles of Retailing (3)
- F100 Foundations (2)
- F125 Merchandising (3)
- F175 Directed Occupational Experience (4)\*
- F195 Practicum in Vocational Education (3)
- F308 Coordination of Cooperative Occupational Education (3)
- F325 Field Study in Occupational Education (4)\*
- F397 Curriculum Construction for Marketing and Distributive Education (3)

**\*\*F398 Principles of Teaching Distributive Education (3)**

**Select 12 semester hours from courses such as:**

- Accountancy 36 Accounting I (3)
- Accountancy 37 Accounting II (3)
- Journalism 120 Advertising Principles and Practice (3)
- Marketing 204 Principles of Marketing (3)
- Marketing 206 Distribution Systems (3)
- Marketing 312 Marketing Management (3)
- Marketing 344 Analysis of the Consumer Market (3)
- Management 254 Introduction to Business Law (3)
- Finance 218 Risk and Insurance (3)
- Finance 316 Credits and Collections (3)

\*Students who have two or more years of full-time marketing and/or distributive occupational experience may be exempt from taking F175 and/or F325.

\*\*Meets special methods requirement

**Bachelor of Educational Studies Degree Program**

Students interested in marketing education may select a program through the Bachelor of Educational Studies (BES) degree. This program option is available for students preparing for training positions in sales, marketing or distributive enterprises. Students are expected to complete general education, the preprofessional and secondary professional education requirements, as well as the required courses for certification-seeking majors, including directed occupational experience. The BES degree-seeking student will do an internship with a business and industry enterprise within the training or personnel department in lieu of the student teaching requirement.

**VOCATIONAL HOME ECONOMICS GRADES 7-12**

Two options are available for students preparing to teach home economics education. Option I is applicable to the majority of students.

**Option I.** Vocational certification to teach comprehensive home economics programs may be obtained by completing the general education, the preprofessional and the secondary professional education requirements plus the required courses listed below. Semester hours are in parentheses.

**Home Economics: 49-50 semester hours**

- Human Nutrition, Foods and Food Systems Management 34 Nutrition—Current Concepts and Controversies (3)
- Human Nutrition, Foods and Food Systems Management 121 Principles of Food Preparation (5)
- Human Nutrition, Foods and Food Systems Management 122 Food Buying and Meal Management (3)
- Clothing and Textiles 81 Clothing Construction (3)
- Clothing and Textiles 182 Textiles (3)
- Clothing and Textiles 285 Buying of Textiles and Clothing (2) or Clothing and Textiles 83 Contemporary Fashion Fundamentals (3)
- Housing and Interior Design 40 Principles of Environmental Design (3)
- Housing and Interior Design 140 Residential Design I (3) or Family Economics and Management 370 Housing the

- Family (3)
- Family Economics and Management 172 Management in Family Living (2)
- Family Economics and Management 172 Home Management Lab (2)
- Family Economics and Management 173 Personal and Family Finance (3)
- Family Economics and Management 174 Selection of Home Equipment (3)
- Child and Family Development 160 Early Childhood (3)
- Child and Family Development 163 Interpersonal Relationships, Marriage and the Beginning Family (3)
- Child and Family Development 264 Child Development Lab (5-6)
- Child and Family Development 363 Family Development (3) or Sociology 214 The Family (3)

**Home Economics Education Requirements**

In addition to the secondary professional education requirements, the student must complete the following home economics education courses.

- F100 Foundations (1)
- F175 Directed Occupational Experience (2)
- F235 Organization of Vocational Home Economics (2)
- F275 Occupational Home Economics Programs (2)
- \*F280 Methods of Teaching Vocational Consumer-Home-making (3)
- F315 Current Developments in Home Economics Education (3)

\*Meets special methods requirement.

**Other Requirements**

A three-semester-hour course in economics and in sociology, psychology or anthropology is required. The natural science requirement for general education must include introductory courses in both chemistry and biology. The health requirement for preprofessional education is met by completing Nursing 199 Introduction to Home Nursing and Family Health.

**Option II.** Students who intend to teach one specific home economics subject area may earn vocational certification by completing (1) the general, the preprofessional and the secondary professional educational courses and (2) a specific set of home economics subject matter courses. The courses must be selected in consultation with assigned advisers from the home economics area of the College of Education and from the College of Home Economics.

**Bachelor of Educational Studies Degree Program**

The Bachelor of Educational Studies degree was designed for those students wishing to prepare for an educational role in business and industry or human service professions. Programs are designed around individual career goals and include: (1) the general, the preprofessional and professional education courses and (2) a set of home economics subject matter courses. Students completing the program are not certified to teach.

Program options include:

- Food Management Services
- Consumer Education Services
- Clothing and Apparel Services
- Housing and Environmental Services
- Human Services

**INDUSTRIAL ARTS KINDERGARTEN-GRADE 12**

Students preparing to teach industrial arts must complete the general education, the preprofessional and the secondary professional education requirements as well as the courses prescribed in the general industrial arts curriculum. The curriculum, comprised of 40 semester hours, prepares prospective teachers at the elementary and junior high school levels. Semester hours are in parentheses.

**General Industrial Arts Curriculum: 40 semester hours**  
Mechanical and Aerospace Engineering 20 Engineering Drawing (3)

- F9 Industrial Materials (3)
- F10 Fundamentals of Woodwork (3)
- F100 Foundations (1)
- F112 Introduction to Metals Processing (3)
- F154 Energy and Power Technology (3)
- F155 Electricity/Electronics (3)
- F221 Machine Woodworking (3)
- F254 Power Technology (3) or F256 Alternative Energy Technology (3) or F355 Applied Electronics (3)
- F341 Metals Processing Technology (3)
- F350 Industrial Design (3)
- F361 Architectural Drawing and Home Design (3)
- F375 Selection and Organization of Subject Matter (3)
- F390 Principles of Teaching Industrial Subjects (3)\*

\*Meets special methods requirement.  
Certification to teach industrial arts at the senior high school level is obtained by meeting the requirements for the general industrial arts curriculum and by concentrating in one of the areas of specialization below. The subject or subjects which the holder is qualified to teach are specified on the certificate. The areas of specialization and the amount of additional course work for each are as follows:

**Woodworking: 12 semester hours**

- F10 Fundamentals of Woodwork (3)
- F221 Machine Woodworking (3)
- F331 Technology of Woodworking (3)
- FFW204 Wood Technology (3)

**Metalworking: 11 semester hours**

- F112 Introduction to Metals Processing (3)
- F341 Metals Processing Technology (3)
- Agriculture Engineering 20 Welding (2)
- Elective (3)

**Drafting: 12 semester hours**

- Mechanical and Aerospace Eng. 20 Engineering Drawing (3)
- F350 Industrial Design (3)
- F361 Architectural Drawing and Home Design (3)
- Housing and Interior Design 141 Architectural Design I (3) or 344 Architectural Design II (3)

**Energy and Power: 15 semester hours**

- F154 Energy and Power Technology (3)
- F155 Electricity/Electronics (3)
- F254 Power Technology (3)
- F256 Alternate Energy Technology (3)
- F355 Applied Electronics (3)

**TECHNICAL EDUCATION GRADES 10-12**

To qualify as teachers of technical subjects, students should include technical courses which are appropriate to their areas of specialization. This course work of 41-42 semester hours is required in addition to the general education, the preprofessional and the secondary education professional courses. The following list is an example of a general major in industrial-technical education. Semester hours are in parentheses.

**Industrial-Technical Curriculum: 41-42 semester hours**

- \*\*Management 202 Fundamentals of Management (3)
- \*\*Engineering 30 Engineering Graphics (3)
- Economics 51 General Economics (5)
- Mathematics 9 Trigonometry (2)
- Mathematics 80 Analytic Geometry and Calculus I (5)
- Physics 11 Elementary College Physics (5)
- \*Chemistry 1 Introductory Chemistry (5)
- \*\*F10 Fundamentals of Woodwork (3)
- \*\*F112 Introduction to Metals Processing (3)
- F190 Programs and Issues in PAVTE (1)
- \*\*F355 Applied Electronics (3)
- F375 Selection and Organization of Subject Matter (3)
- \*\*F385 Manufacturing Processes (2-3)
- \*\*\*F390 Principles of Teaching Industrial Subjects (3)
- \*\*Agricultural Engineering 20 Welding (2)
- \*Meets general education requirements.
- \*\*Students who have had appropriate industrial/occupational experience or its equivalent through two or more units of credit in a given technical subject at the senior high or junior college level, may have their competency verified and thus establish University credit through tests administered by the Industrial Education faculty after enrollment on the Columbia campus.
- \*\*\*Meets special methods requirement.

## TRADES AND INDUSTRIES GRADES 10-12

Industrial education majors who plan to qualify as teachers of trades and industries must complete the general education, the pre-professional and the secondary professional education requirements and should include the courses listed below in their programs. Semester hours are in parentheses.

### Trades and Industries Curriculum: 44-45 semester hours

Engineering 30 Engineering Graphics (3)\*\*  
 Economics 51 General Economics (5)\*  
 Economics 210 Labor Economics (3)  
 Geography 100 Economic Geography (3)  
 Sociology 1 Introduction to Sociology (3)\*  
 Chemistry 1 Introductory Chemistry (5)\*  
 Physics 11 Elementary College Physics (5)  
 Management 202 Fundamentals of Management (3)  
 F10 Fundamentals of Woodwork (3)\*\*  
 F112 Introduction to Metals Processing (3)\*\*  
 F321 Vocational Guidance (3)  
 F365 Occupational Analysis (2)  
 F375 Selection and Organization of Subject Matter (3)  
 F385 Manufacturing Processes (2-3)  
 F390 Principles of Teaching Industrial Subjects (3)  
 Elective—Shop and/or drawing courses (3)

\*Meets general education requirements.

\*\*Students who have had appropriate industrial/occupational experience or its equivalent through two or more units of credit in a given technical subject at the senior high or junior college level, may have their competence verified and thus establish University credit through tests administered by the Industrial Education faculty after enrollment on the Columbia campus.

## MISSOURI DEPARTMENT OF ELEMENTARY AND SECONDARY EDUCATION

### Requirements for Extended Certificates

An individual completing a UMC program in teacher education leading to a Missouri certificate to teach may obtain certification to teach in additional areas by meeting the following requirements established by the Missouri Department of Elementary and Secondary Education.

Certification Area	Hours Required By Level			
	K-9	K-12	7-9	7-12
General Agriculture	N/A	N/A	21	30
Allied Arts	N/A	N/A	N/A	18*
Art	21	30	N/A	N/A
Business Education	N/A	N/A	N/A	30
Driver Education	N/A	N/A	N/A	21**
English	N/A	N/A	21	30
Foreign Language Areas	21	30	N/A	N/A
Health Education	21	N/A	N/A	N/A
General Home Economics	N/A	N/A	N/A	30
Industrial Arts	24	36	N/A	N/A
Instructional Media Technology	N/A	18	N/A	N/A
Journalism	N/A	N/A	N/A	21
Mathematics	N/A	N/A	21	30
Music-Instrumental	26	36	N/A	N/A
Vocal	26	36	N/A	N/A
Instrumental and Vocal	28	40	N/A	N/A
Physical Education	30	40	N/A	30
School Librarian	N/A	18	N/A	N/A
Speech and Theatre	N/A	N/A	21	30
Science Areas	N/A	N/A	21	30
Social Studies	N/A	N/A	24	40

\*Available only to candidates fully certified in Art or Music K-12 or English or Speech and Theatre 7-12.

\*\*Available only to candidates who have a valid secondary teaching certificate.

Note: All state certification candidates should complete the appropriate methods/techniques course(s) for each area extended certification is sought provided this course(s) is available through the College of Education.

Note: For specified areas of course work required for state certification, see the appropriate academic adviser or the certification officer at 107 Hill Hall.

## NON-CERTIFIABLE ADJUNCT AREAS

Adjunct areas, although not required, are

designed and offered to enhance the employability of students whose programs cannot accommodate an additional certifiable major and/or minor. They also may be useful to students who have a special interest in one or more of the areas listed. Suggested semester hours are in parentheses.

Coaching (11-12)  
 Dance (12)  
 Business (12)  
 Marketing (15)  
 Outdoor Education (20)  
 Teaching in Correctional Institutions (10)  
 Preparing Regular Educators for Mainstreaming the Exceptional (13)  
 Reading (12)

## FACULTY

### Administration

**Bob G. Woods**, dean and professor, PhD, University of Iowa  
**W.R. Miller**, associate dean and professor, EdD, University of Missouri-Columbia  
**Charles Koelling**, associate dean and professor, EdD, University of Missouri-Columbia

### EDUCATIONAL AND COUNSELING PSYCHOLOGY

**Warren R. Seymour**, professor and chairperson, PhD, University of Missouri-Columbia  
**Donn Brolin**, professor, PhD, University of Wisconsin-Madison  
**Robert L. Burton**, professor, EdD, University of Oklahoma  
**Robert Callis**, professor, PhD, University of Minnesota  
**Richard Caple**, professor, EdD, Columbia University  
**Robert J. Dollar**, professor, EdD, Oklahoma State University

**Richard A. English**, professor, PhD, University of Arizona  
**John L. Ferguson**, professor, EdD, University of Missouri-Columbia

**Norman C. Gysbers**, professor, PhD, University of Michigan

**Joseph A. Johnston**, professor, PhD, University of Michigan

**Paul T. King**, professor, PhD, Pennsylvania State University  
**James R. Koller**, associate professor, PhD, University of Missouri-Columbia

**Joseph T. Kunce**, professor, PhD, University of Missouri-Columbia

**John F. McGowan**, professor, EdD, University of Missouri-Columbia

**LeAdelle Phelps**, assistant professor, PhD, Brigham Young University

**C. David Roberts**, assistant professor, PhD, University of Arizona

**Charles Schmitz**, associate professor, PhD, University of Missouri-Columbia

**Terry D. TenBrink**, professor, PhD, Michigan State University

**James N. Thompson**, assistant professor, EdD, University of Missouri-Columbia

**Richard W. Thoreson**, professor, PhD, University of Missouri-Columbia

**Robert R. Trimble**, associate professor, PhD, Oklahoma State University

**Frank E. Wellman**, professor, PhD, University of Nebraska

**Virginia R. Wheeler**, assistant professor, EdD, University of Missouri-Columbia

**Carl G. Willis**, assistant professor, EdD, Oklahoma State University

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**James L. Craigmile**, professor, EdD, University of Nebraska

**Arni T. Dunathan**, professor, EdD, University of Utah

**Carl C. Fehrle**, professor, PhD, University of Iowa

**Thomas L. Good**, professor, PhD, University of Indiana

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**Veralee B. Hardin**, professor, EdD, University of Missouri-Columbia

**Helen K. Harrison**, assistant professor, MA, Iowa State University

**Peter Hasselriis**, professor, PhD, Syracuse University  
**Merlyn Herrick**, associate professor, EdD, University of Indiana

**Stevie Hoffman**, associate professor, PhD, University of Florida

**Larry A. Kantner**, professor, EdD, Pennsylvania State University

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**Mary Lenox**, associate professor, EdD, University of Massachusetts-Amherst

**Linnea D. Lilja**, associate professor, PhD, University of Minnesota

**Jacqueline McMahon**, assistant professor, PhD, University of Missouri-Columbia

**James A. Middleton**, professor, DM Ed, Oklahoma State University

**Mary Virginia Morgan**, assistant professor, M Ed, University of Missouri-Columbia

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**Robert Reys**, professor, EdD, University of Missouri-Columbia

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**Richard D. Robinson**, professor, EdD, University of Georgia

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**Bob G. Woods**, professor, PhD, University of Iowa

### EDUCATIONAL ADMINISTRATION

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**Carter D. Ward**, assistant professor, PhD, University of Missouri-Columbia

### HEALTH AND PHYSICAL EDUCATION

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**James L. Ballinger**, associate professor, EdD, University of Missouri-Columbia

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**William M. Busch**, assistant professor, MS, Southern Illinois University

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**John B. Gorman**, assistant professor, PhD, University of Iowa

**Marilee M. Howell**, assistant professor, M Ed, University of Missouri-Columbia

**Leon E. Johnson**, professor, EdD, University of West Virginia

**Norman S. Lawnick**, associate professor, EdD, University of Missouri-Columbia  
**Benjamin R. Londeree**, associate professor, EdD, Toledo University  
**Marilyn Markel**, assistant professor, EdD, University of Missouri-Columbia  
**Mary Marjorie Meredith**, assistant professor, MS, University of Missouri-Columbia  
**Carol A. Odor**, assistant professor, MS, University of Tennessee  
**Paul C. Ritchie**, professor, EdD, University of Missouri-Columbia  
**John A. Roberts**, professor, PhD, University of Iowa  
**Jean Y. Smith**, assistant professor, M Ed, University of Missouri-Columbia  
**Norman E. Stewart**, assistant professor, M Ed, University of Missouri-Columbia  
**Thomas Vaughn Walker**, assistant professor, PhD, Oregon State University  
**Parris Watts**, assistant professor, HSD, University of Indiana

## HIGHER AND ADULT EDUCATION AND FOUNDATIONS

**Robert J. Dollar**, professor and chairperson, EdD, Oklahoma State University  
**Nicholas Adams**, associate professor, EdD, American University  
**John W. Alspaugh**, professor, EdD, University of Missouri-Columbia  
**Robert L. Burton**, professor, EdD, University of Oklahoma  
**Irvin W. Cockriel**, associate professor, EdD, University of Missouri-Columbia  
**Phil Connell**, assistant professor, MA, University of Colorado  
**Ralph C. Dobbs**, professor, EdD, University of Indiana  
**Carolyn A. Dorsey**, associate professor, PhD, New York University  
**Edmund A. Ford**, associate professor, EdD, University of Missouri-Columbia  
**Gary C. Fox**, associate professor, PhD, Michigan State University  
**Ralph E. Glauert**, assistant professor, PhD, University of Missouri-Columbia  
**Roger D. Harting**, professor, EdD, University of Missouri-Columbia

**Merlyn C. Herrick**, associate professor, EdD, University of Indiana  
**Walter Hunter**, professor, EdD, University of Colorado  
**Christopher J. Lucas**, professor, PhD, The Ohio State University  
**W.L. Moore**, assistant professor, PhD, University of Wisconsin  
**Joseph Lee Saupe**, professor, EdD, University of Illinois-Urbana  
**Keener Tippin**, assistant professor, EdD, University of Missouri-Columbia  
**Bob G. Woods**, professor, PhD, University of Iowa  
**Bonnie Zelenak**, assistant professor, PhD, Kansas State University

## PRACTICAL ARTS AND VOCATIONAL-TECHNICAL EDUCATION

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**Jo Behymer**, associate professor, EdD, University of Missouri-Columbia  
**Carl Cameron**, assistant professor, PhD, University of Florida  
**Donald Claycomb**, assistant professor, PhD, University of Missouri-Columbia  
**Dabney B. Doty**, assistant professor, M Ed, University of Missouri-Columbia  
**Michael J. Dyrenfurth**, professor, PhD, Bowling Green State University  
**Lonnie J. Echernacht**, associate professor, EdD, University of Missouri-Columbia  
**John E. Elias**, professor, EdD, University of Nebraska  
**Lorraine L. Hilgedick**, assistant professor, EdD, University of Missouri-Columbia  
**James B. Karnes**, assistant professor, EdD, University of Missouri-Columbia  
**Franklin J. King**, professor, EdD, University of Missouri-Columbia  
**Mary Jane Lang**, professor, EdD, University of Missouri-Columbia  
**Richard E. Linhardt**, associate professor, PhD, University of Missouri-Columbia  
**Betty B. Martin**, associate professor, PhD, University of Missouri-Columbia  
**F. Milton Miller**, professor, EdD, University of Missouri-Columbia

**Wilbur R. Miller**, professor, EdD, University of Missouri-Columbia  
**Donald D. Osburn**, professor, PhD, North Carolina State University  
**Joan Quilling**, assistant professor, PhD, Michigan State University  
**Harley Schlichting**, assistant professor, PhD, University of Missouri-Columbia  
**Clifton Smith**, assistant professor, EdD, Virginia Polytechnic Institute and State University  
**Bob R. Stewart**, professor, EdD, University of Maryland  
**Lynda West**, assistant professor, PhD, University of Missouri-Columbia  
**Curtis R. Weston**, professor, EdD, University of Missouri-Columbia  
**Melchior J. Zelenak**, assistant professor, PhD, University of Iowa

## SPECIAL EDUCATION

**Richard C. Schofer**, professor and chairperson, EdD, Northern Colorado State University  
**Sandra K. Alper**, associate professor, PhD, University of Iowa  
**Reuben Altman**, professor, PhD, University of Texas  
**Robert F. Busch**, associate professor, PhD, University of Missouri-Columbia  
**Carl T. Cameron**, assistant professor, PhD, University of Florida  
**Marilyn R. Chandler**, associate professor, PhD, University of Iowa  
**Sandra W. Gautt**, associate professor, PhD, University of Missouri-Columbia  
**Judith Grosenick**, professor, PhD, University of Kansas  
**Veralee B. Hardin**, professor, EdD, University of Missouri-Columbia  
**Sharon Huntze**, assistant professor, EdD, University of Missouri-Columbia  
**James E. Leigh**, associate professor, PhD, Southern California University  
**Clifford Magnusson**, assistant professor, EdD, Wayne State University  
**Stephen B. McCarney**, assistant professor, EdD, University of Florida



# COLLEGE OF ENGINEERING

A course in civil engineering was taught on the Columbia campus in 1849, giving the University of Missouri the distinction of being the first institution west of the Mississippi River to offer engineering education.

Engineers must keep up with rapid technological changes. To do that, their education has to be broad enough to allow for continued development throughout their careers.

At UMC, engineering offers a liberalized, four-year, 126-hour curriculum designed to keep up with rapid technological changes. Electives allow the student to choose from a wide array of interdisciplinary opportunities, such as social science, ecology, pre-medicine, prelaw, politics, management, environmental sciences, health care systems, agriculture and biological sciences.

Bachelor, master and doctoral degrees are available in agricultural, chemical, civil, electrical, industrial, and mechanical/aerospace engineering at UMC. The bache-

lor's degree in computer engineering also is offered. Master's and doctoral degree programs are offered in nuclear engineering.

See the Graduate Catalog for details on graduate programs in engineering.

The curriculum gives a solid foundation of mathematics and physical sciences followed by the application of these sciences in engineering specialties. The rest of the curriculum encompasses social and humanistic courses, such as English, economics, public speaking, government, literature and history.

The College is organized into the Departments of Agricultural Engineering, Chemical Engineering, Civil Engineering, Electrical Engineering, Industrial Engineering, Mechanical and Aerospace Engineering, Nuclear Engineering, and Naval Science (Navy ROTC).

The College also administers undergraduate programs in civil, electrical, computer, and mechanical engineering on the Univer-

sity of Missouri-Kansas City campus. Admission details are available in the *UMKC Undergraduate Catalog*.

## ADMISSION

### FRESHMAN ADMISSION REQUIREMENTS

Entering freshmen are expected to have completed 15 units of approved high school course work, including 3 units in English, 3 in mathematics and 2 in science with laboratory. Mathematics should include 2 units of algebra, 1 unit of plane and solid geometry (combination course) and ½ unit of trigonometry. Senior mathematics beyond this is recommended.

Deficiencies in high school mathematics must be removed by taking the appropriate precalculus mathematics course during the freshman year. These credits do not count toward the engineering degree.

Less than average ability on the Missouri English Placement Test (MEPT) requires enrollment in English 1, which does not count



toward the engineering degree. A superior score on the MEPT enables the freshman student to enroll in English 65GH Honors Exposition. If a student places out of English 1 but does not qualify for English 65GH, then the student must enroll in English 60 Exposition during the sophomore year.

### INTERNATIONAL STUDENTS

Admission of international students is determined on an individual basis by a committee of representatives from the admissions office and the College of Engineering.

Before registering for classes at the University, each international student must take the UMC English Language Test (developed for international students). Students passing the UMC English Language Test will be eligible to take English 1, English 60 and other required English courses, if any.

All international students (even those with transferred English credit) whose test scores indicate that additional English training is needed, will be required to register for an English language support class (developed for international students) in the first semester of enrollment. This course does not count toward graduation credit but regular attendance is required and failure to attend will result in dismissal from the University. The English language support class taken must be satisfactorily completed before the student can enroll in English 1 or English 60. Students not satisfactorily completing the English language support class in the first semester of enrollment must re-enroll in the English language support class in the second semester. If the student does not satisfactorily complete the English language support class in the second term of enrollment, the student will not be permitted to re-enroll in the College of Engineering.

### TRANSFER STUDENTS

Students wishing to transfer to UMC from another accredited college or university are subject to the regulations established by the UMC Faculty Council concerning transfer of credit. Transfer of credit is described in the Academic Regulations section of this catalog.

The UMC College of Engineering cooperates with 19 colleges in helping preengineering students transfer to UMC with maximum ease and no loss of credits.

A student may take the first two years at the participating school and then transfer to UMC for the junior and senior years in engineering. After the four-year program is completed, the students are awarded a BS in their chosen field of engineering.

Participating schools are:

Crowder College, Neosho, Mo.  
East Central Junior College, Union, Mo.  
Florissant Valley Community College, Metropolitan St. Louis  
Forest Park Community College, Metropolitan St. Louis  
Hannibal-LaGrange College, Hannibal, Mo.  
Jefferson College, Hillsboro, Mo.  
Longview Community College, Metropolitan Kansas City  
Maple Woods Community College, Metropolitan Kansas City  
Meramec Community College, Metropolitan St. Louis  
Mineral Area Community College, Flat River, Mo.  
Missouri Western State College, St. Joseph, Mo.  
Moberly Area Junior College, Moberly, Mo.  
Northeast Missouri State University, Kirksville, Mo.  
Northwest Missouri State University, Maryville, Mo.  
Penn Valley Community College, Metropolitan Kansas City

Southeast Missouri State University, Cape Girardeau, Mo.  
Southwest Missouri State University, Springfield, Mo.  
State Fair Community College, Sedalia, Mo.  
Three Rivers Community College, Poplar Bluff, Mo.  
Trenton Junior College, Trenton, Mo.

To be recommended for the BS degree from the UMC College of Engineering, a student transferring from an accredited institution other than the University of Missouri must complete at least 30 upper-level credit hours, 200 and above or equivalent, in the degree program at University of Missouri campuses. At least 21 of the 30 credit hours must be upper-level engineering courses approved by the department awarding the degree. However, for a student transferring with senior standing from another University of Missouri campus, the last 15 hours must be completed in residence on the campus where the degree program is located: 12 of these 15 hours must be in engineering and approved by the department awarding the degree.

## STUDENT SERVICES

### ADVISEMENT

Each student in the College of Engineering is assigned a faculty adviser who assists the student in reaching academic and professional goals. Students are encouraged to meet with their advisers as often as needed.

### PLACEMENT

Most graduating seniors obtain initial employment as a result of campus interviews conducted by more than 200 companies and government agencies. The interviewing companies represent almost every phase of American industry and business.

The placement office in 1010 Engineering has a full-time director and a secretary.

### STUDENT ORGANIZATIONS

One of the highlights for engineering students, dating back to 1903, is the annual celebration of St. Pat's week. Rumor has it St. Patrick was an engineer, so, in celebration of his birthday, engineering students stage a series of campus stunts, dances, banquets, lab exhibits (open to the public), a queen contest and general hoopla. Many alumni return to join in the festivities and to hold their annual meeting in Columbia at that time.

Some of the scholastic and professional organizations available to engineering students are:

**Alpha Epsilon**, honor society for upper-class and graduate students in agricultural engineering

**Alpha Pi Mu**, national industrial engineering honor society

**American Society of Agricultural Engineers**, student chapter

**American Institute of Chemical Engineers**, student chapter

**American Society of Civil Engineers**, student chapters

**American Institute of Industrial Engineers**, student chapter

**American Society of Mechanical Engineers**, student chapter

**Associated General Contractors**, student chapter

**American Society of Metals**, student chapter

**American Nuclear Society**, student chapter

**Chi Epsilon**, national civil engineering honor fraternity

Engineering Student Council

**Engineers' Club**, for all students and faculty of the College of Engineering

**Eta Kappa Nu**, national electrical engineering honor society

**Institute of Electrical and Electronics Engineers**, student branch

**IEEE Computer Society**, student branch

✓ **Midshipmen's Club**, Navy ROTC

**Missouri Shamrock**, a magazine appearing four times during the academic year and containing articles on technical subjects and other matters of interest to the College, staffed by engineering students.

**Pi Tau Sigma**, national mechanical engineering honor fraternity

**Scabbard and Blade**, national ROTC honor fraternity

**Society of Automotive Engineers**, student branch

**Society of Black Engineers**

**Society of Women Engineers**, open to any person enrolled in the College of Engineering

**St. Pat's Board**

**Tau Beta Pi**, national engineering honor society

## SCHOLARSHIPS IN THE COLLEGE OF ENGINEERING

To be considered for any of the scholarships administered by the Engineering Scholarship Committee, students should fill out a form available from the dean's office. Deadline for application is March 1. Forms should be returned to the student's major department or to the department's representative on the Engineering Scholarship Committee. Students who have not decided on a major should return the form to the chairman of the scholarship committee. The scholarship committee matches scholarship criteria with the applicant's qualifications.

Students who have declared an engineering major are also eligible for scholarship awards through their department and should inquire at the department office.

During the 1982-83 academic year, 246 engineering scholarships totaling \$141,185 were awarded. Specific information on scholarships is available in the dean's office.

**Alcoa Foundation Engineering Scholarships:** Scholarship awarded to the highest GPA students in electrical and mechanical engineering.

**American Institute of Chemical Engineers Scholarship:** Presented annually to the junior in chemical engineering who has the highest scholarship record for the freshman and sophomore years and shows greatest promise of professional success. Must be a member of the student chapter of AIChE.

**AIIE Greater K.C. Chapter Stephen Gillespie Memorial Scholarship:** For outstanding industrial engineering freshman.

**American Institute of Industrial Engineers Greater St. Louis Chapter Scholarship:** For an outstanding industrial engineering junior or senior.

**American Society of Quality Control Scholarship:** Given to a full-time sophomore, junior or senior (GPA of at least 2.8). Must be a U.S. citizen. Student must write brief statement why he/she is interested in quality control. Renewable on satisfactory academic progress.

**Armco Scholarships:** Awards to outstanding industrial engineering freshmen.

**Associated General Contractors of Missouri Scholarship:** Award in construction or construction management; located in the Columbia-Kansas City area; with interest in working summers for sponsor. Renewable on satisfactory progress.

**Bannes-Shaughnessy Inc. Scholarship:** Scholarship awarded to deserving student in civil engineering with emphasis on construction.

**Frederick G. Baender Scholarship:** Awarded annually to mechanical engineering undergraduates.

**R.P. Beasley Memorial Scholarship:** Given to one or more agricultural engineering sophomores.

**Black & Veatch Scholarships:** To engineering students who have completed at least three semesters; GPA at least 3.0; have interest in a consulting engineering career; work summers for Black & Veatch.

**Boeing Wichita Company Scholarship:** For undergraduates in mechanical, electrical, aeronautical, or civil engineering.

**Milo M. Bolstad Scholarship:** To a mechanical engineering undergraduate.

**Booker/Moulder Freshman Engineering Scholarships:** Two freshman scholarships. Applicants must be in the top 25

percent of high school class and U.S. citizens. Preference is given to former employees of R.W. Booker and their children, to residents of Camden County and to children of CEC of Missouri members.

**Joe B. Butler Memorial Award, Missouri Society of Professional Engineers:** To an engineering junior.

**Chesebrough-Ponds Industrial Engineering Scholarship:** Awarded annually to a sophomore, junior or senior in electrical engineering with a career interest in industry. Selection is by power systems group, department of electrical engineering.

**Chevron Scholarship in Electrical Engineering:** To an outstanding junior or senior in electrical engineering with a career interest in industry. Selection is by power systems group, department of electrical engineering.

**Chevron Scholarship in Mechanical Engineering:** To an outstanding mechanical engineering undergraduate.

**Paul N. Doll Scholarship:** To one or more agricultural engineering sophomores.

**Dow Chemical USA Engineering Scholarship:** Awarded to outstanding engineering students interested in energy systems and their technological and socioeconomic problems. Separate application required.

**Engineering Faculty Wives Award:** To a junior or senior on basis of financial need.

**Engineers' Wives Auxiliary of The St. Louis Chapter of MSPE:** Award to a junior or senior of good scholastic standing; must have need; preference given to residents of Missouri and St. Louis area. Separate application required.

**Epple Scholarship in Civil Engineering:** For a senior civil engineering student with financial need and professional promise.

**Engineering Freshman Scholarship:** For a highly qualified entering freshman; must be in top 10 percent of high school graduating class and score in the 90th percentile on national tests.

**Stanley and Jeanne Fistedis Scholarship:** Preference given to Missouri residents who are graduates of Missouri high schools, from rural areas and interested in civil engineering.

**General Motors Scholarship:** Applicants selected during their sophomore year for two final years of tuition and fees support, plus additional allotment. Recipients must work for General Motors during their last two undergraduate summers.

**H. William Gieschen Memorial Scholarship:** Selection based on scholarship, financial need, professional promise. Must be U.S. citizen.

**The Greater Kansas City Chapter, National Association of Women in Construction Scholarship:** Awarded alternate years to a junior or senior interested in a construction industry career.

**Roy P. Hart Scholarship:** To a male student in engineering or the physical sciences. Recipient must attend church regularly, be a student leader, distinguished in a major team sport, have completed four years of eligibility in athletic competition at UMC, have above-average scholastic record, and need financial assistance to complete BS Engineering degree or to pursue graduate study.

**George and Eliza Hechler Memorial Scholarship:** For a senior student from Chariton County enrolled in engineering or home economics.

**Glen J. and Elma P. Hopkins Scholarship in Civil Engineering:** Preference to applicants from Kansas City or Plattsburg, Mo., whose parents are employed by the city of Kansas City.

**Institute of Nuclear Power Operations Scholarship:** Awarded on academic excellence and demonstrated interest in, and potential for, a career in nuclear utility industry. Must be U.S. citizen. Separate application required.

**M.M. Jones Scholarship:** To one or more freshmen in agricultural engineering.

**The Lloyd and Margaret Ketcham Scholarship:** Based on scholarship, financial need and indication of professional promise. Must be U.S. citizen.

**James E. Kunkler/Armco Scholarship:** For entering freshman in the top 10 percent of high school graduating class and scoring in 90th percentile on national tests.

**C.W. La Pierre Scholarship:** Award based on scholarship, professional promise and financial need.

**John and Mary Lockwood Scholarship:** For outstanding upperclass student interested in engineering research.

**Forrest S. Lyman Scholarship:** Based on scholarship, financial need and professional promise.

**Gladys C. and C. Myron Lytle Scholarship:** To an engineering student who is a Missouri resident.

**Edward and Dorothy Maran Scholarship:** To engineering students from St. Charles County and graduate of any high school in that county. Must be U.S. citizen.

**Dean E.J. McCaustland Scholarship for Working**

**Students:** For a working engineering student of good moral character and of good academic standing.

**Christian and Clara Kincaid Meier Scholarship in Electrical Engineering:** To an electrical engineering student who ranks in the upper 10 percent academically and has financial need. Must be a U.S. citizen.

**Charles J. Miller Scholarship:** Awarded to entering freshmen.

**3M Company Scholarship:** To an engineering student having at least two regular semesters remaining before graduation.

**Minority Scholarships:** Engineering Program for Minority Students. Amount is based on scholastic ability and financial need.

**Missouri Engineers of Chicago Scholarship:** Awards are based on academic excellence and participation in student activities.

**Monsanto Company Scholarship:** To an outstanding freshman chemical engineering student recommended by department.

**James S. Rollins Scholarship:** To a junior in engineering in recognition of academic merit and character.

**I.O. Royse Scholarship in Engineering:** Two or more scholarships based on financial need. Recipients encouraged to contribute to the fund on completion of their academic goals.

**Chauncey M. Saville Freshman Engineering Scholarship:** Awarded to entering qualified freshmen in the top 10 percent of their graduating class and scoring in the 90th percentile on national tests.

**Katherine Y. Saville Memorial Scholarship:** For underserved population of the College of Engineering; preference given to freshman women.

**Lionel O. Schott Memorial Scholarship:** To qualified engineering students.

**Ralph L. Scorch Scholarship:** To an undergraduate in mechanical engineering.

**John R. Slay Jr. Scholarship:** Two awards to qualified engineering students.

**Dwayne D. Smith Memorial Scholarship:** To entering freshmen in the top 10 percent of their graduating class and scoring in the 90th percentile on national tests.

**Society of Women Engineers Scholarship:** To qualified and deserving women engineering students. Scholarship amounts vary. Eligibility: furnish official transcript; GPA 3.5 or better; complete separate application on, or before, Feb. 1 preceding the September in which recipient will use award.

**St. Louis Division of ASHRAE Scholarship:** Annually to an outstanding student in the field of environmental control; separate application required.

**Robert Lee Tatum Scholarships:** For qualified engineering undergraduates.

**Transfer Student Scholarships:** For transfer students from two-year community colleges. Applicants should have completed a two-year preengineering program with a 3.2 or better GPA.

**Mendell P. and Regina Paves Weinbach Memorial Prize in Electrical Engineering:** Award to highest ranking member of the graduating class in electrical engineering.

**F.H. Wells Scholarship in Engineering:** One or more scholarships to freshmen or sophomores with high GPAs and professional promise.

**Rex M. Whitton Sr. Memorial Scholarship:** To qualified engineering students; preference given to students from Jackson County, Mo.

## SPECIAL EDUCATIONAL PROGRAMS

### ENGINEERING FOR MINORITY STUDENTS

The program is designed to ensure that minority students have every opportunity to become professional engineers. Assistance is provided in academic advising, personal counseling, financial support and engineering-related work experience. An extensive scholarship program also is available to minority students.

### CREDIT BY EXAMINATION

Advanced placement tests allow freshmen to obtain advanced standing quickly.

At UMC, some freshmen engineering students may earn up to 18 hours toward degrees through CLEP General Subject Matter Examination. The hours apply toward a degree in

engineering as follows: English (3), social science (6), biological sciences (3) and humanities (6).

Students also may earn credit through exams given by various departments on the Columbia campus, such as chemistry, mathematics, political science, engineering graphics and foreign languages, and through A.P. (advanced placement) exams taken while still in high school.

In addition, college credits earned during high school may apply toward an engineering degree.

Some of the advantages of earning advanced standing are:

1. Students can graduate with a BS degree in three years instead of four and begin a professional career a year sooner—a big gain in terms of today's high engineering salaries.

2. Students can enter graduate school a year sooner than the normal academic schedule provides—or use the extra time to broaden the undergraduate program.

3. Students have the opportunity to participate in more sophisticated interdisciplinary programs, cutting across several fields within or external to traditional engineering programs.

Students interested in the accelerated program should contact their department chairman.

## FIVE-YEAR LIBERAL ARTS AND ENGINEERING

Some students prefer a thorough education in both liberal arts and engineering. At UMC, this can be done through a five-year program leading simultaneously to a BS degree in engineering and an AB degree from the College of Arts and Science. For more information, contact the dean's office in both colleges.

## THREE TWO-YEAR LIBERAL ARTS AND ENGINEERING

This is offered in cooperation with several Missouri colleges and universities. Participants in this program will receive an AB degree from the first college they attend and a BS in engineering from UMC. After three years of liberal arts study at one of the participating schools, at least two more years of work in engineering are required on the Columbia campus.

Cooperating schools are:  
Central Methodist College, Fayette  
Central Missouri State University, Warrensburg  
Culver-Stockton College, Canton  
Drury College, Springfield  
Missouri Valley College, Marshall  
Northeast Missouri State University, Kirksville  
Northwest Missouri State University, Maryville  
Stephens College, Columbia  
Tarkio College, Tarkio  
William Jewell College, Liberty

## ENGINEERING COOPERATIVE EDUCATION

Participating companies establish eligibility for this cooperative work-study program. Most require at least one year of appropriate and successful college studies. A reasonably good grade record is required, and student activities and personal development are also considered. Financial need is not a factor. Most of the cooperative programs are arranged so that academic studies and company employment and training can be finished in five calendar years or less. For more information contact the engineering dean.

### Participating companies are:

**ACF Industries**, St. Louis, Mo.  
**Black & Veatch**, Consulting Engineers, Kansas City, Mo.  
**Burns & McDonnell**, Kansas City, Mo.  
**Caterpillar Tractor Co.**, Peoria, Ill.  
**Chesebrough-Ponds**, Jefferson City, Mo.  
**City of Kansas City**, Mo.  
**Corps of Engineers**, Kansas City and St. Louis  
**Deere and Co.**, Moline, Ill.  
**Department of Transportation**, U.S. Coast Guard, St. Louis, Mo.  
**Emerson Electric Co.**, St. Louis, Mo.  
**Environmental Protection Agency**, Region VII, Kansas City, Mo.  
**Federal Pacific Electric**, St. Louis, Mo.  
**Frisco Railroad**, Springfield, Mo.  
**General Electric**, St. Louis, Mo.  
**General Motors**, Kansas City, Mo.  
**Granite City Steel**, Granite City, Ill.  
**McDonnell Douglas Corp.**, St. Louis, Mo.  
**Missouri State Highway Department**, Jefferson City, Mo.  
**Missouri Pacific Railroad**, St. Louis, Mo.  
**Monsanto**, St. Louis, Mo.  
**National Aeronautics & Space Administration**, Houston, Texas  
**Olin Co.**, Alton, Ill.  
**Phillips Petroleum**, Bartlesville, Okla.  
**Pontiac Motor Division, GMC**, Pontiac, Mich.  
**Shell Oil**, Wood River, Ill.  
**3M Co.**, St. Paul, Minn.  
**Union Electric Co.**, St. Louis, Mo.  
**Western Electric**, Kansas City, Mo.

### ENGINEERING HONORS

Opportunities available to honors students include:

1. Study programs tailored to the student's interests.
2. More personal attention from the honors adviser.
3. Honors courses and honors sections of regularly scheduled courses taught by senior faculty members.
4. Independent study or undergraduate research with a senior faculty member whose specialty interests the honors candidate.

Superior students may participate in honors sections of campuswide courses such as mathematics, American government, biology, chemistry and physics during the freshman year.

To be eligible for admission into the program, a student in the College of Engineering must have a grade point average of 3.0 (4.0 = A) at the sophomore level or higher. A comparable grade point average is required of transfer students. In exceptional cases, students who fall slightly below these standards may still be admitted to this program.

Students who successfully complete the Engineering Honors Program (including the independent project) will have the designation "Honors Scholar in Engineering" added to their diplomas and permanent records.

Interested students should contact their departmental office.

### COORDINATED UNDERGRADUATE ENGINEERING PROGRAM (CUEP)

In Kansas City, accredited BS programs in civil, electrical and mechanical engineering are provided by the UMC/UMKC Coordinate Undergraduate Engineering Program (CUEP). Engineering faculty in Kansas City are members of the faculty of the UMC College of Engineering. The UMC Engineering faculty is responsible for the professional content and administration of those programs and recommends candidates for the BS degree. Details are available in the *UMKC Undergraduate Catalog*.

### PROFESSIONAL OPPORTUNITIES

The average starting salary for May 1982 BS graduates was \$25,000. A recent national survey ranked average starting salary highest among accountants, chemists, engineers, mathematicians, physicists and business people. Engineers are in great demand. Graduates are succeeding better in job placement than those in any other four-year BS degree program. Engineering is a flexible profession. Future engineers have a wide range of career choices from highly abstract research to technical design. Engineers apply scientific knowledge to the use of natural resources to benefit people.

### PROFESSIONAL ENGINEERING REGISTRATION

The revised statutes of Missouri (Section 327.221) require that all applicants for registration as a professional engineer in the state of Missouri be a graduate of, and hold a degree in, engineering in a curriculum accredited by the Accreditation Board for Engineering and Technology. The UMC undergraduate programs in agricultural, chemical, civil, electrical, industrial and mechanical engineering at Columbia are so accredited, as are the civil, electrical and mechanical engineering programs in Kansas City.

### UNDERGRADUATE PROGRAM OF STUDY

At UMC, engineering offers a liberalized, four-year, 126-hour curriculum with electives to allow the student a choice from a wide array of interdisciplinary opportunities. With help from an adviser, students are free to plan much of their own study program.

Students must earn a grade point average of C (2.0 on 4.0 scale) in all courses required for graduation.

Students may receive up to nine hours advanced ROTC credit toward graduation, provided all departmental degree requirements are met, all ROTC requirements are met and students are commissioned in a branch of the Armed Forces.

### LOWER DIVISION PROGRAM

Freshman/Sophomore Years—62 credit hours required. There is one basic lower division program which includes a thorough preparation in mathematics and sciences and engineering electives. The similarity in the departmental lower division programs permits a student, in consultation with an adviser, to postpone declaring a major until the end of the sophomore year. Undecided students, who ultimately choose chemical engineering, should be cautioned that electives may be limited. Departmental advisers should be consulted for detailed information. If a student takes electives associated with a particular major, the similarity of engineering programs will permit a student to transfer to another major at the end of the sophomore year with no loss in credit.

#### Physics (9 hours)

Physics 80, 123, 124 University Physics I, II, III (3 hrs. each)

#### Chemistry (5 hours)

Either Chem 5 Chemistry for Engineers (5) or Chem 11 General Chemistry (5). Students who have a preference for

chemical engineering should take Chem 11-12 General Chemistry (5 hrs. each), during the freshman year and Chem 210-212 Organic Chemistry during the sophomore year. Chemical engineers should take Chem Engr 225 Chemical Process Calculations in their sophomore year.

#### Mathematics (16 hours)

Mathematics 80 Analytic Geometry and Calculus I (5), Mathematics 175 Calculus II (5), Mathematics 201 Calculus III (3), and Mathematics 304 Differential Equations (3). A C or better is required in both Mathematics 80 and Mathematics 175 to continue the math sequence.

#### Communication Skills (8 hours)

Engineering 5 Digital Computer Computation (2), English 60 Exposition (3). Either Engr. 30, English 161 or Speech 75 depending on departmental requirements.

#### Engineering and Science (12 hours)

Students undecided about their major should select courses from the following in consultation with an adviser:

Biological Science 1 Gen. Biology Lecture (3)

Chemistry 12 Gen. Chemistry (5)

Chemistry 210-212 Organic Chemistry (3 hrs. each)

Geology 2 Physical Geology (3)

Engineering 85 Statics and Elementary Strength of Materials (3)

Engineering 99 Engineering Thermodynamics I (3)

Engineering 110 Software Engineering (3)

Engineering 124 Circuits, Theory I (3)

Engineering 126 Introduction to Computer Systems (3)

Engineering 132 Probabilistic Models (3)

Engineering 195 Intermediate Strength of Materials (3)

Those students definitely committed to a major should select the Engineering/Science electives from the following courses. These courses are required in the respective curriculum.

Agricultural Engineering: Biological Science 7, Engineering 30, 85, 99.

Chemical Engineering: Chemical Engineering 12, 210, 212, Chemical Engineering 225, Engineering 85, 124

Civil Engineering: Engineering 85, 99, 124, 195

Computer Engineering: Engineering 85, 99, 110, 124, 126

Electrical Engineering: Engineering 85, 99, 124, 126

Industrial Engineering: Engineering 85, 99, 124, 132

Mechanical Engineering: Engineering 85, 99, 124, 195

**Humanities and Social Sciences (12 hours)**

See Appendix B.

### UPPER DIVISION PROGRAM

**Junior/Senior Years—64 credit hours required.** The junior year is essentially devoted to the student's major field. Although the program is stated in terms of specific courses, a student may, in consultation with an adviser, rearrange the program to suit particular needs and interests.

See Appendix A for specific course listings by curriculum.

The senior year has been made flexible to accommodate a student's interest. In consultation with an adviser, the student has great freedom to plan an individual program.

Because the chemical engineering curriculum contains 17 hours of chemistry beyond that required of the other fields, senior-year flexibility is less than indicated below. Detailed chemical engineering curriculum outlines are available from the Department of Chemical Engineering upon request.

Students in other engineering departments also should check with advisers for any additional senior year course requirements.

#### Senior Year Curriculum

28-32 credit hours required.

#### Engineering Design and Synthesis (3-9 hours)

Students should consult an adviser for departmental requirements.

#### Humanities/Social Sciences (4-6 hours)

See Appendix B

#### Electives (12-21 hours)

Since there is a wide variety of possibilities, depending on a student's particular interest and career objectives, a student should, in consulta-

tion with an adviser, plan a total program as early as possible. Program possibilities could include prelaw studies, premedical studies, computer engineering, environmental engineering, ecology, health care systems engineering, energy engineering, biological sciences, nuclear engineering, agriculture, management...the possibilities are unlimited. See the departmental sections for further information.

## APPENDIX A

The following are upper division course requirements by curriculum.

### Agricultural Engineering (64 hours)

Civil Engineering 113 Engineering Measurements (3)  
 Engineering 124 Circuit Theory I (3)  
 Civil Engineering 185 Intro to Dynamics (3)  
 195 Professional Practice in Ag Engineering (1)  
 Engineering 195 Intermediate Strength of Materials (3)  
 203 Environmental Control of Farm Buildings (3)  
 221 Soil Conservation Engineering (3)  
 241 Analysis of Farm Machines (3)  
 Civil Engineering 251 Fluid Mechanics (3)  
 Mechanical Aerospace Engineering 252 Instrumentation and Measurement Lab I (3)  
 Agronomy 100 Soil Systems (3)  
 English 161 Technical Writing (3)  
 English 60 Exposition (3) or Speech 75 Intro to Speech Communication (3)  
 Engineering Design Electives (9)  
 Engineering Science Electives (6)  
 Electives (12)

### Chemical Engineering (47 hours)

170 Chemical Process Measurements (3)  
 234, 235 Principles of Chem. Engr. I & II (6)  
 243 Chemical Engineering Laboratory I (2)  
 261, 262 Chem. Engr. Thermodynamics I & II (6)  
 304 Digital Computer Application in Engineering (3)  
 363 Chemical Reaction Engineering and Technology (3)  
 370 Modern Methods of Chemical Process Control (3)  
 385 Chemical Engineering Design I (3)  
 Mechanical and Aerospace Engineering 224 Engineering Materials I (3)

Chemistry 231, 233 Physical Chemistry (6)  
 English 161 Technical Writing (3) or Speech 75 Introduction to Speech Communication (3)  
 Engineering Science Electives (6)

### Civil Engineering (40 hours)

113 Engineering Measurements (3)  
 185 Introduction to Dynamics (3)  
 212 Transportation Systems Engineering (3)  
 221 Structural Analysis I (4)  
 222 Design of Reinforced Concrete Members (3) or 223 Design of Steel Members (3)  
 232 Civil Engineering Materials (3)  
 241 Fluid Mechanics Laboratory (1)  
 251 Fluid Mechanics (3)  
 240 Applied Fluid Mechanics (2)  
 341 Hydrology (3)  
 355 Soil Mechanics (3)  
 374 Civil Engineering Systems Design (3)  
 391 Intro. to Water Quality (3)  
 English 161 Technical Writing (3)

### Computer Engineering (39 hours)

205 Circuit Theory II (3)  
 216 Linear Systems & Circuits (3)  
 226 Logic Design (4)  
 227 Assembly Language Programming (3)  
 235 Physical Electronics (3)  
 255 Experimental Electrical Engineering I (3)  
 286 Electronic Circuits & Signals I (3)  
 306 Operating Systems & Software Design (4)  
 326 Microcomputer Architecture & Interfacing (4)  
 328 Design of Digital Subsystems (3)  
 English 161 Technical Writing (3)  
 Math 226 Discrete Structures (3)

### Electrical Engineering (34 hours)

205 Circuit Theory II (3)  
 206 Feedback Theory (3)  
 216 Linear Systems & Circuits (3)  
 225 Electromagnetic Fields (3)  
 226 Logic Design (4)  
 235 Physical Electronics (3)  
 255, 256 Experimental Electrical Engineering I, II (6)  
 266 Power Engineering I (3)  
 286 Electronic Circuits & Signals I (3)  
 English 161 Technical Writing (3)  
**Industrial Engineering (43 hours)**

Engineering 195 Intermediate Strength of Materials or MAE/CE 185 Introduction to Dynamics (3)  
 339 Evaluation of Engineering Data (3)  
 349 Engineering Quality Control (3)  
 351 Plant layout and materials handling (3)  
 358 Economic Studies in Engineering (3)  
 360 Measurement of Human Work (3)  
 361 Intro. to Human Factors Engr. (3)  
 381 Industrial Systems Design (4)  
 385 Manufacturing Systems Design (3)  
 387 Linear Programming (3)  
 388 Industrial Systems Simulation (3)  
 397 Operations Research Models (3)  
 398 Scheduling Systems (3)  
 Elective (3)

### Mechanical Engineering (64 hours)

185 Introduction to Dynamics (3)  
 199 Engineering Thermodynamics II (3)  
 224 Engineering Materials I (3)  
 234 Engineering Materials II (3)  
 251 Fluid Mechanics (3)  
 252, 262 Instrumentation & Measurements Laboratory I & II (6)  
 256 Design of Machine Elements (4)  
 285 Systems Dynamics (3)  
 296 Design Synthesis (3)  
 299 Heat Transfer (3)  
 Electrical Engineering 205 Circuit Theory II (3) or Engineering 126 Introduction to Computer Systems (3)  
 English 161 Technical Writing (3) or Speech 75 Intro. to Speech Communication (3)  
 Engineering Design Elective (3)  
 Engineering/Math/Science Electives (9)  
 Free Electives (8)  
 Humanities/Social Studies Electives (4)

## APPENDIX B

To satisfy the humanistic-social sciences requirement, each student must take a minimum of three courses, including at least one upper-class course (numbered 100 or higher), from one of the subgroups of the major areas listed. Students should consult their adviser about course selection.

The humanistic-social sciences requirement cannot be met by taking three courses in psychology.

In addition to the other humanistic-social sciences courses, a student must take an economics course, preferably Economics 41 Principles of Economics (3 hrs.).

The Missouri Constitution requires that graduates of Missouri state universities and colleges must have completed a course in American history or government, including study of Missouri government. Courses satisfying this requirement are listed in the course description section of this catalog.

### Humanistic Studies

Fine Arts: All art history and appreciation; all music appreciation, history and literature; Speech 6. Applied art or music courses do not fulfill this requirement.

Foreign Civilizations: All courses in classical archaeology; French 110, German 110, Spanish 110, Italian 110, Asian Civilizations 181; Roman culture; Greek culture.

Humanities: Classical Studies 225 and 226; Humanities GH101, GH102, GH103 and GH104; Speech 110.

Literature: All courses in literature; all foreign language literature courses beyond basic skills series.

Mythology: All courses in classical civilization and literature in translation: Classical Studies 60, 115, 116, 225 and 226.

Philosophy: All courses.

Religion: All courses except languages.

### Social Sciences

Anthropology: All courses except 142, 143,

151, 185, 342, 367, 376 and 393 (research and methods courses).

Economics and Agricultural Economics: All courses except 317 and 372 (research and methods courses).

Geography: All courses except 303, 337 and 366 in cartography, meteorology and climatology.

History: All courses.

Political Science: All courses.

Psychology: Only Psychology 1 General Psychology (3 hrs.).

Sociology and Rural Sociology: All courses except 180 and 375 (research and methods courses).

## AGRICULTURAL ENGINEERING

### 100 Agricultural Engineering Building, (314) 882-2350

The Department of Agricultural Engineering offers degrees both in the College of Agriculture and the College of Engineering. The student should enroll in the College of Engineering for the bachelor of science degree in agricultural engineering. Dual enrollment in both engineering and agriculture also is possible.

Agricultural engineering graduates are employed by industry for design, development, sales and management. State and federal agencies employ agricultural engineers to deal with environmental problems such as erosion control and water pollution. With an advanced degree, a graduate may be employed by a college or university in a teaching, research or extension position, or as a researcher for the federal government.

Agricultural engineering students take a lower division program in common with all other engineering students. Agricultural engineering courses, other required courses and electives are taken in the junior and senior years. A wide variety of course offerings are available on the Columbia campus and, through electives, the student can obtain a broad engineering education or specialize in a specific subject. Some of the specialties available through agricultural engineering include:

- Agricultural structures
- Agricultural wastes and pollution control
- Crop storage and processing
- Farmstead engineering
- Safety engineering
- Irrigation and drainage systems
- Livestock environmental engineering
- Machinery design and development
- Pest control engineering
- Soil conservation
- Utilization and quality control of water resources

Specific course sequences for specialty programs are made in consultation with an adviser. The above list offers suggested areas, but it is not exhaustive.

## CHEMICAL ENGINEERING

### 1030 Engineering Building, (314) 882-3563

The Department of Chemical Engineering offers undergraduate and graduate degrees in chemical engineering.

UMC chemical engineering graduates plan, design, research and establish equipment specifications for all aspects of industrial plants.

Graduates work closely with industrial, legal and political leaders, as well as governmental agencies, to reduce the hazards posed by air and water pollution. Graduates are active in the fields of chemicals, synthetic textile fibers, plastics, aerospace, air and water pollution control, chemical and nuclear energy conversion, nuclear radiation, food and other bioengineering chemical productions, ceramics, petrochemicals and petroleum refining, material processing, and biochemical engineering physiology.

Chemical engineering students take a curriculum the first two years which is common to all engineering students. Chemistry 11 and 12 should be scheduled during the freshman year, Chemistry 210 and 212 during the sophomore year, and Engineering 85, 124 and MAE 224 in the junior year. During the junior year, the student takes chemical engineering subjects and in the senior year, specific design-oriented subjects.

With the approval of the department chairman, the student may design a program of study emphasizing business administration, prelaw or one of the following sciences: environmental engineering, engineering management, food processing, biology, geology, applied mathematics, statistics, nuclear engineering, biochemical engineering or solid-state engineering.

When the chemical engineering curriculum is completed, the student is adequately prepared for advanced study in business, law, medicine, science or chemical engineering.

Undergraduates may arrange with individual faculty members for independent study work.

## **CIVIL ENGINEERING**

### **1047 Engineering Building, (314) 882-6269**

Virtually every structure around—schools, housing projects, shopping centers, streets, sewers, tunnels, bridges, roads, airports, railways, dams, water systems, sewage treatment plants, just about every structure a city needs—was designed and built by a civil engineer. Everything from a sanitary landfill to a great university (and the road connecting them) was built by a civil engineer.

Civil engineers work both indoors and out. Many work for consulting engineering firms where they conceive and draw the plans for construction. Others work for contractors as surveyors or construction supervisors. Still others work for municipalities and state agencies. In recent years, many civil engineers have been working to control water and air pollution as well as to solve solid waste disposal problems. This branch of civil engineering is known as environmental engineering. Civil engineers often direct the public work engineering programs of major municipalities. Virtually every major industry in the United States employs civil engineers.

At UMC, a civil engineering student can specialize in six basic areas:

1. Structural engineering (reinforced concrete and steel).
2. Sanitary and environmental engineering (water supply, waste water treatment, solid waste disposal, air pollution control, hazardous waste management).
3. Transportation and urban systems engi-

neering (highways, railways, mass transit systems, land use planning, surveying and photogrammetry).

4. Construction planning and management (building equipment, methods and costs).

5. Hydraulic engineering and water resources planning and management (large scale water projects, systems and optimization techniques).

6. Municipal and public works engineering (the full range of municipal engineering services).

The Department of Civil Engineering is well equipped for classroom and laboratory instruction and research. In addition to advanced surveying equipment, extensive laboratories are available for concrete and steel materials testing, soils testing, hydraulics and fluid mechanics, and chemical and microbiological analysis related to water supply and wastewater treatment. Civil engineering is one of the most highly laboratory-oriented disciplines at the University. Excellent shop facilities and technicians are available to fabricate and maintain the laboratory and research equipment.

A civil engineering undergraduate student will share a program common to engineering students in other departments in the first two years of study. Statics (Engineering 85) and Strength of Materials (Engineering 195) will comprise 6 of the 12 hours of the engineering and science requirements. Thermodynamics (Engineering 99) and Circuits (Engineering 124) may be deferred in favor of required courses from the junior year. This enables the student to pursue specialty areas in greater depth in the last two years.

During the junior year, design-oriented coursework is taken in the specialty areas in civil engineering. In the senior year, the student may either elect a broad program of civil engineering or explore a specialty area in depth.

In the final semester, the student is required to take part in a comprehensive three-credit Civil Engineering Systems Design course (CE 374). This course simulates a consulting engineering office working on a major civil engineering design project. The project actually is derived from the current work in a regional consulting engineering office. This experience gives the opportunity to integrate all aspects of civil engineering design practice with the increasingly important management and organizational responsibilities of the civil engineer.

The Department of Civil Engineering also cooperates with the Department of Geology to administer a program which leads to a dual degree in civil engineering-geology.

## **COMPUTER ENGINEERING**

### **213 Electrical Engineering Building, (314) 882-2648**

This relatively new engineering discipline, growing from roots in electrical engineering and applied mathematics, offers exciting and challenging career opportunities. The explosive developments in such areas as microcomputers, robotics, and large scale integrated circuits promise to increase the demand for computer engineers.

The Bachelor of Science degree in computer engineering, offered in the Department of

Electrical Engineering, provides a strong yet balanced emphasis in both hardware (digital electronics and computer architecture) and software (systems and application programming). Research programs in computer graphics, image processing, speech synthesis and recognition, and computer simulation significantly enhance the degree program. The curriculum receives additional support from the electrical engineering and the computer science curricula.

The computer engineering undergraduate student will take a two-year, lower-division program common to all branches of engineering as described earlier in this brochure.

In the two-year, upper-division program, one year of specialized course and laboratory work is directed to the core subjects of software design, systems programming, computer architecture, digital electronics and digital system design. During the final year, each individual pursues career objectives by selecting, with an adviser's help, a series of computer engineering electives.

Many students combine their BS degree in computer engineering with a BS degree in electrical engineering in a special 138-hour program. Others use their electives to pursue interdisciplinary studies in business, law, medicine, bioengineering, information science or other areas.

## **ELECTRICAL ENGINEERING**

### **213 Electrical Engineering Building, (314) 882-2648**

The Department of Electrical Engineering offers undergraduate degrees in electrical engineering and computer engineering.

UMC electrical engineering graduates are at the forefront of the technological growth leading to the dramatic increase in global communications; the accelerated use of electric power; the dominating influence of the computer on modern society; the increased use of electronic components and equipment for improved health care, transportation, recreation, agricultural production, marketing, manufacturing; and countless other activities. Two factors in particular, the continuing global energy problem and the rapid advances in microelectronics, assure a constant demand for electrical engineering graduates now and in the future.

An electrical engineering undergraduate will take a two-year lower-division program common to all branches of UMC engineering.

In the two-year upper-division program, one year of specialized work in electrical engineering is followed by a year in which, with the assistance of an adviser, an electrical engineering program can be planned around individual career objectives. The student will take three senior-level electrical engineering courses, each with an accompanying one-hour laboratory. These three courses, each in a different topic area, can be selected from a wide range of topical courses.

If a student is interested in interdisciplinary studies in such topics as medicine, law, business, computer systems, bioengineering or electronics, a variety of courses offered by the department and the campus can be chosen. Several specific program guidelines already

have been prepared to assist in selecting course sequences in energy systems, power electronics, computer systems, digital systems, electronics, communications, electromagnetics and acoustics, networks, system control and bioengineering.

The department emphasizes close interaction with industry. Industry engineers visit regularly, and industry-sponsored student projects are provided to give an extra dimension to the program to ensure an excellent electrical engineering education.

A student also may earn a second baccalaureate degree in computer engineering (described elsewhere in this brochure) through a special 138-hour BSEE/BSCoE degree program.

## **INDUSTRIAL ENGINEERING**

**213 Electrical Engineering Building,  
(314) 882-2691**

The Department of Industrial Engineering offers undergraduate and graduate degrees in industrial engineering.

UMC industrial engineering graduates use physical laws and the principles of science in developing or designing systems which produce goods and provide services. Industrial engineers not only work in manufacturing industries but in hospitals, government agencies, commercial and financial institutions, and many other organizations.

An industrial engineer in a manufacturing organization may be concerned with the design of a single work place involving one or more persons and one or more machines. In designing such work places, the industrial engineer must not only consider the capabilities of machines, but also the physiological and psychological capabilities and limitations of humans. An industrial engineer also is involved in the design of computer-integrated manufacturing processes with robots, in the design of entire plants and in the design of systems to control the production, inventory and quality of large numbers of complex products. At higher corporate levels, there are concerns with plant and warehouse locations, the development of sales forecasts and the evaluation of proposals to produce new products and the building of new or improved production facilities.

The same skills used as an industrial engineer to design manufacturing systems are also useful in designing better systems to care for patients in hospitals, facilitating the judicial process, providing faster and more accurate mail distribution, improving airline reservation methods, controlling large space projects, and reducing air and water pollution. In effect, the engineer may be involved in the design of many systems which provide beneficial services at a cost that society can afford.

An industrial engineering undergraduate will take a curriculum common to all engineering students during the first two years. In addition to basic science, mathematics and communication skills, a knowledge of physiology, sociology, the tools of operations research and computer applications are necessary. This additional background in the behavioral sciences is necessary to design complex systems in which people can operate effectively. Because indus-

trial engineers are involved in solving complex problems requiring an understanding of one entire organization, they become prime candidates for top management or administrative positions.

The industrial engineering curriculum provides a great amount of freedom for the student to tailor an individual program. On a multidisciplinary campus such as UMC, students will have many opportunities to satisfy individual needs or desires. Students can plan interdisciplinary programs in law, medicine, computers and control systems, health care systems design, management, human factors engineering, bioengineering, judicial systems design, educational systems design and management information system design.

## **MECHANICAL AND AEROSPACE ENGINEERING**

**1006 Engineering Building, (314) 882-2684  
or 882-2785**

UMC mechanical engineering graduates are involved in the design, analysis and control of machine systems; the understanding and use of materials; and the generation and use of mechanical power. Because mechanical engineering offers a broad base of preparation, mechanical engineers are employed by almost all industries.

Aerospace engineering represents an extension of mechanical engineering into the "off-the-ground" environment. If involved in this important area, the student is concerned with material properties, lightweight structural considerations, control systems analysis, heat transfer propulsion systems, aerodynamics and many other activities related to spacecraft and aircraft.

Students work in well-equipped laboratories in material science, structural integrity, interactive computer graphics, measurement and instrumentation, heat transfer and fluid dynamics, systems dynamics, and energy exchange processes. These laboratories are available for instructional and research purposes at both the undergraduate and graduate levels. Students also have the opportunity to become involved in special industrial laboratory projects and to use a growing array of computer terminals.

Students participate in a curriculum which offers maximum transferability among all departments for the first two years and a maximum of individuality for the last year.

Students concentrate on departmental requirements during the junior year. The student's senior year is primarily elective so an individual study program can be developed. This enables students to complete a traditional program or create a unique program with special emphasis on aerospace engineering, bioengineering, system design, materials, computer-aided design (CAD), energy and thermal systems.

Undergraduate courses in mechanics have been developed in both the civil engineering and mechanical engineering departments. They are now co-listed for your convenience under the course descriptions for both departments.

In addition to its BSME, MSME and PhD degree programs in Columbia, the Department

of Mechanical and Aerospace Engineering offers parallel BSME and MSME programs in Kansas City.

## **NAVY/MARINE ROTC**

**105 Crowder Hall, (314) 882-6693**

The Naval Reserve Officers Training Corps (NROTC) was established in 1926 to offer qualified college students the necessary naval science courses required to qualify them for commissions in the Naval or Marine Corps Reserve. Its mission has since been changed to supply regular naval officers to the fleet. Today, NROTC is the primary source of regular naval officers.

The NROTC unit at the University of Missouri-Columbia was established in 1946. The first NROTC midshipmen graduated in the class of 1950. Since that time, UMC NROTC graduates have served the country as shipboard officers, submariners and aviators attached to the fleets of the U.S. Navy.

NROTC graduates incur a three- or four-year military obligation and receive starting salaries ranging from \$19,240 to more than \$30,000 per year in certain specialties, all with regular raises, extensive travel opportunities, invaluable personnel and hardware management experience, on-the-job training and complete medical and dental care.

### **PROGRAMS**

Navy/Marine ROTC students may major in approved courses of study leading to a baccalaureate degree, and take one naval science course for credit each semester. Each course provides the student with a better understanding and knowledge of various aspects of the Navy or Marine Corps. Associated with each course is a leadership laboratory designed to orient the student to the responsibilities of a junior naval officer. The activities taught include water survival, self-defense, physical fitness, orienteering, aviation, nuclear power orientation with associated field trips, pistol/rifle marksmanship and rappelling.

### **SCHOLARSHIPS**

Navy/Marine ROTC has two- and four-year scholarships available. High school seniors and college freshmen and sophomores are eligible for the scholarship programs. Scholarship applicants are considered on the basis of a nationwide competition. Application must be made prior to December for the class entering the following fall. Qualified midshipmen in the college program may be appointed directly to the scholarship program depending upon quota limitations. The Navy pays tuition, costs of textbooks, miscellaneous fees and a tax-free subsistence allowance of \$100 per month. One purpose of the NROTC program is to provide officers with a technical background. A large number of scholarship students are in technical majors and those scholarship students who are not in technical majors are required to complete basic calculus and physics courses.

Scholarship midshipmen make three summer cruises for which they receive full pay as midshipmen. Upon graduation, scholarship midshipmen are commissioned as ensigns in the regular Navy or second lieutenants in the regular Marine Corps.

## TWO-YEAR SCHOLARSHIPS

The scholarship and college two-year programs are intended to allow students to enter Navy/Marine ROTC at the beginning of their junior year. The two-year program is especially suited for transfer students and for UMC students who did not participate in NROTC during the first two years. The programs are similar to the four-year programs described above. However, the first two years of naval science training is accomplished during a six-week summer session at the Naval Science Institute, U.S. Naval Base in Newport, R.I. All travel expenses and salary are paid by the Navy.

The two-year scholarship program is open to eligible students who have completed two semesters of calculus. Upon successful completion of training at the Naval Science Institute, students are eligible for scholarship benefits at the beginning of their junior year. These benefits are the same as stated for the four-year scholarship program.

Others may apply for the two-year college program. Students receive \$100 per month subsistence allowance plus a cruise between the junior and senior years. This subsistence allowance amounts to about \$2,500 for the junior and senior years. Non-scholarship college program students are not required to complete the calculus/physics sequence.

## ACADEMICS

The freshmen and sophomore Naval Science course of study consists of four courses: 11 Introduction to Naval Science; 123 and 124 Naval Ships Systems I and II; and a seminar, 112 Seapower and Maritime Affairs. The latter addresses historic and modern applications of seapower and the influence of maritime affairs on international relations. During the junior year, NROTC students take 235 Navigation and 236 Naval Operations. These include theory and technique of surface and aerial navigation, theory of celestial navigation, basic principles of aerology, maneuvering board training, tactical and fleet communications, and rules of the nautical road. During the senior year, students take 247 Navy Management and 248 Administration in the Naval Profession.

Academic requirements for Marine option midshipmen are 155 Evolution of the Art of War and 156 Amphibious Warfare, taught in lieu of the junior and senior Navy courses listed above.

Academic credit for naval science courses toward a baccalaureate degree is accepted by most UMC schools and colleges, and is included in a student's grade point average.

## MARINE CORPS OPTION

Any midshipman may apply for a commission in the Marine Corps instead of the Navy. If the student is selected by the Marine Corps, the last two years of naval science courses are taught by the Marine officer instructor. These courses prepare the midshipman for a commission as second lieutenant in the U.S. Marine Corps. After graduation and commissioning, Marine Corps officers report to the Marine Corps Basic School in Quantico, Va., for six months of officers' professional education prior to further assignment to duty with the operating forces. Some specialties available in the Marine

Corps include field artillery, infantry, aviation, communications, data systems, supply and engineering.

## MIDSHIPMAN ACTIVITIES

Midshipmen may elect to participate in a wide variety of activities sponsored by the NROTC unit. The unit's rifle, pistol and drill teams travel to several off-campus meets each year.

The midshipmen field athletic teams in volleyball, softball, football, basketball and soccer and are usually very competitive in the campus intramural and city leagues.

Yearly social activities include a Navy Ball, Marine Corps Ball, a formal "Dining In" for graduating seniors, battalion picnics and informal social gatherings.

## MILITARY OBLIGATION

NROTC college and scholarship program midshipmen incur absolutely no military obligation during their freshman year. This time is strictly a period to allow students to get a better understanding and appreciation of the life of a naval officer. Once commissioned, college program midshipmen serve in the fleet for three years while scholarship midshipmen serve for four years.

## NUCLEAR ENGINEERING

### 1026 Engineering Building, (314) 882-3550

The junior and senior years as an undergraduate engineering student at UMC are the time students begin branching out, taking courses to mold their education to fit their particular career objective. During the junior and senior years, nuclear engineering can assist students to prepare for professional life or to launch their graduate school career.

With a background in nuclear engineering, students can choose among many different professional fields in which to work. Chemical engineers, for example, are involved in the preparation and reprocessing of reactor fuel and in a variety of chemical processes used in a nuclear power plant.

Mechanical engineers in nuclear-related fields deal with the stress and fatigue in materials that are subjected to radiation; they also are involved in thermal hydraulic design and analysis of power plants.

With an electrical engineering degree and knowledge of nuclear processes, students might be working with instrumentation analysis and design, computer design and applications, or with the distribution of power generated from a nuclear plant.

Through the cooperative efforts of UMC's mechanical, electrical, chemical and nuclear engineering faculty, undergraduate course sequences have been developed for mechanical, electrical and chemical engineering majors who want an elective sequence in nuclear engineering. These suggested sequences (listed below) should be particularly useful if students are interested in pursuing graduate work or a career in nuclear engineering.

### CHEMICAL ENGINEERING

#### Junior Year Curriculum (32 hours)

Chemistry 12, 210, 212 (Taken in soph. yr., 11 hrs.)  
170 Chem. Process Measurements (3)  
234, 235 Principles of Chemical Engineering I and II (6)  
243 Chem. Engr. Lab I (2)  
261, 262 Chem. Engr. Thermodynamics (6)

Chemistry 231, 233 Physical Chemistry (6)  
304 Digital Computer Applications in Engineering (3)  
Mechanical and Aerospace Engineering 224 Science of Engineering Materials (3)

#### Senior Year Curriculum (35 hours)

Engineering Design and Synthesis (9)  
Humanistic and Social Studies (6)  
English 161 or Speech 75 (3)

#### Electives\* (12)

### ELECTRICAL ENGINEERING

#### Junior Year Curriculum (33 hours)

205 Circuit Theory II (3)  
206 Feedback Theory (3)  
216 Linear Systems and Circuits (3)  
225 Electromagnetic Fields (3)  
235 Physical Electronics (3)  
255, 256, & 357 Experimental Electrical Engineering I, II, & III (9)  
266 Power Engineering I (3)  
286 Electronic Circuits and Signals I (3)

#### Electives\* (3)

Senior Year Curriculum (31 hours)  
Engineering Design and Synthesis (3-9)  
Humanistic Social Studies (6)  
Electives\* (22-16)

### MECHANICAL/AEROSPACE ENGINEERING

#### Junior Year Curriculum (34 hours)

185 Intro to Dynamics (3)  
199 Engineering Thermodynamics II (3)  
224 Engineering Materials I (3)  
234 Engineering Materials II (3)  
251 Fluid Mechanics (3)  
252, 262 Instrumentation and Measurement Lab I & II (6)  
256 Design of Machine Elements (4)  
285 Systems Dynamics (3)  
EE 205 Circuit Theory I or Engr. 126 Intro to Computer Systems (3)

English 161 Technical Writing or Speech 75 Intro to Speech Communication (3)

#### Senior Year Curriculum (30 hrs)

296 Design Synthesis (3)  
299 Heat Transfer (3)  
Engineering Design Elective (3)\*  
Engineering/Math/Science Electives (9)\*  
Free Electives (8)\*

Humanities/Social Studies Electives (4)

\*Suggested elective courses include the following:

Nuclear Engineering 305 Survey of Nuclear Engineering (3)  
Nuclear Engineering 306 Engineering Analysis (3)  
Nuclear Engineering 315 Engineering Evaluation of Energy Systems and Resources (3)  
Nuclear Engineering 341 Nuclear Chemical Engineering (3)  
Nuclear Engineering 346 Introduction to Nuclear Reactor Engineering (3)  
Nuclear Engineering 349 Nuclear Engineering Materials (3)  
Nuclear Engineering 353 Introduction to Fusion (3)  
Nuclear Engineering 355 Nuclear Reactor Lab I (3)  
Nuclear Engineering 365 Nuclear Power Engr. (3)  
Mechanical and Aerospace Engineering/Nuclear Engineering 375 Introduction to Plasmas (3)  
Mechanical and Aerospace Engineering/Nuclear Engineering 382 Lasers and Their Applications (3)  
Nuclear Engineering 391 Radiation Detection and Measurement (3)  
Mechanical and Aerospace Engineering 185 Introduction to Dynamics (3)  
Mechanical and Aerospace Engineering 224 Science of Engineering Materials (3)  
Mechanical and Aerospace Engineering 251 Fluid Mechanics (3)  
Mechanical and Aerospace Engineering 351 Power Plant Design (3)  
Mechanical and Aerospace Engineering 368 Principles of Turbomachinery (3)  
Electrical Engineering 345 Electromechanical Conversion I (3)  
Physics 215 Intermediate Modern Physics (3)

Several special research facilities and laboratories are available to students in the undergraduate course sequence in nuclear engineering. The University of Missouri Research Reactor (MURR), a 10-million watt research reactor, has the highest steady-state neutron flux of any university reactor in the United States. Surrounding the MURR is a 26,000-square-foot laboratory facility for nuclear research. Other facilities available include a 5,000-curie Cobalt-60 irradiator installed at the

MURR facility, a neutron generator, digital and analog computers, nuclear instrumentation devices and a nuclear reactor simulator.

Students interested in the undergraduate course sequences available in nuclear engineering should contact the chairman of the Department of Nuclear Engineering at 1026 Engineering Building.

## FACULTY

### ADMINISTRATION

**William R. Kimel**, dean, professor, PhD, University of Wisconsin PE

**Jack W. Morgan**, assistant dean, professor, EdD, University of Missouri-Columbia

### AGRICULTURAL ENGINEERING

**Neil F. Meador**, professor, chairman, PhD, Michigan State University PE

**Maynard E. Anderson**, professor, PhD, University of Missouri-Columbia PE

**David E. Baker**, associate professor, MS, Illinois State University

**Donald B. Brooker**, professor emeritus, MS, University of Missouri-Columbia

**H. David Currence**, associate professor, PhD, Iowa State University PE

**C. Leroy Day**, professor, PhD, Iowa State University PE

**James R. Fischer**, associate professor, PhD, University of Missouri-Columbia PE

**James C. Frisby**, professor, PhD, Iowa State University PE

**Charles Fulhage**, associate professor, PhD, University of Missouri-Columbia PE

**Albert Garcia III**, instructor, MS, San Jose State University PE

**Maurice R. Gebhardt**, professor, PhD, University of Missouri-Columbia PE

**Robert M. George**, professor, MS, University of Missouri-Columbia

**James M. Gregory**, assistant professor, PhD, Iowa State University

**Franklin D. Harris**, professor, PhD, University of Arkansas

**Allen R. Hjelmfelt Jr.**, professor, PhD, Northwestern University PE

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**Eugene L. Iannotti**, associate professor, PhD, University of Maryland

**Alvin Larke**, assistant professor, PhD, University of Missouri-Columbia

**Thomas R. McCarty**, assistant professor, PhD, Cornell University

**Kenneth L. McFate**, professor, MS, University of Missouri-Columbia PE

**Richard E. Phillips**, professor, PhD, Michigan State University PE

**Donald Pfost**, associate professor, PhD, The Ohio State University PE

**Milton D. Shanklin**, professor, PhD, University of Missouri-Columbia PE

**Dennis M. Sievers**, associate professor, PhD, University of Missouri-Columbia PE

**David B. Smith**, professor, PhD, University of Missouri-Columbia PE

### CHEMICAL ENGINEERING

**George W. Preckshot**, chairman, professor, PhD, University of Michigan PE

**Rakesh K. Bajpai**, assistant professor, PhD, IIT, Kanpur, India

**Paul C.H. Chan**, assistant professor, PhD, California Institute of Technology

**L. E. Marc de Chazal**, professor, PhD, Oklahoma State University PE

**James R. Lorah**, professor emeritus, PhD, University of Washington

**Ralph H. Luebbbers**, professor emeritus, PhD, Iowa State University PE

**Richard H. Luecke**, professor, PhD, University of Oklahoma PE

**Thomas R. Marrero**, associate professor, PhD, University of Maryland PE

**David G. Retzloff**, assistant professor, PhD, University of Pittsburgh

**Truman S. Storvick**, professor, PhD, Purdue University PE

**John B. Sutherland**, professor emeritus, PhD, University of Pittsburgh

**Dabir S. Viswanath**, professor, PhD, University of Rochester

### CIVIL ENGINEERING

**John T. O'Connor**, chairman, professor, Eng D, Johns Hopkins University PE

**James W. Baldwin Jr.**, professor, PhD, University of Illinois PE

**Shankha K. Banerji**, professor, PhD, University of Illinois PE

**Neal B.H. Benjamin**, professor, PhD, Stanford University PE

**Richard T. Douty**, professor, PhD, Cornell University PE

**Karl H. Evans**, professor, MS, University of Illinois PE

**Mriganka M. Ghosh**, professor, PhD, University of Illinois PE

**David L. Guell**, associate professor, PhD, Northwestern University PE

**Mark P. Harris**, associate professor emeritus, MS, Georgia Institute of Technology PE

**Gerard B. Hasselwander**, assistant professor, PhD, University of Texas-Austin PE

**George F.W. Hauck**, associate professor, PhD, Northwestern University PE

**Louis Hemphill**, associate professor, PhD, University of Missouri-Columbia

**Jimmie W. Hinz**, associate professor, PhD, Stanford University

**Charles W. Lenau**, professor, PhD, Stanford University PE

**Henry Liu**, professor, PhD, Colorado State University PE

**Jay B. McGarraugh**, professor, PhD, Purdue University PE

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**Harry Rubey**, professor emeritus, CE, University of Illinois PE

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**John R. Salmoms**, professor, PhD, University of Arizona

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**M. Bala Subramanyam**, assistant professor, PhD, University of Iowa

**James R. Tudor**, professor, PhD, Illinois Institute of Technology PE

**Harry Wakeley Tyrer**, associate professor, PhD, Duke University

**Kenneth Unklesbay**, associate professor, PhD, University of Missouri-Columbia PE

**Edward J. Vredenburg**, associate professor, MS, University of Missouri-Columbia

**Rex A. Waid**, professor, PhD, University of Wisconsin PE

**Donald L. Waidelich**, professor, PhD, Iowa State University

**Clifford L. Wallis**, professor emeritus, DSc, Harvard University

**Kuno Zimmermann**, associate professor, PhD, Lehigh University

### INDUSTRIAL ENGINEERING

**J. Goldman**, chairman, professor, DSc, Washington University (St. Louis) PE

**Alec Chang**, assistant professor, PhD, Mississippi State University PE

**Larry G. David**, professor, PhD, Purdue PE

**Antonio J. Dieck**, assistant professor, PhD, Georgia Institute of Technology

**Robert M. Eastman**, professor, PhD, Pennsylvania State University PE

**Michael S. Leonard**, associate professor, PhD, University of Florida PE

**Jack L. James**, lecturer, MS, University of Nebraska

**Owen W. Miller**, professor, DSc, Washington University (St. Louis) PE

**Sencer Yeralan**, assistant professor, PhD, University of Florida PE

**MECHANICAL AND AEROSPACE ENGINEERING**

**Paul W. Braisted**, chairman, professor, PhD, Stanford University PE

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**J. Kenneth Blundell**, assistant professor, PhD, Nottingham (England)

**C. Quinton Bowles**, associate professor, PhD, Delft (Netherlands) PE

**Gaylord H. Bunch**, associate professor, MS, University of Missouri-Columbia PE

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**William E. Stewart**, assistant professor, PhD, University of Missouri-Rolla PE

**George H. Stickney**, associate professor, PhD, University of Michigan; DrEng, University of Kansas PE

**Abdurahman A. Sukere**, assistant professor, PhD, Michigan State University



**Richard C. Warder Jr.**, professor, PhD, Northwestern University PE  
**David E. Wollersheim**, professor, PhD, University of Illinois PE  
**Ross D. Young**, associate professor, MS, Iowa State University PE

### NAVAL SCIENCE

**Fred J. Cone**, chairman, professor, MBA, University of Missouri-Columbia  
**D. Scott Bianchi**, assistant professor, MS, Troy State University  
**Thomas H. Bogard**, associate professor, MS, University of Hawaii  
**David B. Bowman**, instructor, BS, University of Missouri-Columbia

**Jerry W. Kahler**, associate professor, MA, Pepperdine University  
**Mary Schupack**, associate professor, MS, Navy Postgraduate School

### NUCLEAR ENGINEERING

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**Walter Meyer**, adjunct professor, PhD, Oregon State University PE  
**Don M. Alger**, assistant professor, PhD, University of Missouri-Columbia PE  
**Robert N. Brugger**, professor, PhD, Rice University  
**Robert L. Carter**, professor, PhD, Duke University PE  
**F. Marc Edwards**, assistant professor, PhD, University of Colorado

**Ardath H. Emmons**, professor emeritus, PhD, University of Michigan  
**William L. Kennedy**, assistant professor, PhD, University of California-Berkeley  
**William R. Kimel**, professor, PhD, University of Wisconsin PE  
**Phillip K. Lee**, associate professor, PhD, Purdue University  
**K. William Logan**, associate professor, PhD, University of Missouri-Columbia  
**Sudarshan K. Loyalka**, professor, PhD, Stanford University PE  
**Mark A. Prelas**, assistant professor, PhD, University of Illinois  
**Donald R. Smith**, associate professor, PhD, University of Colorado PE  
**James R. Vogt**, professor, PhD, University of Kentucky



# SCHOOL OF HEALTH RELATED PROFESSIONS

The School of Health Related Professions was established on the Columbia campus of the University of Missouri July 1, 1978. Incoming students interested in one of the programs offered are enrolled in the School of Health Related Professions for academic advisement and to complete preprofessional requirements, but must make formal application for admission to the professional component of a program and to candidacy for the degree.

Degree programs offered by the School include: the Clinical Laboratory Sciences with emphasis areas in Medical Technology and Cytotechnology, Health Services Management, Occupational Therapy, Physical Therapy, the Radiologic Sciences with emphasis areas in Radiography and Nuclear Medicine, Respiratory Therapy, and Speech Pathology/Audiology. In addition, degree programs in Dietetic Education with emphasis areas in Food Systems Management and Medical Dietetics are offered in collaboration with the College of Home Economics.

The curriculum for each program is designed to prepare the student to meet the clinical, teaching and management/administrative responsibilities of the fully qualified professional. All curricula meet the standards of the respective national accrediting agency.

## ADMISSION

Students are admitted to the School of Health Related Professions to complete general education requirements and program prerequisites prior to making application for admission to the professional component of the program of their choice and degree candidacy. The general education requirements for the Bachelor of Health Science degree are outlined below. The prerequisites for each program are listed in the description of that program.

The selection procedure and time period during which students may make application for admission to the professional portion of the program of their choice follows. It should be

understood that admission to the University and to the School of Health Related Professions as a preprofessional student does not constitute admission as a candidate for the Bachelor of Health Science degree.

## CRITERIA AND APPLICATION PROCEDURES

Applicants are considered on a competitive basis each admissions period. Selection for participation in the professional component of a program is governed by an admissions committee using established criteria and procedures. Residents of Missouri are given priority for admission. Only those applicants who qualify as Missouri residents for tuition purposes are considered for admission to the programs in Occupational Therapy and Physical Therapy. Faculty do not participate in decisions regarding the determination of residency.

Admissions criteria include completion of the general education requirements and prerequisite courses with a minimum acceptable grade point average of 2.0. Consideration for admission to Physical Therapy requires a cumulative GPA of 2.5 and, similarly, consideration for admission to Speech/Audiology requires a cumulative GPA of 2.6.

### Preprofessional Curriculum Requirements

#### Semester

#### Hours

- |   |   |
|---|---|
| 8 | <b>Courses</b><br><b>Humanities.</b> Must include at least one course from two of the following fields: art, classical studies, foreign language, humanities, literature, music theory/appreciation, philosophy, religion or theater/drama.   |
| 9 | <b>Communicative Skills.</b> Must include two courses in writing and one in oral communication. Students excused from English Composition (3) may satisfy the English requirement by completing English 60 Exposition (3) or its equivalent with a grade of C or better. One course must be taken in public speaking. |
| 9 | <b>Social Sciences.</b> Must include one course in American History or American Government; one course from either sociology, anthropology or economics; and one course in psychology.  |

3  
3  
3

#### Biological Sciences.

#### Physical Sciences.

**Mathematics.** Must be a college-level mathematics course taught by a mathematics department.

While the general education requirements outlined above are required for the Bachelor of Health Science degree regardless of emphasis, each program requires specific prerequisite courses related to that field.

In addition to the criteria stated above, students are selected on the basis of evidence of interest, knowledge of the field, letters of recommendation, and personal interviews.

Applicants for the Occupational Therapy program and the Physical Therapy program also are evaluated on extracurricular activities, work and volunteer experiences, school and college aptitude tests, pattern of academic achievement, verbal expression, and motivation demonstrated by employment and volunteer activities.

## TRANSFER STUDENTS

Students wishing to transfer to UMC from another accredited institution are subject to the academic regulations established by the faculty. Transfer of credit is described in the Academic Regulations section of this catalog.

A maximum of 64 semester hours of credit may be transferred from a community/junior college. Course work completed at an accredited four-year institution will be accepted without limitation. Students must, however, complete a minimum of the last 24 semester hours of a degree program enrolled in the School of Health Related Professions.

Work completed at a school which is not accredited (e.g., some technical schools, hospital schools, or foreign institutions) will require validation and evaluation for advanced standing.

## CREDIT BY EXAMINATION

Students may be awarded advanced standing credit on the basis of the following:

1. The Advanced Placement Program (APP) of the College Entrance Examination Board.

2. The University of Missouri-Columbia Freshman Placement Tests.

3. The College Level Examination Program (CLEP) general and subject examinations.

4. University of Missouri-Columbia departmental examinations.

Students with previous training and/or experience may be allowed to earn advanced standing credit through challenge or equivalency evaluation in certain programs.

## PROFESSIONAL OPPORTUNITIES

Professional opportunities for graduates of programs of the School of Health Related Professions are excellent. Graduates serve in all areas and levels of management, patient care and treatment in many types of health care facilities including state and federal schools and hospitals, veterans hospitals, nursing homes and other health care agencies. Graduates in some areas may go into private practice as well as into teaching and administration.

## STUDENT SERVICES

### ADVISEMENT

Advisement is considered a major responsibility of the faculty in the School of Health Related Professions, and every effort is made to give the student the best advisement possible. Each student is assigned a faculty adviser in the student's program of study.

It is helpful if the student has selected an area of interest prior to completing the first two years of college. To assist with career decision making, the School of Health Related Professions offers introductory courses and experiences aimed at providing information on various programs and career opportunities in these areas.

### STUDENT ORGANIZATIONS

School of Health Related Professions Student Council  
Alpha Eta National Honor Society in Allied Health  
Student Occupational Therapy Association  
Student Physical Therapy Association  
Student Respiratory Therapy Association  
Local Chapter of National Student Speech-Language-Hearing Association

### PLACEMENT

Because of the high demand for graduates, the School of Health Related Professions operates no formal placement office.

### INSURANCE

Liability insurance coverage is provided for students enrolled in courses of instruction at, or under, the direction of a medical facility by the University of Missouri self-insurance plan. A requirement that students provide evidence of medical insurance coverage prior to admission

to candidacy for the degree currently is being considered by the faculty of the School of Health Related Professions.

## THE BACHELOR OF HEALTH SCIENCE DEGREE

### GENERAL REQUIREMENTS

The Bachelor of Health Science degree is granted to candidates who have successfully fulfilled all prescribed requirements, including the following: (1) a minimum of 120 semester hours of credit with a cumulative GPA of at least 2.0; (2) a minimum of the last 24 semester hours of the degree program completed in residency with the School of Health Related Professions; and (3) completed all didactic and clinical requirements outlined by the program.

Fulfillment of all requirements for graduation is the responsibility of the student.

### ADMISSION AND SELECTION DATES

Freshmen and transfer students are enrolled in the School of Health Related Professions for academic advisement and to complete pre-professional course requirements prior to making application for admission to the major. Priority for admission to all programs is given to residents of Missouri. Because of the press of applicants, applications from non-residents are not considered for Occupational Therapy and Physical Therapy.

Preprofessional students are admitted to candidacy for the degree only when they have been selected to participate in the professional component of a program.

Admission and selection dates for the professional component of each program and degree candidacy are shown below.

## CLINICAL LABORATORY SCIENCES

**M722 Medical Sciences Building, (314) 882-1121**

There are two emphasis areas in the Clinical Laboratory Sciences—Medical Technology and Cytotechnology.

In addition, a special program in Histotechnology is offered to certain students who complete selected coursework outlined within the program.

### MEDICAL TECHNOLOGY

Medical technologists are highly skilled health professionals who are involved in performance and supervision of routine and specialized tests in the clinical laboratory areas of microbiology, chemistry, hematology, blood banking, immunology and urinalysis. About three-fourths of all medical technologists work in hospital laboratories. Other employers are clinics, phy-

sicians in private practice, research laboratories, teaching institutions, and biomedical reagent and equipment manufacturers.

### Prerequisite Courses

The following are UMC courses. (Students from other institutions need to be in touch with the program to select appropriate prerequisite courses to meet qualifications for admission.)  
HRP 22 Introduction to the Health Related Professions (1)  
Chemistry 11 General Chemistry (5)  
Chemistry 12 General Chemistry (5)  
Chemistry 205 Organic Chemistry (5)  
Chemistry 221 Quantitative Instrumental Analysis (4)  
Biochemistry 193 General Biochemistry (3)  
Biochemistry 195 General Biochemistry Laboratory (3)  
Pathology 200 Basic Pathology (2)  
Biological Science 205 Fundamentals of Medical and Public Health  
Microbiology (4)  
Physiology 201 Elements of Physiology (5)  
Recommended electives:  
Physics 11 Elementary College Physics (5)  
Biological Science 202 General Genetics (3)

### Professional Certification

Graduates of this program are eligible for examination and certification by the Board of Registry of the American Society of Clinical Pathologists (ASCP).

### Accreditation

The program is accredited by the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS) and the Committee on Allied Health Education and Accreditation (CAHEA) of the American Medical Association.

### CYTOTECHNOLOGY

Cytotechnologists are health professionals trained to detect cellular changes which are important in the early detection and treatment of cancer. Their main responsibility is to detect evidence of cellular disease by microscopic study of cellular samples from different body sites. The most common specimen, the pap smear, is obtained from the female genital tract. Other specimens are obtained from the respiratory tract, the gastro-intestinal tract, the urinary tract and any other body site from which cells can be obtained for examination.

The registered cytotechnologist, with a Bachelor of Health Science degree, can expect a salary similar to that of a medical technologist. Most individuals in the profession work in hospitals or private laboratories. However, there are many opportunities for well-trained cytotechnologists to pursue teaching or research activities.

### Prerequisite Courses

The following are UMC courses. (Students from other institutions need to be in touch with the program to select appropriate prerequisite courses to meet qualifications for admission.)  
HRP 22 Introduction to the Health Related Professions (1)  
Biochemistry 110 Introductory Biological Chemistry (3)  
Anatomy 202 Elementary Anatomy (5)  
Biological Science 210 Parasitology (3)  
Recommended science courses:  
Biological Science 202 General Genetics (3)  
Biological Science 205 Developmental Biology (3)  
Biological Science 222 Vertebrate Embryology (5)  
Biological Science 270 Vertebrate Physiology (5)  
Microbiology 205 Fundamentals of Medical and Public Health Microbiology (4)

### Professional Certification

Graduates of this program are eligible for examination and certification by the Board of Registry of the American Society of Clinical Pathologists (ASCP).

Program	Application Deadline	Selection	Classes Begin
Clinical Laboratory Science	Second semester sophomore year	First semester junior year	May
Dietetics Education	Feb. 8	March 15	Fall semester
Health Services Management	On-campus program April 15 External program Jan. 31	June 15 March 15	Fall semester
Occupational Therapy	June 1	Aug. 1	Summer session
Physical Therapy	Oct. 31	Dec. 31	Summer session
Radiologic Sciences			
Radiography	March 31	May 31	Fall semester
Nuclear Medicine	Feb. 28	March 31	Fall semester
Respiratory Therapy	Feb. 1	March 15	Fall semester
Speech Pathology/Audiology	Feb. 15 sophomore year	March 15	Fall semester

## Accreditation

The program is accredited by the American Society of Cytology and the Committee on Allied Health Education and Accreditation (CAHEA) of the American Medical Association.

## DIETETIC EDUCATION

### 318 Clark Hall, (314) 882-4136

The Coordinated Undergraduate Program (CUP) in Dietetic Education offers two emphasis areas: Food Systems Management and Medical Dietetics.

These programs are offered by the College of Home Economics (Department of Human Nutrition, Foods and Food Systems Management) in collaboration with the School of Health Related Professions. Students in these programs enroll in the College of Home Economics with dual enrollment in the School of Health Related Professions.

## FOOD SYSTEMS MANAGEMENT

Graduates with this emphasis function as members of the management team in hospitals, college residence halls, school food service, government or community facilities and agencies, and industrial or commercial food service facilities. The management dietitian makes critical decisions related to food procurement, production and service, personnel, facilities and financial resources.

### Prerequisite Courses

The following are UMC courses. (Students from other institutions need to be in touch with the program to select appropriate prerequisite courses to meet qualifications for admission.)

Statistics 31 Elementary Statistics (3)  
Agricultural Economics 50 Agricultural Economics (5)  
or

Economics 51 General Economics (5)

or

Economics 1 Fundamentals of Economics I (3)  
Management 202 Fundamentals of Management (3)  
Physiology 201 Elements of Physiology (5)  
Chemistry 205 Organic Chemistry (5)  
HNFFSM 121 Principles of Food Preparation (5)  
HNFFSM 234 Human Nutrition (3)  
Biological Science 105 Introductory Microbiology (3)  
Accounting 36 Accounting I (3)

### Professional Certification

A national registration examination is offered twice each year by the Council of Registration, American Dietetic Association.

### Accreditation

Accreditation of the program is granted by the American Dietetic Association.

## MEDICAL DIETETICS

Graduates with this emphasis function as clinical dietitians in hospitals, outpatient clinics and community agencies. In all of these settings, the clinical dietitian uses the basic tenets of the behavioral sciences in applying the science of nutrition to dietary care. The major roles of the clinical dietitian in any setting are nutritional assessment, counseling and education.

### Prerequisite courses

The following are UMC courses. (Students from other institutions need to be in touch with the program to select appropriate prerequisite courses to meet qualifications for admission.)

Physiology 201 Elements of Physiology (5)  
Chemistry 205 Organic Chemistry (5)  
Biological Science 105 Introductory Microbiology (3)  
HNFFSM 121 Principles of Food Preparation (5)  
HNFFSM 234 Human Nutrition I (3)

## Professional Certification

A national certification examination is offered twice each year by the Council of Registration, American Dietetic Association.

### Accreditation

Accreditation of the program is granted by the American Dietetic Association.

## HEALTH SERVICES MANAGEMENT

### 324 Clark Hall, (314) 882-6178

The baccalaureate degree program in Health Services Management is designed to prepare individuals for careers in the field of health administration. Typical organizations in which graduates of the program gain employment include hospitals, nursing homes, clinics, governmental agencies, non-profit organizations, and other health related entities. This degree also prepares individuals for further specialization at the graduate level.

Established in 1980, the program consists of a residential degree offering for full-time, on-campus students and an extended degree offering for individuals throughout the state who wish to retain their full-time position while pursuing the Bachelor of Health Science (BHS) degree on a part-time basis.

### EXTENDED DEGREE PROGRAM

The Extended Degree Program is designed to enhance managerial skills and knowledge of those individuals who currently are employed in the health care industry and are not able to take advantage of a full-time degree program. Students in this program attend class sessions at a designated learning center approximately every third Saturday of the semester. Each course meets for three- to four-hour sessions, and is conducted in seminar mode, generally involving a combination of lectures, case studies, group exercises/discussions and projects. The instructors utilized in the program are regular members of the faculty of the program in Health Services Management. Credit may be earned through a variety of means such as previous college courses, approved certificate or diploma programs, correspondence courses, challenge examinations, military credits, CLEP, or portfolio assessment.

### RESIDENTIAL DEGREE PROGRAM

The Residential Degree Program accepts students each fall semester. The curriculum focuses on a combination of health and general business administration coursework. Students may utilize professional elective coursework to develop a specific area of concentration or choose to enroll in a broad range of professional elective courses. Specific areas of concentration include Community Health, Finance/Accounting/Data Systems, Long-term Care Administration, Marketing/Public Relations, Personnel Administration, and Planning/Policy/Regulation. A three credit hour, eight-week practicum in a health care facility or agency is required for those students who have not had previous management experience in a health care institution. This practicum typically is completed during the summer between the junior and senior year although a student also may take it following the completion of didactic work.

## REQUIREMENTS

The following are UMC courses. (Students from other institutions need to be in touch with the program to select appropriate prerequisite courses to meet qualifications for admission.)

### Health Services Management Core:

HSM 210 The American Health Care System (3)  
HSM 220 Organization and Management of Health Care Institutions (3)

HSM 250 Health Planning Principles (3)

HSM 330 Risk Management System in Health Care Institutions (3)

HSM 340 Economics of Health Care (3)

HSM 289 Practicum (3)

Management 202 Fundamentals of Management (3)

Management 254 Introduction to Business Law (3)

Management 310 Personnel Management (3)

Finance 203 Corporation Finance (3)

### Quantitative Skills:

Accounting 36 Accounting I (3)

Accounting 37 Accounting II (3)

Computer Science 75 Introduction to Computer Science (3)  
or Computer Science 104 Computers and Programming I (3)

Economics 1 Fundamentals of Economics I (3) and

Economics 2 Fundamentals of Economics II (3) or

Economics 51 General Economics (5)

Statistics 60 Finite Mathematics (3)

Mathematics 61 Elements of Calculus (3)

Statistics 150 Introduction to Probability and Statistics I (3)

Statistics 250 Introduction to Probability and Statistics II (3)

## OCCUPATIONAL THERAPY

### 305 McHaney Hall, (314) 882-3988

Occupational therapists are health professionals who are concerned with alleviating physical or emotional problems, modifying functional ability, and encouraging health adaptations as illustrated by the skills of daily living, play, recreation and work. Through these activities, selected for their therapeutic value, the occupational therapist calls for a response from individuals which alters or influences their physical or emotional condition, tests and evaluates capacity for employment and broadens their independent living ability and social well-being.

### PREREQUISITE COURSES

The following are UMC courses. (Students from other institutions need to be in touch with the program to select appropriate prerequisite courses to meet qualifications for admission.)

HRP 22 Introduction to the Health Related Professions (1)

Home Economics 66 Human Development (3)

Psychology 180 Fundamentals of Abnormal Psychology (3)

Physiology 201 Elements of Physiology (5)

Mechanical and Aerospace Engineering 210 Introduction to Biomechanics (3)

Education A205 Psychology of Learning (3)

Philosophy 10 Introduction to Logic (3)

Industrial Education F101 Industrial Arts for Elementary Teachers (3)

Industrial Education F10 Fundamentals of Woodwork (3)

Biological Sciences 11 Introduction to Zoology (5)

Physiology 201 Elements of Physiology (5)

Education A240 Introduction to Educational Measurement and Evaluation (2)

Child and Family Development 264 Child Development Laboratory (5)

Mechanical and Aerospace Engineering 210 Introduction to Biomechanics (3)

## PROFESSIONAL CERTIFICATION

Upon successful completion of all coursework including the field work experience, students will be permitted to take the American Occupational Therapy Association's certification examination. The examination is given in January and June.

## ACCREDITATION

Accreditation of the program is granted by the American Occupational Therapy Association in collaboration with the American Medical Association.

## PHYSICAL THERAPY

**206 Rusk Rehabilitation Center, (314) 882-7103**

Physical therapy means the examination, treatment and instruction of people to detect, assess, prevent, correct, alleviate and limit physical disability, bodily malfunction and pain from injury, disease and any other bodily and mental condition. It includes administration, interpretation and evaluation of tests and measurements of bodily function and structure; the planning, administration, evaluation and modification of treatment and instruction, including the use of physical measures, activities and devices for preventive and therapeutic purposes; and the provision of consultative, educational and other advisory services for reducing the incidence and severity of physical disability, bodily malfunction and pain. Because of better emergency treatment, more persons now survive serious accidents and often require prolonged therapy. Improved health care also has resulted in greater numbers of aged people who must cope with chronic illnesses. The result is a continuing need for physical therapists to treat patients with conditions such as strokes, arthritis, amputations, head and spinal cord injuries, burns, and cerebral palsy.

### PREREQUISITE COURSES

The following are UMC courses. (Students from other institutions need to contact the program to select appropriate prerequisite courses to meet qualifications for admission.)

HRP 22 Introduction to the Health Related Professions (1)  
Psychology 2 General Experimental Psychology plus one additional psychology course (7-8)  
Chemistry 11 General Chemistry (5)  
Biological Science 11 Introduction to Zoology (5)  
Physics 11 Elementary College Physics (5)  
Physiology 201 Elements of Physiology (5)  
HSM 215 Principles of Health Care Management (3)  
Sociology 324 Sociological Concepts and Health (3)  
Education R370 Educational Statistics (3)  
Education H380 Kinesiology (3)  
Advanced Biological or Physical Science course (3-5)

### LICENSURE

Upon graduation, the student is eligible for testing and licensure in any state. Licensure is required before entry into professional practice.

### ACCREDITATION

Accreditation of the program is granted by the American Physical Therapy Association.

## RADIOLOGIC SCIENCES

**206 Clark Hall, (314) 882-8011**

There are two emphasis areas in the Radiologic Sciences: Radiography and Nuclear Medicine.

Students planning a major in either of these emphasis areas should correspond with a representative of the program to determine eligibility for admission.

### RADIOGRAPHY

Radiographers are health professionals who work closely with physicians specializing in the use of X-ray and radioisotopes in patient diagnosis and treatment. They are responsible for operating equipment, positioning, and taking

X-ray films of internal parts of the body. The radiographer must be capable of keeping delicate and complicated equipment in working order and must often deal with patients who are under stress. Radioactive substances involved with the use of X-ray and patient treatment are potentially dangerous, requiring specialized knowledge and expertise in the performance of professional tasks.

Students are given an opportunity, in this emphasis area, to follow an Education Track (Track I) as part of the coursework or a Management/Administrative Track (Track II). Students interested in teaching in the field of radiography would follow Education Track I. Those students wishing to pursue a management/administrative position after graduation may choose Track II. Either track is designed to enrich the education and enhance the professional marketability of the student. One track is required to complete the required semester hours of credit for graduation.

### Course Requirements

The following are UMC courses. (Students from other institutions need to be in touch with the program to select appropriate prerequisite courses to meet qualifications for admission.)  
HRP 22 Introduction to the Health Related Professions (1)  
Mathematics 9 Trigonometry (2)  
Physics 11 Elementary College Physics (5)  
Education 58 First Aid (3)  
Physiology 201 Elements of Physiology (5)  
Anatomy 202 Elementary Anatomy (5)  
HSM 215 Principles of Health Care Management (3)  
Education Track (15)  
Management/Administration Track (15)

### Professional Certification

Upon completion of the program, students are eligible to sit for the national certifying test given by the American Registry of Radiologic Technologists.

### Accreditation

Accreditation of the program is granted by the American Medical Association.

### NUCLEAR MEDICINE

Nuclear medicine technologists are health professionals concerned with the use of radioactivity for diagnostic, therapeutic, and research purposes.

The nuclear medicine technologist uses radioactive materials to perform body function studies and organ images, and analyze biological specimens. Specific responsibilities of the technologist in the daily operation of the nuclear medicine department include radiation safety, radiopharmaceutical preparation and administration, operation of radiation detection instruments, patient care and positioning during imaging procedures, conducting laboratory studies on biological specimens (e.g., radioimmunoassays and related techniques) and preparing data for the physician's interpretation.

Students are given an opportunity, in this emphasis area, to follow a mathematics-science, a business, or an education track. Each track is designed to enhance the professional marketability of the graduate.

### Course Requirements

The following are UMC Courses. (Students from other institutions need to contact the program to select appropriate prerequisite courses to meet qualifications for admission.)

HRP 22 Introduction to the Health Related Professions (1)  
Mathematics 9 Trigonometry (2)  
Physics 11 Elementary College Physics (5)  
Chemistry 12 General Chemistry (5)  
Statistics 31 Elementary Statistics (3)  
Computer Science 75 Introduction to Computer Science (3)  
Physiology 201 Elements of Physiology (5)  
Anatomy 202 Elementary Anatomy (5)  
Chemistry 205 Organic Chemistry (5)  
HSM 215 Principles of Health Care Management (3)  
Radiology 227 Radioisotopes in Medicine and Biology (4)  
Radiology 328 Introduction to Radiation Biology (3)

### Professional Certification

Upon completion of the program, students are eligible to sit for the national certifying examinations given by the American Society of Clinical Pathologists, the American Registry of Radiologic Technologists, and the Nuclear Medicine Technology Certification Board.

### Accreditation

Accreditation of the program is granted by the American Medical Association.

## RESPIRATORY THERAPY

**203 Clark Hall, (314) 882-8011**

Respiratory therapists are health professionals who specialize in diagnostic evaluation and care of patients with deficiencies and abnormalities of the cardiopulmonary system. Involved are the therapeutic use of medical gases and administration apparatus, ventilatory support, rehabilitation, assistance with cardiopulmonary resuscitation, and maintenance of natural and artificial airways. Specific testing techniques are employed in respiratory therapy to assist in diagnosis, monitoring, treatment and research. These activities include measurement of ventilatory volumes, pressures and flows, blood gas analysis and other related physiological monitoring.

The professional component of the program consists of the last two years. During this time, students are enrolled in laboratory, didactic and clinical education courses. During the supervised clinical education students will demonstrate competencies consistent with the current standards of practice for equipment and techniques associated with the profession. This includes such techniques as intubation, arterial blood gases, and other physiologic monitoring. Students also will be directly and extensively involved in the care of postsurgical patients as well as those with cardiopulmonary, neurological and other disorders.

While students are enrolled in their professional courses, they also enroll in either an education or a management track (depending upon their interest), which will give them additional skills and add a unique dimension to their professional opportunities.

### COURSE REQUIREMENTS

The following are UMC courses. (Students from other institutions need to be in touch with the program to select appropriate courses to meet qualifications for admission.)

HRP 22 Introduction to the Health Related Professions (1)  
Chemistry 1 Introductory Chemistry (5)  
Physics 3 Physical Science (5)  
Anatomy 202 Elementary Anatomy (5)  
Physiology 201 Elements of Physiology (5)  
Microbiology 205 Fundamentals of Medical and Public Health Microbiology (4)  
Biological Sciences 11 Introduction to Zoology (5)

### PROFESSIONAL CREDENTIALING

After graduation, students will be eligible to

take the Registry Examination for registration as a therapist, which is given by the National Board for Respiratory Care (NBRC).

### ACCREDITATION

Accreditation of the program is granted by the Joint Review Committee for Respiratory Therapy Education. JRCRTE is sponsored by the Committee on Allied Health Education and Accreditation (CAHEA) of the American Medical Association.

## SPEECH PATHOLOGY/ AUDIOLOGY

125 Parker Hall, (314) 882-4082

Speech-language pathologists are health professionals who specialize in human communication, its normal development and its disorders. They are trained to deal with communication disorders and are best qualified to offer assistance to persons with speech and language disorders. An audiologist is an individual qualified to provide professional assistance concerning communication problems associated with hearing impairment. An audiologist is a person with graduate professional training who specializes in prevention, identification, and assessment of hearing impairment; in habilitation and rehabilitation of persons with hearing impairment, including the dispensing and fitting of hearing aids.

Because hearing problems are often related to communication disorders, audiologists and speech-language pathologists work together to determine both the sources of a problem and a coordinated program of rehabilitation. Speech-language pathologists, and audiologists often work with other professionals in education, medicine, social work, psychology, rehabilitation, and dentistry to provide the necessary help for the person who has a communication disorder. Both provide professional services in many different types of facilities such as hospitals, rehabilitation centers, private practice, colleges and universities, public and private schools, state and federal government agencies, nursing care facilities, health departments and community clinics.

### COURSE REQUIREMENTS

The following is a representative listing of the types of UMC courses in which a student in the undergraduate component of the program will enroll. For complete course requirements, prospective students should contact the program.

- HRP 22 Introduction to the Health Related Professions (1)
- SPA 22 Introduction to Speech Pathology/Audiology (1)
- Biology Sciences 11 Introduction to Zoology (5)
- Physics 11 Elementary College Physics (5)
- Education A205 Psychology of Learning (3)
- Education G330 Parent Counseling (3)
- Education R370 Elementary Statistics (3)
- Education L339 Education of the Exceptional Child (3)
- English 319 The Structure of American English (3)
- SPA 120 Communication Disorders (3)
- SPA 202 Development of Spoken Language (3)
- SPA 210 Speech Science (3)
- SPA 320 Articulation Disorders (3)
- SPA 325 Clinical Practice (1-3)
- SPA 330 Introduction to Audiology (3)

The undergraduate program in Speech Pathology/Audiology leads to a preprofessional baccalaureate degree in Speech Pathology/Audiology, which presently fulfills the requirements for a certificate to work as a speech-language pathologist in Missouri public schools.

### PROFESSIONAL CERTIFICATION

The American Speech-Language-Hearing Association issues Certificates of Clinical Competence to individuals who have a graduate degree or the equivalent in speech-language pathology or audiology and who present satisfactory evidence of their ability to provide independent clinical service to persons who have disorders of communication (speech, language, and/or hearing). An individual who meets these requirements may be awarded the Certificate of Clinical Competence in speech-language pathology or in audiology, depending on the emphasis in academic and clinical preparation.

Upon notification by the Clinical Certification Board of approval of the academic coursework and clinical practicum requirements, the applicant will be sent registration material for the National Examinations in Speech Pathology and Audiology. Upon approval of the clinical fellowship year, achieving a passing score on the national examination, and payment of all fees and current dues, the applicant will become certified. Refer to the *Graduate Catalog* for information concerning the professional master's program in speech-language pathology and audiology.

### ACCREDITATION

The master's degree program in speech-language pathology is accredited by the Education and Training Board of the American Boards of Examiners in Speech Pathology and Audiology of the American Speech-Language-Hearing Association.

## FACULTY

### ADMINISTRATION

**Roger D. Harting**, interim director, professor, EdD, University of Missouri-Columbia

### CLINICAL LABORATORY SCIENCES

**Richard E. Oliver**, director, associate professor, PhD, University of Missouri-Columbia

**Stanley Hansen**, clinical instructor, MA, University of Missouri-Columbia

**Ellis A. Ingram**, assistant professor, MD, University of Michigan

**Claude K. Leeper**, professor, MD, Washington University

**Lois J. Long**, assistant professor, M Ed, University of Missouri-Columbia

**Martha Mitchell**, assistant professor, M Ed, University of Missouri-Columbia

**Ranadhir Mitra**, associate professor, PhD, University of Missouri-Columbia

**Wallace A. Rogers**, associate professor, MD, University of Minnesota

**Wellington B. Stewart**, professor, MD, University of Rochester

**Henry M. Taylor**, assistant professor, MD, Wayne State University

**Angela Weithman**, instructor, MA, University of Missouri-Columbia

### HEALTH SERVICES MANAGEMENT

**Gordon D. Brown**, professor, director, PhD, University of Iowa

**Keith E. Boles**, assistant professor, PhD, University of Arizona

**Kenneth D. Bopp**, lecturer, MA, Washington University (St. Louis)

**Elizabeth A. Dickhaus**, assistant professor, PhD, University of Missouri-Columbia

**John Glenn**, associate professor, PhD, University of Missouri-Columbia

**Daniel M. Harris**, assistant professor, PhD, State University of New York at Stony Brook

**Lanis L. Hicks**, assistant professor, PhD, University of Missouri-Columbia

**James A. Irvin**, associate professor, PhD, University of Missouri-Columbia

**Andrew A. Lasser**, assistant professor, Dr. PH, University of Pittsburgh

**Kenneth C. Steiner**, assistant professor, director, Continuing Education for the Health Related Professions, PhD, University of Maryland

**Vee Ann Steponovich**, instructor, MS, University of Missouri-Columbia

**Warren A. Thompson**, professor, PhD, University of Missouri-Columbia

**David A. West**, professor, PhD, University of Arkansas

### DIETETIC EDUCATION

**Aimee N. Moore**, professor director, PhD, University of Michigan

**Esther Digh**, instructor, MS, Purdue University

**Loretta W. Hoover**, associate professor, PhD, University of Missouri-Columbia

**Donna Jeffery**, assistant professor, PhD, University of California-Berkeley

**Mary Ann Klie**, instructor, MS, The Ohio State University

**Pauline M. Landhuis**, assistant professor, MS, University of California-Davis

**Mary Belle McDonald**, assistant professor, MS, University of Iowa

**Byrdine H. Tuthill**, professor, MS, University of Wisconsin

**Ellen Vollers**, instructor, MS, University of Missouri-Columbia

### OCCUPATIONAL THERAPY

**William J. Wikoff**, instructor, director, BS, University of Cincinnati

**Mary Brown**, instructor, BS, Temple University

**H. Dwyer Dundon**, associate professor, MA, University of Missouri-Columbia

**Beverly Polasik**, instructor, MA, University of Southern California

### PHYSICAL THERAPY

**Gerald W. Browning**, assistant professor, director, PhD, University of Missouri-Columbia

**James A. Martin**, instructor, M Ed, University of Missouri-Columbia

**Carole Riggan**, instructor, MS, Southern Illinois University

**Marilyn Sanford**, instructor, M Ed, University of Missouri-Columbia

**Cindy Steiner**, instructor, BS, University of Missouri-Columbia

**Deborah Whitley**, instructor, MS, Medical College of Virginia

### RADIOLOGIC SCIENCES

**Mary Sebacher**, assistant professor, director, M Ed, University of Missouri-Columbia

**Rushdy Abadir**, professor, MD, Cairo University

**Aona J. DeClue**, instructor, BS, University of Missouri-Columbia

**F. Mark Edwards**, assistant professor, PhD, University of Colorado

**Philip K. Lee**, assistant professor, PhD, Purdue University

**Gwilym S. Lodwick**, professor, MD, University of Iowa

**Kenneth W. Logan**, associate professor, PhD, University of Missouri-Columbia

**Henry McQuade**, professor, PhD, Washington University (St. Louis)

**Debra Marcy**, instructor, BHS, University of Missouri-Columbia

**Wynn A. Volkert**, associate professor, PhD, University of Missouri-Columbia

### RESPIRATORY THERAPY

**Michael W. Prewitt**, assistant professor, director, PhD, University of Missouri-Columbia

**Timothy H. Hogan**, instructor, M Ed, University of Missouri-Columbia

**James F. Whitacre**, instructor, MS, University of Rochester

**Thomas A. Wicks**, clinical instructor, M Ed, University of Missouri-Columbia

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# COLLEGE OF HOME ECONOMICS

The College of Home Economics was established at UMC in 1900 as the Department of Household Economics. In 1906, the department was renamed Home Economics. The aim at this time was to correlate work in art and physical, and biological and social sciences with studies in home economics. In 1981, the College was among the largest home economics units in the nation.

Today's concerns confronted by home economics graduates can be read in the daily newspapers and heard on every newscast. Consumer issues, nutrition, family finances, housing, ecology, education, marriage stability, child development and aesthetics all relate back to the home. A major in one of the many diverse fields of home economics provides a professional education within the framework of the liberal arts and sciences.

The purpose of home economics is to improve the quality of life for individuals and families. Men and women in the College of Home Economics receive a liberal education and work toward a professional goal in an area of special interest to them.

Cooperative programs with other schools and colleges on the campus provide opportunities for students to develop programs which are the basis for professional service in a variety of ways. Such programs are found in cooperation with the Colleges of Education, School of Journalism, Schools of Medicine, College of Agriculture, College of Arts and Science, College of Business and Public Administration, College of Engineering, and with individuals and departments within those units.

More than 900 undergraduates in the College are preparing themselves for diverse careers, all of which focus on the individual and the family, and the problems they face in today's complex society.

The College of Home Economics was one of the first in the nation to be accredited for undergraduate professional programs by the American Home Economics Association. In addition, the teacher education programs have been accredited by their respective agencies. The American Dietetics Association has certified the dietetics program, and the Department of Housing and Interior Design's program is accredited by the Foundation for Interior Design Education and Research.

Review teams involved in these and other program appraisals have commended the faculty for their academic qualifications, professional competencies and national visibility in professional organizations. The faculty's dedication to maintaining excellent programs and to developing potential of both undergraduate and graduate students also has been cited.

The College is organized into the departments of Child and Family Development; Clothing and Textiles; Family Economics and Management; Housing and Interior Design;

and Human Nutrition, Foods and Food Systems Management.

## ADMISSION

Undergraduate students may enter the College of Home Economics as freshmen. For information on admissions procedures, see Admission in the General Information section of this catalog.

## TRANSFER STUDENTS

For specific information on transfer policies, see transfer of credit in the Academic Regulations section of this catalog.

**Transfer From Other Accredited Schools and Colleges.** It is advisable to receive prior approval from the College of Home Economics for taking courses in the major area before entering UMC. This helps minimize the number of additional courses that may be necessary.

Up to 64 hours may be transferred from junior colleges. Up to 75 hours may be transferred from four-year colleges or from a combination of junior and four-year colleges.

Courses taken on a pass/fail basis are accepted only if comparable to the UMC grading system. A course carrying a transfer grade of D may be used to meet a requirement only if a grade above D is earned in a more advanced course in the same sequence.

**From University of Missouri schools and colleges.** Students in another UMC school or college or from other University of Missouri campuses, must have a cumulative and semester average of 2.0 or better to be eligible for admission to the College of Home Economics.

A student with a cumulative average below 2.0 may be admitted on probation only on approval of both the assistant dean and the Committee on Academic Status of the College of Home Economics.

Credit for D grades earned by a student transferring from another UMC school or college is accepted by the College of Home Economics.

A student who transfers to the University system from another institution and then applies for transfer into the College will have the transcript re-evaluated by the College. Questions regarding transfer credit should be addressed to the assistant dean of home economics, 117 Gwynn Hall.

## STUDENT SERVICES

### ADVISEMENT

One of the outstanding features of the College of Home Economics is its advisement program. It is designed to assist the student in planning a college program, with each student assigned a faculty adviser during the first registration period. In addition, the assistant dean's office provides consultation on student problems.

The student need not select a major until after exploring the various career possibilities. An entering freshman has the first year to explore the areas in home economics and combinations of subject matter areas for positions in such fields as education, health and welfare, business, extension, journalism, rehabilitation and government.

All freshmen entering the College of Home Economics enroll in 10 Introduction to Home Economics. This course emphasizes career decision making, provides an orientation to the campus and the College, and brings into focus the role of home economics in the improvement of the quality of life in the near environment.

### PLACEMENT

The Career Planning and Placement Center, 110 Noyes Hall, serves home economics students. Students also have the advantage of placement services which cover a wide spectrum of career options. These include business, education, journalism and agriculture placement offices located on the campus. The assistant dean's office and individual advisers provide information regarding procedures and contacts.

### STUDENT ORGANIZATIONS

Students desiring more information on the following student organizations should contact the assistant dean of home economics, 117 Gwynn Hall.

Association of Clothing and Textiles  
American Society of Interior Designers  
Campbell-Harrison Cooperative House  
Child and Family Development Club  
Family Economics and Management Student Association  
Food and Nutrition Organization  
Home Economics Graduate Student Association  
Home Economics Journalism Club  
Home Economics Rehabilitation Student Association  
National Association of Home Builders  
Omicron Nu  
Phi Upsilon Omicron  
Student Council  
Student Dietetic Association  
Teachers of Home Economics  
University of Missouri Home Economics Association

### SCHOLARSHIPS

Application and inquiries should be made to the assistant dean's office, 117 Gwynn Hall.

**Veta Bird Adams Annual Award:** The College of Home Economics established an endowment in honor of Veta Adams, a member of the faculty for 20 years. The income will provide scholarships to students who show professional potential and who earn a part of their college expenses. The award is intended for the special deserving student who may not meet guidelines for other awards.

**Henry and Mary Cornelia Crumbaugh Medal:** Awarded for scholastic excellence in chemistry. Established in the will of Mrs. Robert Lee C. Herne in memory of her parents.

**Isabelle Delaney Memorial Fund:** Fund income provides a scholarship for a junior or senior majoring in dietetics. Selection is based on financial need and above-average scholarship.

**Ernest L. Garner Memorial Scholarship Fund:** Awarded annually to Missouri residents from Carl Junction, Mo. and enrolled in first, agriculture; secondly, veterinary medicine; or thirdly, home economics. If there is no suitable applicant from Carl Junction, the scholarship is available to

any student from Jasper County. Preference is given to a veteran or a student from a large family.

**Pauline Gillette Garrett Award:** Upon Dr. Garrett's retirement from the home economics education faculty, professional colleagues and friends established a scholarship fund in her name. The scholarship is awarded with preference given to those preparing to teach home economics.

**Greater Kansas City Home Economics Association Scholarships:** Awarded to a junior or senior majoring in home economics at a Kansas or Missouri college or university.

**Gregory Scholarship Fund:** Scholarships to students who most exemplify the professional characteristics of Cecil L. Gregory or Orrine Z. Gregory. Recipients include students in rural sociology, home economics, communication, extension or any combination of these areas. Preference given to graduate students; priority given to those demonstrating professional potential. Financial need considered, but not a determining factor. Awarded to recipients in home economics in succeeding years.

**Walter E. Haas Memorial Scholarship:** Established through a gift from Mary Haas in her husband's memory. For a sophomore in the College of Home Economics who has a high cumulative grade point average and is enrolled full time. The scholarship may be maintained a second or third year while an undergraduate. Also, a loan for a full-time student.

**Florence Harrison Scholarship:** For students majoring in home economics areas who are in need of financial assistance and show professional promise. Funds provided by donations in memory of Florence Harrison.

**Hechler Memorial Scholarships:** Awarded to outstanding seniors who are residents of Chariton County, Mo., and enrolled in agriculture, engineering or home economics on the Columbia campus. Applicants must be in the upper one-half of the graduating class, have high potential leadership qualifications and be of good, moral character. Financial need is not considered in determining eligibility.

**Adeline Hoffman Award:** Awarded to one student from each department in home economics. Given to stimulate and reward performance demonstrating excellence in aesthetics, as judged by criteria determined by individual departments.

**Home Economics Alumni Scholarships:** Scholarships of \$100 are awarded annually by the Home Economics Alumni Organization to freshmen, sophomores and juniors on the basis of scholarship and need.

**Howell County Extension Homemakers Council Scholarship:** Awarded to a junior or senior majoring in home economics, extension or home economics education who is a resident of Howell County, Mo. Must have a grade point average acceptable to the College and have financial need.

**Jefferson City Production Credit Association Scholarships:** See the scholarship list for the College of Agriculture in this catalog.

**Mary L. Johnson Scholarship:** Awarded on the basis of professional potential to a student in social science, extension service, home economics, communication or a combination with another area. Consideration shall be given to financial need. Preference is given to graduate students. Applications should be made to the director of graduate studies, 114 Gwynn Hall.

**Amy Kelly Scholarships:** Awarded to worthy junior or senior students in the College of Home Economics with preference to applicants considering home economics extension as a vocation. Established by the Missouri Association of Extension Home Economics in recognition of Miss Kelly's years of dedicated leadership in University extension work.

**Grace Klenn Scholarship:** Awarded to a home economics student who resides in Campbell-Harrison House. Must reside at Campbell-Harrison during the semester preceding application and the semester when the award is granted. For sophomores or above.

**Mr. and Mrs. Rudolph Kruse Sr.—Carroll County Scholarship:** Awarded annually to a student enrolled in the College of Agriculture or the College of Home Economics. Recipient must be a Carroll County, Mo., high school graduate. Selection is made on the basis of scholastic excellence, high moral character, financial need and a sincere interest in the field of agriculture.

**Marita Monroe Award:** Given to a worthy student in foods and nutrition. The scholarship was established by the Altrusa Club of Columbia.

**Missouri Home Economics Association Scholarships:** Awarded to two second semester juniors majoring in home economics by the Missouri Home Economics Association. Selected from applicants in four-year colleges throughout the state.

**Phi Upsilon Omicron Mature Student Scholarship:** Awarded to a recipient who is at least 30 years old and who has completed 60 credit hours. Selection is made by the Phi

Upsilon Omicron Alumni Committee.

**Production Credit Association of Missouri Scholarships:** Stipend available to a rural student graduating from an accredited Missouri high school. Award is based on need, high school scholastic and community activities, and sincere interest in home economics. Established by the Production Credit Association of Missouri.

**Ream-McClure Freshman Scholarship:** Scholarship for a beginning freshman, based on scholarship, leadership, character and need.

**Charles Louis and Thelma Ferrell Van Buren Scholarship Fund:** For students majoring in agriculture and home economics who are in need of financial assistance. Selection is made on the basis of academic performance, good character and financial need.

## SPECIAL SERVICES

A child development laboratory provides preschool and day-care experiences for children, and professional training for students interested in early childhood education.

The Council on Consumer Interests, a national organization, is housed in the family economics and management department. The executive director is a faculty member of the College. Other faculty members also have served as officers.

## PROFESSIONAL OPPORTUNITIES

Nationally, home economics continues to have good positions available to graduates. Estimates indicate that during the 1980s, there will be two jobs for each graduate in the country. Graduates with advanced degrees are particularly in demand for college and university teaching positions.

The U.S. Department of Agriculture reports that jobs for home economists are expected to outnumber graduates throughout the 1980s with an annual shortage of about 7,000 people with home economics or related degrees.

One of the largest growth areas will be in dietetics where the number of jobs will increase an estimated 43 percent by 1990, according to a study from the Bureau of Labor Statistics.

## REQUIREMENTS FOR THE BS DEGREE

The completion of all requirements for graduation is the responsibility of the student.

To receive the degree of bachelor of science in home economics a student must have:

1. Satisfactorily completed a minimum of 120 semester hours, including the required general education and home economics foundations courses.
2. Completed requirements for a professional area of competence in one of the departments.
3. Completed a minimum of 45 hours in residence.
4. Acquired a minimum cumulative grade point average of 2.0.

### DEGREE PROGRAM

In consultation with the adviser, a degree program is prepared to meet the student's professional objectives. This program must be on file not later than the first half of the fifth semester. It is the responsibility of the student to initiate the planning during the sophomore year.

After approval, the program becomes the student's official curriculum and copies are furnished to the student, the adviser and the

assistant dean's office. Changes may be made in a student's curriculum upon recommendation of the adviser and approval of the assistant dean.

Courses taken off-campus in either the area of competence or general education requirements, must have prior approval of the adviser and assistant dean. In the area of competence, 15 hours may be taken at another school, provided permission is granted by the adviser and the work is completed at an approved school or college.

Prior to the beginning of the last term, the student must check graduation requirements in the assistant dean's office.

**Second BS Degree.** A student may be granted two baccalaureate degrees if all requirements for both degrees have been met and the student has completed at least 12 semester hours of course work beyond that required for the first degree.

## GENERAL EDUCATION REQUIREMENTS

A minimum of 42 hours is necessary to meet the general education requirements. Courses should be taken in the classifications shown. Courses of similar content transferred from accredited schools may be substituted for courses listed. If there is a question about a course, write the assistant dean, 117 Gwynn Hall. CLEP or other advanced credit is accepted where applicable.

**Biological and Physical Sciences: 8 hours** All 8 hours may be selected from one department or may be selected from different departments; one course must include a laboratory. Courses may be selected from the following: General Biology 1 (5) or 7 (3), Introductory Zoology 11 (5), General Botany 12 (5), Introductory Chemistry 1 (5), Preparation for General Chemistry 10 (2), General Chemistry 11 (5), Principles of Geology 1 (5) or Physical Geology 2 (3), Physical Science 3 (5), Elementary College Physics 11 (5), Introduction to Astronomy 1 (4).

**Humanistic Studies and Fine Arts: 8 hours** Appreciation or history of art, music, theater and broadcasting such as Art 3; Music 1, 21, 30; Speech 3 and 6.

Foreign civilization courses, classical archaeology and mythology, civilization courses taught in foreign language departments or in area studies programs.

Literature courses in the Department of English and literature courses numbered above 103 in foreign language department.

Philosophy and logic

Humanities 101, 102, 103, 104

Religion (except language)

**Social and Behavioral Science: 9 hours** Required: sociology, three hours; psychology, three hours; principles of economics, three or five hours (Clothing and textiles, family economics & management, housing design, design management and merchandising each require five hours of economics). Courses may be selected from General Psychology (3) or General Experimental Psychology (5); Introduction to Sociology 1 (3) or Rural Sociology 1 (3); Fundamentals of Economics 1 (3) and/or II (3), General Economics 51 (5), or Agricultural Economics 50 (5). (Social Psychology may be used for either the sociology or psychology requirement.)

**English: 6 hours (3 hours if student passes freshman placement test in English)** Must include two courses in English composition, unless English 1 is waived through placement tests or English 65 GH is completed.

**American History or Political Science: 3-5 hours** Select from the following: 3 Survey of American History to 1865 (3), 4 Survey of American History from 1865 (3), Themes in American History 11 (3), American History 20 (5), American Government 1 (5), and Introduction to Political Science 11 (3).

**Mathematics: 3 hours** Mathematics 9, 10, or 12; Mathematics 7 & 8 is required for any Child and Family Development elementary certification; Math 10 is required for dietetics majors.

**Communication Skills: 3 hours** Select from the following: Introduction to Speech Communication 75 (3), Group

Communication 171 (3), Business and Professional Speech Communication 275 (3), Fundamentals of Communication 210 (3), Media Techniques 115 (3), or Demonstration Techniques 110 (2).

**Home Economics Foundation Courses: 5-6 hours** The 5-6 hours must be selected from the approved list below and must include a course from each of two departments other than the student's major department.

#### CHILD AND FAMILY DEVELOPMENT

66 Principles of Human Development (3)

163 Interpersonal Relationships, Marriage and the Beginning Family (3)

225 Intro to Family Studies (3)

#### CLOTHING AND TEXTILES

83 Contemporary Fashion Fundamentals

182 Textiles (3)

#### FAMILY ECONOMICS AND MANAGEMENT

72 Management in Family Living (2)

173 Personal and Family Finance (3)

175 The Consumer in our Society (3)

370 Housing the Family (3)

372 Family Values and Resource Management (3)

#### HOUSING AND INTERIOR DESIGN

40 Principles of Environmental Design (3)

343 Contemporary Designers (3)

349 Housing Fundamentals (3)

#### HUMAN NUTRITION, FOODS AND FOOD SYSTEMS MANAGEMENT

34 Nutrition—Current Concepts and Controversies (3)

131 Basic Concepts of World Nutrition (3)

Total: 42-48 hours

#### ELECTIVES

Electives vary with the student's professional objectives and are chosen by the student in consultation with the adviser; 1-4 hours of physical education may be taken for elective credit.

## CHILD AND FAMILY DEVELOPMENT

### 31 Stanley Hall, (314) 882-4035

The Department of Child and Family Development combines basic understanding of human development with preparation for professional service to individuals and families. Career opportunities for child and family development specialists are found in community, government and extension services; elementary and secondary education; business; and journalism. The child and family development major also prepares the student for graduate study in this and related fields. The program is individually planned to fit the interest and career objectives of the student.

#### AREAS OF EMPHASIS

The student's program is developed from a base of human and family development courses. It is essential for the student working with children to understand and be able to maximize the resources offered by the family. It is equally important for the student concerned with the quality of family life to recognize the intricate spiral of changing needs in the growing individual. The child and family development area focuses on this synthesis and allows for further specialization, if desired, with emphasis in either human or family development.

Professional competence in either the human or family development emphasis is gained by course work and through experiences that develop skills in interpersonal relationships, problem solving and analysis, leadership, program organization, resource management, and communication with varied clientele.

In addition to required CFD courses, the program is completed with courses selected from child and family development, other areas of home economics, the social sciences, and allied professional fields, such as education, community development, recreation, social

work, business, and health. For some students, courses in the arts, humanities, or biological sciences may be appropriate.

#### CHILDREN IN GROUP SETTINGS

This major is designed to prepare graduates for positions of responsibility and leadership in public and private nursery schools, day-care centers, infant-care programs, after-school programs, and other educational and welfare facilities for children. Additional job opportunities include group homes, adolescent drop-in centers, hospital play groups, and YMCA/YWCA.

The general goal of the option is to provide instruction and experience to help students gain competence in understanding, guiding, and teaching children. Emphasis is on understanding human development, with primary focus on child development, behavior and learning; family planning and evaluation in addition to working relationships with children, parents, professional colleagues and community workers.

#### A. Preprofessional Requirements (General Education)

Speech 75 Introduction to Speech Communication (3) or Speech 171 Group Communication (3)

HNFFSM 34—Nutrition—Current Concepts & Controversies (3)

FEM 72 Management in Family Living (2) or FEM 173 Personal and Family Finance (3) or FEM 175 The Consumer in Our Society (3)

#### B. Requirements in Child and Family Development (32 hours minimum)

CFD 66 Principles of Human Development (3)

CFD 160 Early and Middle Childhood (3) or 260 Adolescence and Adulthood (3) or 367 Aging and the Near Environment (3)

CFD 163 Interpersonal Relationships, Marriage and the Beginning Family (3)

CFD 225 Introduction to Family Studies (3)

CFD 264 Child Development Laboratory (5)

CFD 341 Multi-Cultural Study of Children and Families (3)

CFD 358 Administration of Programs for Children and Families (3)

CFD 361 Working With Parents (3)

CFD 364 Advanced Child Development Lab (6) and/or CFD 390 Field Training (cr. arr.)

#### C. Supporting Coursework from Child and Family Development

(B, C, D, & E must total at least 60 hours in CFD and related areas)

#### D. Requirements in Related Areas

Educ T305 Early Childhood Curriculum and Methods (3)

Educ T306 Diagnosis and Intervention in Early Childhood (3)

Educ G395 Introduction to Helping Professions (3) or SW 101 Topics in Social Work

#### E. Supporting Coursework from Related Areas

(B, C, D, & E must total at least 60 hours from CFD and related areas)

#### EARLY CHILDHOOD CERTIFICATION

##### A. Preprofessional (General Education)

Political Science 1 or 11

History 3, 4, 5, or 11

Math 7 and 8

HNFFSM 34

Speech 75, or Speech 171

Family Economics & Management 72, 173, or 175

##### B. Child and Family Development (30 hours minimum)

CFD 66 Principles of Human Development (3)

CFD 160 Early and Middle Childhood (3)

CFD 163 Interpersonal Relationships, Marriage, and the Beginning Family (3)

CFD 225 Introduction to Family Studies (3)

CFD 264 Child and Development Laboratory (5)

CFD 361 Working with Parents (3)

Select courses to total 30 hours in CFD

##### C. Support Courses and Electives

Educ H326 Motor Development in Early Childhood (3)

Educ L339 Education of Exceptional Children (3)

Educ T161 Aiding: Kindergarten (2) (Preferred) or Educ T162 Aiding: Primary Grades (Grades 1-3) (2)

Educ T209 Literature in the Elementary School (3)

Educ T221 Science in the Elementary School (2)

Educ T230 Art Activities in the Elementary School (2)

Educ T256 Elementary School Music (2)

Educ T267 Teaching Mathematics in the Elementary School (3)

Educ T303 Emergent Language in Early Childhood (3)

Educ T305 Early Childhood Curriculum and Methods (3)

Educ T306 Strategies of Diagnosis and Intervention in Early Childhood

Educ T311 Teaching the Language Arts in the Elementary School (2)

Educ T315 Teaching of Reading (3)

Educ T317 Diagnostic and Corrective Reading in the Classroom (3)

Educ T319 Practical Experiences in Reading (2)

Educ T350 Social Studies in the Elementary School (3)

Educ T371 Production of Instructional Media Materials (3)

#### D. Student Teaching Block

Educ B350, B352, or B353 Foundations (3)

Educ C241 School Organization & Admin. for Elementary Teachers (2)

Educ T299 Student Teaching (8)

#### HUMAN AND COMMUNITY SERVICES

The goal of this option is to provide instruction and experiences which will help students develop competence in understanding, guiding and working with people. Emphasis is placed on understanding of human and family development, administrative aspects of community programs, communication skills, and program development and evaluation.

Careers include family and childrens' services, youth organizations, churches, court and justice systems and mental health centers.

\*This program leads to dual degrees: A Bachelor of Social Work degree through the School of Social Work and the Bachelor of Science degree through the Department of Child and Family Development, College of Home Economics.

**A. Preprofessional (General Education)** Completion of these courses fulfills the general education requirements of both the College of Home Economics and the School of Social Work.

Biology 1 (5)

Geo. 1 or 2; Chem. 1 or 2; Physics 11; Astronomy 1; Botany 12; Zoology 11 (3-5)

Anthropology 1, 150, 152, or 154 (3)

English 1 (unless exempt) (3)

Philosophy 1, 5, 10, 50, 110, 120, 125, 130, 204, 205, 310, 311, 322, or 323 (3)

Economics 1, 2, 50 or 51 (3-5)

Sociology 1 (3)

Psychology 1 (3)

History 3, 4, 11, 20 (3)

Pol. Sci. 1 or 11 (3-5)

Math 10 or 12 (3)

Speech 75 or 171 (3)

Statistics 31, Ed. Res. R370, Soc. 375, or S.W. 319 (3)

Sociology 127, 337, 369, or CFD 351 (3)

Soc/Psych 260 (3)

FEM 72, 173, 175, or 372 (2-3)

HNFFSM 34 (3)

Humanities and Fine Arts (2-3)

Any course from the following:

Religion (except language)

Classical Studies

Romance Language (Lit. courses numbered 103 & above)

Art History and Archeology

Germanic and Slavic Studies (Lit. courses numbered 103 & above)

Art 3

Music 21, 30, 31, 121, 122

English 2, 3, 4, 5, 6, 90, 102, 103, 135, 175, 177, 179

#### B. Child and Family Development Requirements

CFD 66 Principles of Human Development (3)

CFD 160 Early and Middle Childhood (3)

CFD 163 Interpersonal Relationships, Marriage and the Beginning Family (3)

CFD 225 Introduction to the Study of Families (3)

CFD 260 Adolescence and Adulthood (3)

CFD 264 Child Development Laboratory (5)

CFD 367 Aging and the Near Environment (3)

CFD 341 Multi-Cultural Study of Children and Families (3)

CFD 356 Child and Family Advocacy (3)

Choose two from the following three:

CFD 363 Family Development (3)

CFD 352 Violence in the Family (3)



- CFD 368 Family Interaction (3)  
**C. Social Work Requirements**  
 SW 125 Social Welfare and Social Work (3)  
 SW 303 Social Justice and Social Policy (3)  
 SW 304 Introduction to Community and Organizational Processes (3)  
 SW 306 Introduction to Social Work Practice (3)  
 SW 312 Research Methods for Social Work (3)  
 SW 320 Social Psychological Perspectives in Human Development for Social Work (3)  
 SW 321 Social Deviance (3)  
 SW 330 Interaction Skills Workshop (3)  
 SW 361 Strategies of Direct Practice (3)  
 SW 390 Interventive Processes I (6)  
 SW 301 Senior Professional Seminar (3)

**D. General Electives**

0-4 hours as required to complete the dual degree program minimum of 132 hours.

**FAMILY STUDIES**

The option is designed to acquaint the student with the concepts and principles basic to the development of a broad understanding of families—and how such families function in an ever-changing environment. Families are studied in relation to their immediate (household) and near (neighborhood-society) environments. The family studies program emphasizes a normative family life as opposed to a clinical perspective.

**A. Preprofessional (General Education)**

- HNFFSM 34 (Nutrition Concept) (3)  
 FEM 72 (2), 173 (3), or 175 (3) Choose one

**B. Family Core required for both Option 1 (Family Studies) and Option 2 (Extension in Family Studies)**

- CFD 66 Principles of Human Development (3)  
 CFD 163 Interpersonal Relationships, Marriage and the Beginning Family (3)  
 CFD 225 Introduction to Family Studies (3)  
 CFD 264 Child Development Laboratory (5)  
 CFD 351 The Black Family: Past, Present & Future (3)  
 CFD 352 Violence in the Family (3)  
 CFD 363 Family Development (3)  
 CFD 368 Family Interaction (3)  
 Choose one of the following three:  
 CFD 160 Early and Middle Childhood (3)  
 CFD 260 Adolescence and Adulthood (3)  
 CFD 367 Aging and the Near Environment (3)  
 Choose one of the following two:  
 Psy 120 Human Sexuality (3)  
 Educ H361 Education in Human Sexuality (3)  
 Psy 280 Theories of Personality (3)

**Option 1—Family Studies requirements:**

- CFD 361 Working with Parents (3)  
 Psy 180 Abnormal Psychology (3)  
 Psy/Soc 260 Social Psychology (3)  
 Soc 40 Crisis in American Society (3) or Soc 185 Contemporary Social Problems (3)

An additional 21 hours selected from courses which support professional interest (i.e. gerontology, youth, community development, research methods, statistics, small group process/dynamics, adult learning).

**Option 2—Extension Option in Family Studies requirements:**

- CFD 300 Problems (Summary Seminar) (3)  
 CFD 390 Field Training (6)  
 RCA 190, 192, 193, 194, or 300 level (6)  
 Soc 201 Organization and Leadership (3)  
 Undergraduate Extension Education course, or F 376, or readings (3)

Choice of one of the following areas:

- Youth/adolescent emphasis: 12-18 hours related to youth/adolescence selected in cooperation with the advisor.
- Extension option with general home economics emphasis: at least 18 hours made up of two courses from each of four other departments in the College of Home Economics. Additional unrestricted electives as needed to complete 120 credit hours required.

**PROFESSIONAL OBJECTIVES**

Courses and experiences planned for these emphases can vary, depending upon the professional objectives and career plans of the student.

Community, Extension or Government. Courses and experiences may be planned to

prepare students for positions with community or government agencies, extension programs, international services such as Peace Corps or Vista, and businesses producing services and products for parents and/or children.

Teaching. To teach young children in a primary or elementary setting the student should complete CFD human development and professional competency requirements and additional early childhood certification requirements for Missouri and/or other states.

To teach child and/or family development in secondary school (specialized teaching certificate), the student should complete the following: general education requirements for both home economics and education, CFD and home economics subject area requirements, required professional education courses, and appropriate electives. (See Home Economics Education.)

Journalism. A student preparing for a career combining journalism with child and family development must complete 30 hours of journalism courses in addition to 30 hours in child and family development requirements. (See Home Economics Journalism.)

Graduate Study. A student planning to continue study at the graduate level should investigate entrance requirements for child and family development or other programs. These may involve undergraduate orientation to research (including statistics) and to specific matter or professional courses.

**CAREER OPPORTUNITIES IN CHILD AND FAMILY DEVELOPMENT**

Parent coordinator in a school or Head Start program.

Teacher or director in a nursery, Head Start, or day care program.

Elementary school teacher where emphasis is given to child development and family life.

High school teacher in child and family development.

Youth program director.

Extension specialist in child and family development.

Professional worker in child guidance and family life clinics.

Consultant to businesses offering child care services or producing or selling products for children.

Staff worker in federal, state, or community programs serving children and families.

Human development specialist in programs for the elderly.

Staff worker in child abuse, rape crisis, or battered women programs.

Case worker in foster care, adoption, day care licensing, protective services and juvenile court.

Director of youth programs such as 4-H, YMCA/YWCA.

Educational director of church and religious organizations.

Case worker for mental health centers.

**CLOTHING AND TEXTILES**

137 Stanley Hall, (314) 882-7317

In clothing and textiles, a student may emphasize one of the following areas: fashion merchandising, clothing and design, or tex-

tiles. Other specialized programs are available for the student who wishes to prepare for a professional career in teaching, business, journalism, or community, extension or government services. Students in the clothing and textiles program are required to achieve a grade of C or better in all clothing and textiles courses.

**AREA OF COMPETENCE**

The following courses are required (21 hours):

- Contemporary Fashion Fundamentals 83 (3)
- Introduction to the Fashion Industry 86 (3)
- Textiles 182 (3)
- History of Dress and Fashion 187 (3)
- Apparel Production Processes 282 (3)
- Clothing and Textiles 384 (3)
- Clothing Behavior and Society 388 (3)

**AREA OF EMPHASIS**

**Fashion Merchandising**

The following courses are required (18 hours overall):

- 9 credit hours required:
- Fashion Retailing 186 (3)
- Applied Textiles 286 (3)
- C&T 386 (new course) (3)
- Select 9 hours:
- Clothing Construction 81 (3)
- Pre-Internship Seminar 1xx (1)
- Fashion Illustration 183 (2)
- Fashion and Costume Design 281 (3)
- Apparel Production Components 283 (3)
- The Clothing/Textiles Consumer 285 (2)
- Recent Trends 355 (1-4)
- Costume History 381 (3)
- Field Training 390 (1-6)
- Supporting areas courses—21 hours
- Principles of Marketing 204 (3)
- Accounting 36 (3)
- Select 15 hours from business related areas in consultation with adviser.

**Clothing and Design**

The following courses are required (22-23 hours):

- Clothing Construction 81 (3) and/or Apparel Production Components 283 (2)
- Fashion Illustration 183 (2)
- Fashion and Costume Design 281 (3)
- Costume History 381 (3)
- Applied Costume Design 382 (3)
- Flat Pattern Design 387 (3)
- Select 6 hours:
- Preinternship Seminar 1xx (1)
- Fashion Retailing 186 (3)
- The Clothing/Textiles Consumer 285 (2)
- Applied Textiles 286 (3)
- Recent Trends 355 (1-4)
- Tailoring 380 (3)
- Advanced Fashion Illustration 383 (3)
- C&T 386 (new course) (3)
- Internship 390 (3-6)
- Choose A or B

**A. Commercial Apparel Design Option—18 credit hours**

- Select 6 hours of marketing courses
- Select 6 hours studio art courses
- Select 6 hours art history (fulfills requirement for humanities also)

**B. Theater/Costume Design Option—18 credit hours**

- Sp Dra 20 Principles of Technical Theater Production (2)
- Sp Dra 251 Beginning Theatrical Costume Design (3)
- Sp Dra 253 Design Techniques (2)
- Sp Dra 352 Scenic Design (3)
- Sp Dra 353 Advanced Theatrical Costume Design (3)
- Select 5 hours of art history including Art His 10

**Textiles**

The following courses are required:

- 350 Readings (cr.arr.)
- 355 Recent Trends (in Textile Technology) (1-2)
- 385 Textile Fibers (3)
- 480 Textile Fabrics (3)
- Ag. Econ. 225 Statistical Analysis (3)
- Art 140 Beginning Fibers (3)
- Chem. 11 General Chemistry
- Chem. 12 General Chemistry
- English 161 Technical Writing (3)

Select either Chemistry 205 Organic Chemistry (5) or Chemistry 210 Organic Chemistry (3) and Chemistry 211 Organic Chemistry Laboratory (2)  
 Select 6 hours in marketing including Marketing 204 Principles of Marketing (3)  
 Select either Physics 80 University Physics I (3) or 11 Elementary College Physics (5)  
 Select 3 additional hours from advertising, anthropology, art, art history & archaeology, management, marketing, psychology, rural sociology, sociology or statistics. All prerequisites should be included in the program.

## PROFESSIONAL OBJECTIVES

**Business.** A student completing the requirements in fashion merchandising, clothing and design, or textiles is prepared for a great variety of opportunities in retailing, marketing and manufacturing.

**Journalism.** The student preparing for a career in clothing and textiles journalism must complete 30 hours in clothing and textiles (21 hours in area of competence and 9 hours in an area of emphasis), and at least 30 hours in journalism (see Home Economics Journalism).

**Teaching.** To teach clothing and textiles in secondary schools, a student develops a program through consultation with advisers in both clothing and textiles and home economics education. (See Home Economics Education.) The program must include the following: general education courses to meet requirements of both the College of Education and the College of Home Economics, required secondary professional education courses, and selected courses in clothing and textiles to fulfill specialized subject area requirements.

**Community, Extension or Government Service.** In addition to the requirements for all majors in clothing and textiles, the student must choose supportive courses from the following for a minimum of 15 credit hours.

FEM 173 Personal & Family Finance (3)  
 FEM 175 The Consumer in Our Society (3)  
 C&T 380 Tailoring (3) or C&T 387 Flat Pattern Design (3)  
 Ed. Psych. A102 Educational Psychology (2)  
 Ext. Education 210 Fundamentals of Communications (3)  
 PAVTE F376 Homemaking Education for Adults (2-3)  
 Rural Soc. 201 Org. & Leadership in Modern Society (3)  
 Rural Soc. 255 Youth in Today's World (3)  
 Rural Soc. 335 Social Change & Trends (3)  
 Rural Soc. 340 Community Social Structure (3)  
 Soc. 214 The Family (3)  
 Soc. 216 Urban Sociology (3)  
 Soc. 225 Social Processes of Communication & Diffusion (3)  
 Spch. 105 Prin. of Radio & Television (2)  
 Spch. 171 Group Communication (3)

**Graduate Study.** An advanced degree program may be planned around individual interests and abilities. In addition to major requirements, the student should choose supportive courses in one or more of the physical or social sciences.

## CAREER OPPORTUNITIES IN CLOTHING AND TEXTILES

Store manager.  
 Buyer of clothing and textiles for retail stores.  
 Designer for apparel manufacturers.  
 Coordinator and designer of displays and exhibits for retail stores and manufacturers.  
 Market representative for apparel, textile, and other related manufacturers.  
 Personnel supervisor of employees in retail stores.  
 Advertising coordinator in retail stores.  
 Coordinator of fashion shows.  
 Bridal and wardrobe consultant for consumers.  
 Small business owner.

Writer and editor for newspapers and magazines.

Writer, coordinator of consumer educational materials.

Teacher in junior and senior high schools, adult and community programs.

Extension specialist and area staff member in clothing and textiles.

Technician for testing and research laboratories for producers and retailers.

Research and testing specialist for consumer products.

## FAMILY ECONOMICS AND MANAGEMENT

238 Stanley Hall, (314) 882-7836

This department offers three professional program options: family-consumer economics and management, consumer affairs, and rehabilitation.

In each program, the student must complete requirements for (1) general education, (2) area of competence, and (3) where indicated, professional objective. The student must complete 5 hours of economics with a grade of C or above and must earn a grade of C in all courses identified under area of competence, area of emphasis or professional objective, with the exception that a grade of D is allowed in only one course.

### AREA OF COMPETENCE

The following are required (17 credit hours):

FEM 72 Management in Family Living (2)  
 FEM 173 Personal & Family Finance (3)  
 FEM 175 The Consumer in Our Society (3)  
 FEM 178 Community Agencies (1)  
 FEM 372 Family Values and Resource Management (2)  
 FEM 376 Management of Financial Resources (3)  
 CFD 255 Introduction to Study of the Family (3)

### AREAS OF EMPHASIS

#### Family-Consumer Economics and Management

This program incorporates work in family and consumer economics, home management, home equipment, and other areas of home economics. By selecting suitable courses, a student may prepare for a variety of careers including the following: family financial counseling; secondary teaching of consumer education, family finance, and home management; extension teaching; or equipment testing and demonstration for utility firms or appliance manufacturers.

The following courses are required for Family-Consumer Economics and Management majors (29-37 hours):

FEM 172 Home Management Practicum (2)  
 FEM 174 Selection of Home Equipment (3)  
 FEM 370 Housing the Family (3)  
 FEM 377 Economics & the Consumer (3)  
 FEM 378 Effective Consumer Decision Making (3)  
 C&T 182 Textiles (3)  
 C&T 285 Buying of Textiles and Clothing (2)  
 Econ. 251 Theory of the Firm (3)  
 HNF&FSM 121 Prin. of Food Preparation (5) or HNF&FSM 21 Elementary Food Preparation (2) or HNF&FSM 122 Food Buying & Meal Management (2-3)  
 HNF&FSM 34 Nutrition—Current Concepts and Controversies (3) or HNF&FSM 234 Human Nutrition I (3)  
 FEM 390 Field Training (1-4) (Recommended but not required)

#### Professional Objective

With help from the adviser, a student in this major selects additional courses appropriate to the career objective. For careers in business and industry, extension, and community or gov-

ernment service, a minimum of 15 hours will be selected from home economics, sociology, extension, education, management, marketing, accountancy and other fields. A student preparing for a career in journalism must complete 30 hours in journalism (see Home Economics Journalism). To attain a specialized teaching certificate for secondary schools, the student must complete the following: general education courses to meet both College of Home Economics and College of Education requirements (see Home Economics Education), required professional education courses, and either C&T 83, Contemporary Fashion Fundamentals or HID 349 Housing Fundamentals.

#### Consumer Affairs

The consumer affairs program prepares students for positions as consumer affairs professionals and other consumer service position in business, government and consumer organizations.

The following courses are required for consumer affairs majors (36-43 credit hours):  
 FEM 318 Topics—Consumer Protection & Public Policy (2) or Pol Sci 317 Public Policy (3)  
 FEM 377 Economics and the Consumer (3)  
 FEM 378 Effective Consumer Decision Making (3)  
 FEM 390 Field Training (1-4)  
 Acy. 36 Accounting I (3)  
 Econ. 251 Theory of the Firm (3)  
 Econ. 256 Economics of Public Policy: Antitrust Economics (3)  
 HE 115 Media Techniques (3)  
 Mgmt. 202 Fundamentals of Management (3)  
 Mgmt. 254 Introduction to Business Law (3)  
 Mktg. 204 Prin. of Marketing (3)  
 Mktg. 350 Society & Government (3) or Mktg. 314 Consumer Behavior (3)  
 Pol. Sci. 311 Administrative Regulation of Business (3)

The student may choose elective courses appropriate for personal interests and/or career goals. These may be selected from general education or professional courses offered by other UMC colleges or from appropriate home economics courses.

#### Rehabilitation

The rehabilitation program prepares students to work in rehabilitation centers, hospitals, extension programs, and private agencies, with physically, mentally or emotionally disabled persons and their families. Professional responsibilities may include recommending adaptive clothing and equipment for the handicapped person, planning renovation in housing to eliminate physical barriers within the home, adapting both living and work areas to the disabled person's needs, teaching work simplification procedures in personal care and household activities, and counseling with the entire family regarding adjustments to the handicapped person's disability.

The following courses are required for rehabilitation majors (51-54 hours):

FEM 73 Introduction to Rehabilitation (1)  
 FEM 170 Work Simplification in Home Processes (2)  
 FEM 171 Working with the Visually Limited (1)  
 FEM 172 Home Management Practicum (2)  
 FEM 174 Selection of Home Equipment (3)  
 FEM 350 Readings (cr. arr.)  
 FEM 370 Housing the Family (3)  
 FEM 374 Use and Care of Home Equipment (3)  
 FEM 390 Field Training (cr. arr.)  
 C&T 300 Problems—Clothing in Rehabilitation (2)  
 C&T 182 Textiles (3)  
 CAPS G412 Vocational Rehabilitation II (2)  
 HNF&FSM 121 Prin. of Food Preparation (5)  
 HNF&FSM 122 Food Buying & Meal Management (3)  
 HNF&FSM 234 Human Nutrition I (3)  
 HNF&FSM 238 Diet Therapy for Health Professionals (3)

MAE 20 Engineering Drawing (3)  
Physi 201 Elements of Physiology (5)  
Psych. 20 Psychology of Personal Adjustment (3) or Psych.  
180 Fundamentals of Abnormal Psychology (3)

### Professional Objective

If the student plans to work under the state merit system, the following are required:  
Ed. Psych. A102 Educational Psychology (2)  
Special Ed. L101 Survey of Special Education (2)  
Special Ed. L321 Intro. to Mental Retardation (3)

### CAREER OPPORTUNITIES IN FAMILY ECONOMICS AND MANAGEMENT

Extension specialist.  
Teacher in family finance, home management, and consumer education in secondary schools.  
Demonstration home economist working with a utility company.  
Equipment tester, writer, or demonstrator for an equipment or appliance manufacturer.  
Consumer interests specialist in business, government, or communications media.  
Financial counselor.  
Rehabilitation home economist working with physically, mentally or emotionally disabled persons in extension, rehabilitation centers, hospitals, and private agencies.  
College teacher or researcher (following advanced study).

## HOUSING AND INTERIOR DESIGN

### 137 Stanley Hall, (314) 882-7224

The overall purpose of housing and interior design is the improvement of the quality of the socio-physical or man-made environment through the education of designers and related professionals. The interior design program in the department is accredited by the Foundation for Interior Design Education and Research (FIDER).

### INTERIOR DESIGN

**Basic Creative Development.** Select at least 18 credit hours from the following:

HID 40 Prin. of Environmental Design (3)\*  
HID 41 Design I (3)\*\*  
HID 42 Design II (3)\*\*  
HID 347 Design Tech. for Environ. Components I (3)  
HID 348 Design Tech. for Environ. Components II (3)  
Art 2 Introduction to Art (3)  
Art 60 Beginning Drawing I (2)  
Art 120 Color Theory  
Art 160 Beginning Drawing II (3)  
Art 165 Anatomical Drawing (3)  
Art 175 Beginning Water Color (3)  
Art 177 Beginning Painting (3)  
Art 220 Beginning Spatial Design (3)  
Art 222 Graphic Design I (3)  
Art 270 Experimental Media I (3)  
Art 320 Space, Light and Color (3)

**Design Planning and Analysis.** Select at least 18 credit hours from the following:

HID 140 Residential Design I (3)\*\*  
HID 141 Architectural Design I (3)\*\*  
HID 149 Contract Design I (3)\*\*  
HID 342 Residential Design II (3)\*\*  
HID 344 Architectural Design II (3)\*\*  
HID 346 Contract Design II (3)\*\*

**History of Art, Architecture and Interiors.** Select at least 9 credit hours from the following:

HID 340 History of the House & Its Furnishings (3)\*\*  
HID 343 Contemporary Designers (3)\*  
Art History & Archeol. 10 Intro. to Western Art (3)\*

**Communication Skills and Technical Knowledge.** Select at least 18 credit hours from the following:

HID 142 Construction Techniques for Interior Components\*\*  
HID 147 Presentation Graphics (3)\*\*  
HID 148 Design III (3)  
Acct. 36 Accounting I (3)  
Art 140 Beginning Fibers (3)  
Art 225 Beginning Photography (3)

Art 230 Beginning Ceramics (3)  
Art 250 Beginning Metals (3)  
Art 285 Beginning Sculpture (3)  
Art 296 Serigraphy I (3)  
C&T 182 Textiles (3)\* (fulfills requirement for one of the home economics foundation courses)  
C&T 285 The Textiles/Clothing Consumer (2)  
Computer Sci. 104 Computers & Programming I (3)  
Elec. Engr. 101 Computer Basics & Applications (3)  
FEM 174 Selection of Home Equipment (3)  
Hort. 60 Flower Arranging (2)  
Hort. 150 Micro-Environmental Design (3)  
Hort. 151 Plants for Interior Design (2)  
Hort. 250 Landscape Graphics (3)  
Hort. 254 Landscape Design (3)  
Journ. 120 Advertising Prin. & Practice (3)  
Mgmt. 202 Fundamentals of Management (3)  
Mktg. 204 Prin. of Marketing (3)  
Mktg. 316 Sales Management (3)  
MAE 20 Engineering Drawing (3)\*  
Spch. 3 Television & Radio in Modern Society (2)  
Spech. 105 Prin. of Radio & Television (2)  
Stat. 31 Elementary Statistics (3)

### Family and Environmental Studies (3 credit hours)

HID 349 Housing Fundamentals (3)\*

### Field Training

HID 390 Field Training (Interior Design) (2-4)

**Professional and Supportive Courses.** These courses can be classified under any section in the professional program deemed appropriate by the adviser.

HID 300 Problems (2-3)

HID 318 Topics (3)

HID 341 Computer Graphic Applications to Design (3)

GH 100 Interdepartmental Colloquium (Communication Techniques in Program Planning) (2-3)

MAE 117 Experimental Course (in topics relating to HID) (cr. arr.)

Additional courses may be selected as electives from landscape design, business, sociology, psychology, and art.

\*Required

\*\*Required—must be completed with a grade of C or above.

## DESIGN MANAGEMENT AND MERCHANDISING

### Creative Development Design Planning.

(18 cr. hr. req.)

HID 40 Prin. of Environmental Design (3)\*

HID 41 Design I (3)\*

HID 42 Design II (3)\*

HID 140 Residential Design I (3)\*

HID 141 Architectural Design I (3)\*

HID 149 Contract Design I (3)\*

History of Art, Arch. and Interiors (9)

HID 340 History of the House and Its Furn. (3)\*

HID 343 Contemporary Designers (3)\*

Art. Hist. 10 Intro. to Western Art (3)\*

**Design Communications.** Select 6 credit hours from the following:

HID 147 Presentation Graphics (3)

MAE 20 Engineering Drawing (3)\*

### Technical Information (6 credit hours)

C&T 182 Textiles (3)\* (fulfills requirement for one of the home economics foundation courses.)

HID 142 Construction Techniques (3)\*

### Family and Environmental Studies (3 credit hours)

349 Housing Fundamentals (3)

FEM 175 The Consumer in Our Society (3)\* (requirement for one of the home economics foundation courses.)

### Field Training

HID 390 Field Training (Merchandising) (2-4)

**Business Management.** Select 21 credit hours from the following:

Act. 36 Accounting I (3)\*

Fin. 123 Principles of Finance (3)

Mgt. 202 Fundamentals of Management\*

Mgt. 330 Organization Theory (3)

Mgt. 329 Organizational Behavior (3)

Mgt. 310 Personnel Management (3)

Mkt. 204 Principles of Marketing (3)\*

Mkt. 315 Management of Promotion (3)

Mkt. 316 Sales Management (3)

Mkt. 317 Marketing Channel Design & Policy (3)

Mkt. 344 Analysis of the Consumer Market (3)

Stat. 31 Elementary Statistics (3)

**Professional and Supportive Courses.** These can be classified under any section in the professional program deemed appropriate by adviser.

HID 300 Problems (2-3)

HID 318 Topics (3)

HID 341 Computer-Graphic Applications to Design (3)

MAE 117 Experimental Course (relating to ID) (3)  
GH 100 Interdepartmental Colloquium (2-3)  
HIST 201 Topics (courses relating to ID) (cr. arr.)

## HOUSING DESIGN

**Basic Creative Development.** The following courses are required.

HID 40 Principles of Environmental Design (3)\*

HID 41 Design I (3)\*\*

HID 42 Design II (3)\*\*

### Design, Structure and Analysis.

(15 cr. hrs. req.)

HID 140 Residential Design I (3)\*\*

HID 141 Architectural Design I (3)\*\*

HID 344 Architectural Design II (3)\*\*

MAE 20 Engineering Drawing (3)\*

HID 142 Construction Technique for Interior Components (3)\*\*

**History of Art, Architecture and Interiors.** (6 credit hours required.)

HID 340 History of the House and Its Furnishings (3)

HID 343 Contemporary Designers (3)

Art History 10 Introduction to Western Art (3)\*

Art History 141 American Art and Architecture (3)

Art History 365 American Architecture (3)

**Design Communication.** (6 credit hours required.)

HID 147 Presentation Graphics (3)\*\*

HID 148 Design III (3)

### Field Training

HID 390 Field Training (Housing) (4)

**Housing Emphasis Units.** Students must choose a minimum of 15 credit hours from any one of the units listed below, 9 from another unit, and 6 credit hours from the remaining unit.

UNIT I: Business, Finance, Real Estate and Marketing

Acct. 36 Accounting I (3)

Ag. Eng. 338 Rural Real Estate Appraisal (3)

Econ. 229 Money and Banking (3)

Fin. 340 Principles of Real Estate (3)

Fin. 341 Real Estate Appraisal (3)

Jour. 120 Advertising Prin. and Practice (3)

Mgmt. 202 Fundamentals of Management (3)\*

Mgmt. 254 Introduction to Business Law (3)\*

Mgmt. 356 The Law of Commercial Credit Transactions (3)

Mkt. 204 Principles of Marketing (3)

Mkt. 336 Sales Management (3)

UNIT II: Community Planning, Political Science and Social Science

HID 349 Housing Fundamentals (3)\*

Pol. Sci. 102 State Government (3)

Pol. Sci. 306 Municipal Government (3)

Pol. Sci. 308 Comparative Urban Politics (3)

Pol. Sci. 310 Introduction to Public Administration (3)

Pol. Sci. 317 Public Policy (3)

RCA 360 Principles and Practices of Planning (3)

RCA 362 The Implementation of the Local Planning Process (3)

RCA 364 Area and Regional Planning (3)

Soc. 120 Population and Ecology (3)

Soc. 184 Social Impact Analysis (3)

Soc. 216 Urban Sociology (3)

UNIT III: Construction and Technical Knowledge

Ag. Eng. 215 Electricity on the Farm (3)

Civ. Eng. 20 Surveying (3)

Civ. Eng. 301 Building, Design, Construction Analysis (3)

Civ. Eng. 365 Engineering Administration

Civ. Eng. 367 Construction Contracts and Specifications (3)

Civ. Eng. 368 Construction Planning and Scheduling (3)

Civ. Eng. 369 Construction Methods and Equipment (3)

MAE 117 Experimental Course (Housing) (cr. arr.)

FFW 253 Sight Construction (3)

FFW 206 Wood Engineering (3)\*

MAE 321 Creativity in Design (3)

**Electives.** Electives may be selected from any of the previous areas or from the following courses.

Art 222 Graphic Design I (3)

Art 225 Beginning photography (3)

FEM 174 Selection of Home Equipment (3)

GH 100 Interdepartmental Colloquium (Solar Energy/Theory and Application) (3)

Hort. 254 Landscape Design (3)

Hort. 354 Advanced Landscape Design (4)

HID 341 Computer-Graphic Applications to Design (3)

HID 342 Residential Design II (3)

HID 347 Design Techniques for Environmental Components I (3)

Psy. 30 Applied Psychology (3)

## PROFESSIONAL OBJECTIVES

**Extension and other Government or Community Service.** The student preparing for a career in extension or other government service should choose supportive courses from the following suggested subject areas to complete requirements.

Ed. Psych. A102 Education Psychology (2)  
Ext. Ed. 210 Fundamentals of Communications (3)  
Rural Soc. 201 Org. & Leadership in Modern Society (3)  
Rural Soc. 225 Social Processes of Communication & Diffusion (3)  
Rural Soc. 335 Social Change & Trends (3)  
Rural Soc. 340 Community Social Structure (3)  
Soc. 214 The Family (3)  
Soc. 216 Urban Sociology (3)  
Soc. 120 Populations and Ecology (3)  
Soc. 184 Social Impact Analysis (3)

**Journalism.** A student preparing for a career combining journalism with housing and interior design must complete 30 hours in journalism (see Home Economics Journalism), plus 30 hours in housing and interior design.

**Teaching.** To teach housing and interior design in secondary school, the student should complete the following: general education courses to meet both College of Education and College of Home Economics requirements, (see Home Economics Education), required professional education courses, home economics courses as indicated in general education requirements, and HID 349 Housing Fundamentals. The student may be excused from HID 42 and 147, C&T 182, and MAE 20 Engineering Drawing.

## CAREER OPPORTUNITIES IN HOUSING AND INTERIOR DESIGN

Professional interior designer specializing in residential and/or commercial design.  
Housing or interior design consultant.  
Professional interior designer specializing in residential and/or commercial design.  
Housing or interior design consultant.

Professional interior designer with a department store, architectural or interior design firm, space planner, contract interior firm, or with a manufacturer

Journalist specializing in housing or interior design.

Housing and interior design teacher in secondary schools, adult education, or extension programs.

College teacher or researcher (following advanced study).

Store, studio or showroom manager.

Retail buyer of textiles and furnishings.

Sales representative for manufacturers of furnishings and architectural products.

Coordinator of bidding, purchasing and construction.

Writer or editor for newspaper or magazine.  
Consumer products consultant.

Housing designer.

Estimator.

Construction administrator and planner.

Housing finance and real estate specialist.

Marketing specialist.

Community planner.

Housing inspector.

Housing conservationist.

Presentation illustrator.

Energy conservationist or auditor.

## HUMAN NUTRITION, FOODS AND FOOD SYSTEMS MANAGEMENT

217 Gwynn Hall, (314) 882-4288

Whether the student's interest is in the natural or social sciences, the Department of Human Nutrition, Foods & Food Systems Management offers many program options. At both the undergraduate and graduate levels, graduates from this department are in demand.

### PREPROFESSIONAL (General Education)

General education courses are selected to provide a suitable background for programs in the human nutrition, foods and food systems management areas. Biological Sciences I (5) or Biological Sciences 11 (5) and Chemistry I (5) or 11 (5) must be taken. Majors in nutrition research and food research options must take Chemistry 11 (5) and 12 (5).

### AREAS OF COMPETENCE

The following courses are required.

HNFFSM 121 Principles of Food Preparation (5)

HNFFSM 234 Human Nutrition I (3)

**Organic chemistry 5-8 hours.** Select from the following: Chemistry 205 (5) or Chemistry 210-211 (5) and 212 (3). Journalism students may take Biochemistry 110 (3).

**Microbiology or bacteriology 3-4 hours.** Select from Microbiology 205 (4), Biological Sciences 105 (3) or 212 (4).

**Physiology 4-5 hours.** Physiology 201 (5).

**Biochemistry 3-5 hours.** Select either Biochemistry 193 (3) or Biochemistry 193-195 (5). Medical dietetics and general food and nutrition emphasis must take Biochemistry 193-195 (5). Biochemistry is not required for journalism, food research or food systems management dietetics emphasis.

### MINIMUM GRADES

Students in human nutrition, foods and food systems management are expected to meet the following grade standards.

1. A minimum grade of C in all departmental courses.

2. A minimum grade of C in biochemistry, microbiology and physiology for dietetics and nutrition research emphasis.

3. A minimum competency of 75 percent in all professional courses (with practicum or clinical experiences) for food systems management and medical dietetics in the coordinated program. Medical dietetics majors must also obtain a 75 percent competency in HNF&FSM 334.

### AREAS OF EMPHASIS

#### Food and Nutrition

A student in food and nutrition may choose general food and nutrition, nutrition research or food research.

The broader aspects of this combination serve as a professional basis for positions in business and industry, extension, government and community service, teaching, and communications-journalism.

The following courses are required.

HNFFSM 221 Science of Food Preparation (3)

HNFFSM 334 Human Nutrition II Lecture (3)

Select 14-15 credit hours in other HNF&FSM courses above 100 level (excluding 121, 221, 234 and 334).

Select a minimum of 6 credit hours from other Home Economics departments including at least one from FEM and at least one from CFD of the following:

FEM 173 Personal and Family Finance (3)  
FEM 175 The Consumer in Our Society (3)

FEM 372 Family Values and Resource Management (2)

FEM 377 Economics and the Consumer (3) and at least one of the following:

CFD 66 Principles of Human Development (3)

CFD 160 Early and Middle Childhood (3)

CFD 163 Interpersonal Relationships, Marriage and the Beginning Family (3)

CFD 225 Intro to Family Studies (3)

CFD 260 The Child from Six Through Adolescence (3)

CFD 264 Child Development Laboratory (3-6)

Other appropriate areas are home management, housing, home equipment, and design.

Select 3 credit hours of Statistics from the following:

Stat 31 Elementary Statistics (3)

Stat 207 Statistical Analysis (3)

Ag Econ 225 Statistical Analysis (3)

Select 3 credit hours of Computer Science from the following:

Comp Sci 75 Introduction to Computer Science (3)

Comp Sci 104 Computers and Programming I (3)

Comp Sci 201 Programming as a Research Tool (3)

Select 3 credit hours of Technical Writing:

Eng 161 Technical Writing (3)

Select an additional 12 credit hours from at least two of the following departments: accountancy, agricultural economics, animal husbandry, anthropology, computer science, economics, family and community medicine, food science and nutrition, horticulture, marketing, psychology, rural sociology, sociology, statistics and foreign language departments. These courses are in addition to the general education requirements.

**General Food and Nutrition.** In addition to the required courses listed above, the student will select additional courses in consultation with the adviser.

**Nutrition Research.** This area is for the student who plans to work in research or do graduate study in human nutrition. It also may be used as preparation for those planning to enter a professional program in medicine. The following courses are required.

HNFFSM 333 Human Nutrition II Laboratory (1)

Chem. 221 Quantitative Instrumental Analysis (4)

Math 80 Analytic Geometry & Calculus I (5)

Statistics 207 Statistical Analysis (3) or Ag. Econ. 225 Statistical Analysis (3)

Select 9 hours from the following:

HNFFSM 132 Experimental Lab Animal Nutrition (3)

HNFFSM 321 Experimental Foods (3)

HNFFSM 335 Nutrition During the Life Cycle (3)

HNFFSM 338 Diet Therapy (3)

Biochem. 270-272 Biochemistry (3 hrs. each)

Biochem. 274 Biochemistry Lab (3)

Biochem. 304 General Biochemistry Lectures (5)

Biochem. 305 Biochemistry Lab (3)

Math 175 Calculus II (5)

Physics 11-12 Elementary College Physics (5) (3)

Social Sciences: psychology, sociology, or anthropology courses in addition to general education requirements.

**Food Research.** This area is for students who plan to work in research or do graduate study in the natural science aspects of foods.

The following are required courses.

HNFFSM 221 Science of Food Preparation (3)

HNFFSM 321 Experimental Foods (3)

HNFFSM 375 Sensory Analysis of Food (3)

Chem. 221 Quantitative Instrumental Analysis (4)

FSN 309 Food Chemistry I (5)

Math 80 Analytic Geometry & Calculus I (5)

Select 9 hours from the following:

HNFFSM 131 Basic Concepts of World Nutrition (3)

HNFFSM 224 Meat Selection & Identification (3)

HNFFSM 320 Cultural Food Patterns (2)

HNFFSM 323 Modern Methods of Food Preservation (3)

FSN 305 Food Analysis (3)

FSN 372 Food Microbiology (3)

FSN 373 Food Microbiology Laboratory (2)

HNFFSM 376 Microwave Heating of Food (2)

Chem. 211-213 Organic Chemistry Lab (2 hours each)

Chem. 230 Physical Chemistry (3)

Physics 11-12 Elementary College Physics (5) (3)

Stat. 207 Statistical Analysis (3) or Ag. Econ. 225 Statistical Analysis (3)

Social Sciences: Psychology, sociology, or anthropology courses in addition to general education requirements.

**Food and Nutrition Journalism.** Students in food and nutrition journalism are required to take the following courses to fulfill the 30 hours of HNFFSM.

Organic Chemistry 3-5 hours. Select from the following: Biochemistry 110 (3) or Chemistry 205 (5) or 210-211-212 (8).

Physiology 5 hours. Physiology 201 (5)

HNFFSM 121 Principles of Food Preparation (5)

HNFFSM 122 Food Buying and Meal Management (1-3)

HNFFSM 234 Human Nutrition I (3)

HNFFSM electives (minimum 9-13 hours)

### Dietetics

Three dietetics options are available to the student: the preinternship program and either the medical dietetics or the food systems management options of the Coordinated Undergraduate Program (CUP) in dietetics. The programs are offered by the College of Home Economics in collaboration with the School of Health Related Professions. Food systems management emphasizes the management of all types of food services; medical dietetics emphasizes nutritional care of people with varying needs; and the preinternship program provides basic course work in both specialities.

Applications for either option in the CUP program are due February 8 of the sophomore year. Applicants must have a 2.5 GPA and meet all academic prerequisites. Details about the CUP program should be obtained as early as possible from the department chairperson or the CUP educational director.

**Four-year Pre-Internship Program in General Dietetics.** In this program, the student earns a bachelor's degree at the end of four academic years. To become eligible for American Dietetic Association (ADA) membership and registration, a student must complete an ADA approved post-baccalaureate experience such as a 6-12 month internship. The following courses are required.

HNFFSM 122 Food Buying & Meal Management (2 or 3)

HNFFSM 228 Prin. of Food Systems Management (3)

HNFFSM 235 Nutrition Education (3)

HNFFSM 324 Food Procurement & Production in Foodservice Systems (5)

HNFFSM 326 Development, Utilization & Maintenance of Physical Resources (2)

HNFFSM 327 Operations Analysis in Food Systems (3)

HNFFSM 334 Human Nutrition II Lecture (3)

HNFFSM 338 Diet Therapy (4)

HNFFSM 339 Medical Dietetics (3)

Accty. 36 Accounting I (3)

Soc. 218 Industrial Sociology (3) or Mgmt. 311 Collective Bargaining (3)

Select electives to complete required 120 hours.

**Medical Dietetics Coordinated Undergraduate Program.** Clinical experiences in nutritional care of patients in the University Hospital and Clinics and other health care facilities are coordinated with classes so that after four academic years, plus one summer (eight weeks), the student earns a bachelor's degree and is eligible to apply for Active Membership in The American Dietetic Association and to write the registration examination.

The following courses are required.

HNFFSM 122 Food Buying & Meal Management (1)

HNFFSM 221 Science of Food Preparation (3)

HNFFSM 228 Principles of Food Systems Management (4)

HNFFSM 235 Nutrition Education (5)\*

HNFFSM 236 Evaluation of Nutritional Status (3)\*

HNFFSM 333 Human Nutrition II Laboratory (1)

HNFFSM 334 Human Nutrition II Lecture (3)

HNFFSM 335 Nutrition During the Life Cycle (3)

HNFFSM 338 Diet Therapy (6)\*

HNFFSM 339 Medical Dietetics (12)\*

Statistics 31 Elem. Statistics (3) or Statistics 207 Statistical Analysis (3) or Ag. Econ. 225 Statistical Analysis (3)

Select electives to complete required 124 hours.

**Food Systems Management Coordinated Undergraduate Program.** Practicum (experi-

ences in managing food service operations) in the University Hospital and Clinics and other food service facilities are coordinated with classes so that after four academic years the student will earn a bachelor's degree and (is eligible to apply for active membership in the American Dietetic Association).

The following courses are required.

HNFFSM 221 Science of Food Preparation (3)

HNFFSM 228 Principles of Food Systems Management (4)\*

HNFFSM 238 Diet Therapy for Health Professionals (3)\*

HNFFSM 324 Food Procurement & Production in Foodservice Systems (5)

HNFFSM 325 Mgmt. of Food Procurement & Production in Foodservice Systems (6)\*

HNFFSM 326 Development Utilization & Maintenance of Physical Resources (4)\*

HNFFSM 327 Operations Analysis in Food Systems (4)\*

HNFFSM 328 Management of Food Systems (8)\*

Mgmt. 202 Fundamentals of Management (3)

Mgmt. 308 Operations Management (3)

Mgmt. 329 Organizational Behavior (3)

Statistics 31 Elementary Statistics (3) or Statistics 207 Statistical Analysis (3) or Ag Economics 225 Statistical Analysis (3)

Select 6 hours of management electives.

Select electives to complete required 124 hours.

\*These courses include practicum experiences in the University Hospital and Clinics and other types of health care of food service facilities. The practicum experiences are open only to students accepted in these specific programs.

### PROFESSIONAL OBJECTIVES

**Food and Nutrition.** In addition to the required courses, the student should choose supportive courses in the department and other departments in the college or on campus, in accordance with professional objectives and career plans.

**Dietetics and Foods Systems Management.** In addition to the required courses, the student should choose supportive courses in the department and related departments to broaden the scope of career opportunities.

**Journalism.** A student preparing for a career of journalism in food and nutrition must complete 30 hours in journalism (see Home Economics Journalism), and 30 hours in HNFFSM to include the department's minimum requirements for all majors.

**Teaching.** To teach food and nutrition in secondary schools, the student should complete the following: general education courses to meet both College of Home Economics and College of Education requirements; required professional education courses; and home economics courses as indicated. HNF&FSM 122 is a requirement.

**Research and Graduate Study.** A student planning to continue study at the graduate level may follow the undergraduate food and/or nutrition research option. However, an advanced degree program may be developed around an individual's professional goals and interests.

### CAREER OPPORTUNITIES IN HUMAN NUTRITION, FOODS AND FOOD SYSTEMS MANAGEMENT

Food and nutrition specialist in extension.

Teacher of food and nutrition in secondary schools, adult education, special occupational programs, colleges and universities.

Teaching dietitian in outpatient clinics, public health, and community nutrition programs.

Clinical dietitian as a member of a team in clinical research units.

Specialist developing and demonstrating new products in the food industry.

Administrative dietitian managing food systems in hospitals, colleges, the armed services, and other food service operations.

Food and nutrition editor and writer for radio, TV, magazines and newspapers, textbooks, and advertising.

### HOME ECONOMICS EDUCATION

Certification to teach home economics is obtained through the College of Education. Home economics education is an area in the Department of Practical Arts and Vocational-Technical Education (PAVTE) in the College of Education. A student preparing to teach vocational home economics has three options. Option 1 applies to the vast majority of students.

**Option 1.** The student must enroll in the College of Education. A bachelor of Science in Education and vocational certification to teach comprehensive home economics programs may be obtained by completing the courses listed below in addition to the requirements in general education, preprofessional education, and secondary professional education as identified in the College of Education section of this catalog.

**Option 2.** A College of Home Economics student who intends to teach one specific home economics subject area may dually enroll in the College of Education and complete the following: the College of Home Economics requirements for a BS in the chosen subject and the College of Education requirements in general, preprofessional and professional education for a BS in education.

**Option 3.** Vocational certification to teach home economics related skills in occupational programs may be obtained by accumulating a specific number of hours of work experience in addition to completing the requirements for Option 1 or Option 2. Work-hour requirements vary according to the student's professional goals.

### REQUIRED PROFESSIONAL COURSES

The following courses are required for Options 1, 2, and 3.

PAVTE F100 Foundations (1)

PAVTE F175 Directed Occupational Experience (2)

PAVTE F235 Organization of Vocational Home Economics Programs (2)

PAVTE F275 Occupational Home Economics Programs (2)

PAVTE F280 Methods of Teaching Vocational Consumer-Homemaking (3)

PAVTE F315 Current Developments in Home Economics Education (3)

### SUBJECT MATTER COURSES

The following courses are required for Options 1 and 3.

HNF&FSM 34 Nutrition-Concepts and Controversies (3)

HNF&FSM 121 Principles of Food Preparation (5)

HNF&FSM 122 Food Buying and Meal Mgmt. (3)

C&T 81 Clothing Construction (3)

C&T 182 Textiles (3)

C&T 285 The Textiles/Clothing Consumer (2)

HID 40 Prin. of Environmental Design (3)

HID 140 Residential Design I (3)

FEM 72 Management in Family Living (2)

FEM 173 Personal & Family Finance (3)

FEM 174 Selection of Home Equipment (3)

FEM 175 The Consumer in Our Society

CFD 160 Early and Middle Childhood (3)

CFD 163 Interpersonal Relationships, Marriage and the Beginning Family (3)

CFD 225 Intro to Study of the Family (3)

CFD 264 Child Development Lab (3-6)

## HOME ECONOMICS EXTENSION

A student who plans to be an extension home economist, youth specialist, or extension specialist may choose a subject matter area of interest or a general program such as Interdepartmental Studies. In addition, a master's degree in a subject matter area generally is required in Missouri.

The student must fulfill the requirements for the chosen major while pursuing the extension objective. Additional electives might be chosen appropriately from such areas as adult education, communications and the social sciences.

## HOME ECONOMICS JOURNALISM

The College of Home Economics, cooperating with the School of Journalism, offers a curriculum in home economics journalism. This program prepares men and women for work in one or more media—newspaper, magazine, television, and radio—or for positions in public relations, advertising or editorial offices where a home economics background is helpful or essential.

A home economics journalism degree is awarded to a student who satisfactorily completes:

1. General education requirements for home economics

2. 30 hours in a major area in one of the departments in home economics or a minimum of two courses from each department for a general home economics background. A grade of C or above is required in all home economics courses selected; and

3. 30 hours of journalism courses. To be assured of admission, the student must have a 3.0 grade point average and have completed 60 credit hours at the time of enrollment in the School of Journalism courses. Students with less than a 3.0 will be admitted on a space available basis. Courses required are:

120 Advertising Principles & Practice (2 or 3)  
300 Mass Media & Society (2)

309 History & Principles of Journalism

Plus completion of a sequence in Journalism (see Journalism requirements under School of Journalism) OR completion of the following for general journalism or public relations:

105 News (3)  
306 Reporting (3)  
110 Editing (3)  
360 Intermediate Writing (3)  
Electives in Journalism (10)

Also recommended:  
Journalism Careers (0)

## INTERDEPARTMENTAL STUDIES IN HOME ECONOMICS

The major offers the student an opportunity to develop a highly individualized curriculum to meet academic and career goals. Students may select this program if other established academic programs in the college do not meet their specialized needs. It provides for a liberal education and breadth in home economics.

A written statement of goals and an outline of study is approved by the student's advising committee, which is composed of three home economics advisers from different departments. These advisers are selected by the student with

one adviser serving as the permanent adviser. The assistant dean is a member of the advising committee.

Graduates find opportunities in business, communication, international service, home service, social service agencies, administration and management, and extension.

The program of study includes:

1. 42 hours in general education with 5 hours minimum in economics.

2. Appropriate physical and biological sciences with chemistry required for certain options.

3. 11 credit hours in each of four of the five departments in the College with a minimum of 6 credit hours of formal, structured courses numbered 300 or above (all must be completed with a C or above).

4. 34 hours of supporting courses either within or outside of home economics allowing for flexibility to meet student interests and career choices.

## FACULTY

### ADMINISTRATION

**Bea Litherland**, dean, professor, PhD, University of Minnesota

**Gail L. Imig**, associate dean, professor, PhD, Michigan State University

**Martha Jo Martin**, assistant dean, assistant professor, EdD, University of Missouri-Columbia

**Margaret Mangel**, dean emeritus, professor emeritus, PhD, University of Chicago

### CHILD AND FAMILY DEVELOPMENT

**Marilyn Coleman**, associate professor, chair, EdD, University of Missouri-Columbia

**Ruth Cook**, professor emeritus, PhD, University of Chicago

**Lois Bryant**, assistant instructor, BS, University of Missouri-Columbia

**Virginia Fisher**, professor emeritus, PhD, University of Missouri-Columbia

**Mary McPhail Gray**, assistant professor, PhD, Michigan State University

**David Imig**, associate professor, PhD, Michigan State University

**Carol Irvin**, instructor, MS, University of Missouri-Columbia

**Lou Isbell**, assistant professor, MS, University of Missouri-Columbia

**Jean Ispa**, assistant professor, PhD, Cornell University

**Mary Beth Mann**, assistant instructor, MS, University of Missouri-Columbia

**Arthur McArthur**, associate professor emeritus, PhD, Stanford University

**Kathy Thornburg**, professor, PhD, University of Missouri-Columbia

**Marion Typo**, assistant professor, PhD, University of Missouri-Columbia

**George Wise**, associate professor, PhD, University of Connecticut

### CLOTHING AND TEXTILES

**Kitty Dickerson**, associate professor, chair, PhD, St. Louis University

**Helen Allen**, professor emeritus, MS, Iowa State University

**Nancy Fair**, assistant professor, PhD, North Carolina State University

**Betty Feather**, associate professor, PhD, University of Missouri-Columbia

**Jean Griffin**, assistant professor, MS, University of Missouri-Columbia

**Jean Hamilton**, assistant professor, PhD, University of Missouri-Columbia

**Josephine Holik**, associate professor, MS, Virginia Polytechnic Institute and State University

**Lois Korslund**, associate professor, PhD, Purdue University

**Elinor Nugent**, professor, PhD, Louisiana State University

**Doris Saxon**, professor, MS, University of Alabama

### FAMILY ECONOMICS

### AND MANAGEMENT

**Edward J. Metzen**, professor, chair, EdD, University of Missouri-Columbia

**Marilyn Caselman**, associate professor, MS, The Ohio State University

**Sandra A. Helmick**, associate professor, PhD, University of Missouri-Columbia

**Eunice Lieurance**, associate professor, MS, Michigan State University

**Anna Cathryn Yost**, associate professor, MS, Purdue University

**Mel J. Zelenak**, associate professor, PhD, University of Iowa

### HOME ECONOMICS JOURNALISM

**Orrine Z. Gregory**, professor emeritus, MS, University of Missouri-Columbia

**Martha Jo Martin**, assistant professor, EdD, University of Missouri-Columbia

### HOUSING AND INTERIOR DESIGN

**Kate Ellen Rogers**, professor, chair, EdD, Columbia University

**Richard Helmick**, associate professor, MFA, Ohio University

**Gary Hennigh**, associate professor, MFA, University of Colorado-Boulder

**Patricia Ann Hilderbrand**, assistant professor, MS, University of Missouri

**Robert Kabak**, professor, MFA, Yale University

**C. Bud Kaufmann**, professor, PhD, Florida State University

**Ruth Stumpe Brent**, assistant professor, PhD, University of Minnesota

**Joe Logan**, assistant professor, PhD, University of Missouri-Columbia

### HUMAN NUTRITION, FOODS AND

### FOOD SYSTEMS MANAGEMENT

**Richard P. Dowdy**, associate professor, chair, PhD, North Carolina State University

**Helen Anderson**, professor, PhD, University of Wisconsin

**Esther Digh**, instructor, MS, Purdue University

**Margaret Flynn**, professor, PhD, University of Missouri-Columbia

**Elizabeth Hensley**, professor, MS, Cornell University

**Loretta Hoover**, associate professor, PhD, University of Missouri-Columbia

**Karla Hughes**, assistant professor, PhD, University of Tennessee

**Donna Jeffery**, assistant professor, PhD, University of Missouri-Columbia

**Treva Kintner**, assistant professor, MS, University of Missouri-Columbia

**Mary Ann Klie**, instructor, MS, The Ohio State University

**Pauline Landhuis**, assistant professor, MS, University of California-Davis

**Mary McDonald**, assistant professor, MS, University of Iowa

**I.G. Mollnar**, associate professor, PhD, Vanderbilt University

**Karen Morgan**, assistant professor, PhD, University of Missouri-Columbia

**Aimee Moore**, professor, PhD, Michigan State University

**Ruby Moore**, instructor, MS, Oklahoma State University

**James Nordstrom**, associate professor, PhD, University of Minnesota

**Byrdine Tuthill**, professor, MS, University of Wisconsin

**John Typo**, professor, PhD, University of Minnesota

**Ellen Vollers**, instructor, MS, University of Missouri-Columbia



# SCHOOL OF JOURNALISM

## EDUCATIONAL PHILOSOPHY

The world's first School of Journalism was established in 1908 at the University of Missouri-Columbia to strengthen the effectiveness of public communications in a democratic society. The faculty has a basic commitment to educate students in the responsibilities and skills of the professional journalist. It also has a broader commitment to advance the profession of journalism through scholarly research, analysis and criticism and through special programs to serve the communications media. The School's first dean, Walter Williams, who went on to become president of the University in 1930, wrote the Journalist's Creed which stresses the profession's rights and responsibilities as a public trust.

The Missouri Plan assures the journalism graduate a broad liberal education, considered essential for a journalist whose work may span many segments of today's complex society. In addition to a broad liberal arts education, students complete practical laboratory work in a variety of settings, including a public radio station, a commercial daily newspaper and network television station.

The School offers the Bachelor of Journalism, Master of Arts and Doctor of Philosophy degrees. Currently, 700 undergraduates and 246 graduate students are enrolled.

The Accrediting Council on Education in Journalism and Mass Communications has accredited the following sequences offered by the School of Journalism: Advertising, Magazine, News-Editorial, Photojournalism, Radio-Television News and the Professional Master's Degree Program.

The Council also has accredited the University's agricultural journalism program.

The School's medical writing program is approved by the American Medical Writers Association.

The School also offers programs combining study in journalism and home economics, business, sociology, education, or public administration, and a sequence in newspaper publishing.

## CAMPUS AND FACILITIES

The School of Journalism is housed in Jay H. Neff Hall, Walter Williams Hall, the Neff Addition, and Gannett Hall—a four-building unit located on a northern corner of the UMC campus—and laboratory work is carried on at radio station KBIA, television station KOMU-TV, and the *Columbia Missourian*.

### COLUMBIA MISSOURIAN

Students, supervised by faculty members with professional experience, produce news, editorials, feature, photographic and advertising work on the *Columbia Missourian*, a

Tuesday through Sunday general circulation newspaper for the city of Columbia and Boone County.

*Vibrations*, a magazine and entertainment supplement to the Sunday *Missourian*, is researched, photographed, written and edited by magazine and photojournalism students.

### KBIA, KOMU-TV

Since 1953, the University of Missouri has operated its own television station on Channel 8. As on the *Missourian*, students work with professional faculty and staff members at the station to prepare and broadcast the daily news report from early morning through 10 p.m. and to produce public affairs and other broadcasts. KOMU-TV is an ABC affiliate.

KBIA, UMC's public FM radio station, covers central Missouri with a 100,000-watt stereo signal. The School of Journalism produces a full schedule of news and public affairs programming on the station, an affiliate of National Public Radio.

### JOURNALISM LIBRARY

The Frank Lee Martin Library in Walter Williams Hall regularly receives periodicals devoted to journalism. It also gets some 200 newspapers—at least one daily from most states, and one or two from each major foreign country. It contains more than half of the 35,000 volumes relating to journalism that are available to students. The remainder are shelved in UMC's Elmer Ellis Library, which contains more than 2.6 million volumes and an equal number of microfilm files.

## SERVICE TO PROFESSION

Since its inception, the School has had the support and respect of professional journalists. The tradition of support that began in 1920 with an alumnus' gift to build Neff Hall continues today. A recent gift of \$460,000 from the Frank E. Gannett Foundation, on behalf of the country's largest newspaper chain, resulted in Gannett Hall, providing space for newswriting and broadcast laboratories, classrooms, an auditorium and a conference center for professional development programs conducted by the School.

In its commitment to continuing education for professional journalists, the School budgets more than a half million dollars annually for workshops, competition and other programs.

### BUSINESS JOURNALISM

The School sponsors the Business Journalism Awards, made possible by a continuing educational grant from INGAA (Interstate Natural Gas Association of America).

Award-winning writers come to the campus in the fall for a two-day Business Journalism Workshop.

The Herbert J. Davenport Fellowships in Business and Economics Reporting give 15 practicing reporters and editors a month of

intensive study of economics, accounting, finance and techniques of reporting business and economics news.

### FOI CENTER

The Freedom of Information Center, established in 1958, collects and disseminates materials about the flow and control of information. It serves subscribers with its bi-monthly *Freedom of Information Digest* and its *Monthly Center Reports*.

### INVESTIGATIVE REPORTING

Investigative Reporters and Editors Inc., established its national headquarters at the School of Journalism in 1978. IRE, organized in 1975 by a group of Pulitzer Prize winners, provides educational services to reporters, editors and others interested in investigative journalism and seeks to maintain high professional and ethical standards.

The quarterly *IRE Journal* examines successful investigative projects and includes how-to tips and techniques.

### LIFESTYLE JOURNALISM

The J.C. Penney-University of Missouri Journalism Awards have encouraged excellence in newspaper lifestyle sections and reporting since 1960.

Each March, the newspaper competition winners join lifestyle reporters and editors in a five-day workshop.

Penney-Missouri flying workshops, begun in 1978, offer one-day seminars for lifestyle editors in cooperation with state press associations.

### MINORITIES DEVELOPMENT

Recruiting talented minority high school and college students for journalism careers is a year-round School goal because of the minority shortage in the media. The School, the Newspaper Fund of Princeton, N.J., and Missouri papers have offered a two-week summer Urban Journalism Workshop since 1971. A Minority Broadcasting Workshop operates concurrently. Sponsors include the School, the Missouri Broadcasters Association and more than 25 stations.

### PHOTOJOURNALISM

The Pictures of the Year competition, begun in 1943, selects the best photojournalism from newspaper, magazine and picture editing categories.

More than 13,000 photos are submitted annually in the world's largest news-oriented photo contest. The competition is cosponsored with the National Press Photographers Association under an educational grant from Canon Inc.

Since 1976, a book based on the competition, *The Best of Photojournalism*, has been published annually.

A one-week Photojournalism Workshop has been held each year since 1945 in a Missouri

town. Professional photographers produce picture stories under the direction of a faculty of outstanding photographers and editors.

### TELEVISION AWARDS

The J.C. Penney-University of Missouri Journalism Awards for community leadership by local television stations began in 1982. The annual competition and workshop are designed to recognize outstanding efforts by local stations in solving problems their communities face and to encourage other stations to take a more aggressive leadership role in their communities.

### SCHOLASTIC JOURNALISM

The Missouri Interscholastic Press Association has offered seminars and competitions for more than 46 years. The press association headquarters at the School of Journalism publishes newsletters and provides annual critiques.

A one-week Summer Media Workshop, begun in 1956, develops skills for high school students and teachers.

High School Journalism Day, during Journalism Week, honors the Missouri Journalism Teacher of the Year, and the Administrator of the Year.

### INLAND DAILY PRESS ASSOCIATION AWARD

Each year since 1945, the School of Journalism has presented a trophy to a newspaper in the Inland Daily Press Association for outstanding community service. Entries are judged by members of the journalism faculty and the presentation is made at the fall meeting of the Association.

### MISSOURI MEDALS

Every year since 1930, the School of Journalism has named Missouri Medialists to receive awards for distinguished service in journalism at Journalism Week in April. Missouri Medals are based on records of performance over many years rather than upon particular instances of journalistic achievement.

### ADMISSIONS REQUIREMENTS

For admission to the School, students must complete an acceptable prejournalism course of study, earn an appropriate grade point average and complete the application procedures announced by the School of Journalism.

### GRADE POINT REQUIREMENTS

For assured admission to the School, a cumulative grade point average of 3.0 (A = 4.0) is required. Students with less than a 3.0 will be admitted on a space available basis according to GPA.

Students for whom space is not available in a particular semester may reapply for consideration in subsequent terms.

The grade point requirement may be waived by the Journalism Admissions Committee when the student has demonstrated unusual motivation toward a journalism career, or when he or she possesses cultural, ethnic, or other attributes especially desirable in journalism, when by previous educational disadvantage the student does not meet the grade point requirements—as long as in the judgement of the committee the student otherwise shows the potential for doing satisfactory work in the School of Journalism.

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### COURSE REQUIREMENTS

Completion of a course of study that includes at least 60 semester credit hours of work at UMC or another accredited two- or four-year institution.

The course of study must include the following:

**1. Foreign Language:** Unless students have completed four or more high school units (years) in a single foreign language, they must complete college work through a reading, composition or conversation course beyond the intermediate level (generally 11 to 13 hours), or demonstrate the equivalent by an acceptable proficiency examination.

Elementary courses must be taken before admission to the school. The reading, composition or conversation course may be completed after admission. In that case, it will count as an elective.

**2. Behavioral, Biological, Physical and Mathematical Science:** At least 14 hours from four of six areas: biological (includes biology, botany, zoology), physical (includes physics, chemistry, geology), mathematical (Math 10, 12 and above, statistics, computer science), anthropological, psychological, sociological science. The 14 hours must include at least one course with a lab (minimum four hours credit).

**3. Social Science:** At least nine hours in three of three areas: economics, history, political science.

**4. Humanistic Studies:** At least eight hours in three of six areas: appreciation or history of art or music (includes Art 3, art history, music history and music literature 21 and above); foreign civilization or classics (each foreign language department has a civilization class, usually 110 or 111); literature; philosophy; humanities (honors sequence 101, 102, 103, 104; religion courses 25, 110 and above, linguistics 20 or 120); speech and dramatic art (Speech 3, 6, 60, 110, 283).

**5. English:** The student must present evidence of proficiency in English composition, which may be fulfilled by completing one or more of the following or the equivalent: English 60 Exposition or 65GH Honors Exposition with a grade of B or higher; or English 60 or 65GH with a grade of C and a satisfactory grade on the English Proficiency Examination. In addition, students whose native language is other than English must present a TOEFL score of at least 525. TOEFL is a test of English as a foreign language.

### CREDIT REQUIREMENTS

**1. CLEP (College Level Examination Program).** Advanced Placement and bonus credit. The School grants no academic credit in these categories. The School grants credit only for college courses successfully completed by the student.

**2. Credit earned as a high school student.** The School of Journalism may recognize coursework completed by high school students in other institutions of higher education provided it appears on a transcript from an accredited college or university.

**3. Unacceptable college courses.** The School accepts no journalism or communication credit in transfer in the 60 hours required

for admission. In certain instances, students may be excused from repeating some introductory journalism courses, but they are still required to complete a minimum of 30 hours of journalism credit at UMC.

The School does not accept credit in basic military science, basic physical education, typing or shorthand, and no more than three hours each of applied or performance music, dance, drama, or studio art.

**4. Junior college coursework.** Students may offer for admission a maximum of 64 hours of junior college work. Junior college work taken after admission to the School is not acceptable.

**5. Typing skill.** Journalism courses require the use of the typewriter. In the second semester students are enrolled, they must demonstrate a typing proficiency of 40 words per minute.

### APPLICATIONS AND ADMISSION DEADLINES

To enroll, obtain an application from the director of admissions, 130 Jesse Hall, University of Missouri-Columbia, Columbia, Mo. 65211.

Freshman applicants must submit an official high school transcript (with class rank) and required test scores.

Undergraduate transfer applicants must submit official transcripts from each high school and college attended.

No transcript can be accepted directly from the student. The student must have the school(s) previously attended send the transcript to the director of admissions.

**Deadlines.** For a prejournalism undergraduate student, the deadlines for the fall semester are May 1 for a freshman and July 1 for a transfer student. For the winter semester the deadline is Dec. 1 for all students and May 1 for the summer session.

The deadlines for applying for admission to the School of Journalism are Feb. 1 for the summer and fall semesters and Sept. 1 for the winter semester.

### ADMISSION WITH BACHELOR'S DEGREE

Students who have been graduated with acceptable bachelor's degrees may apply for admission for the undergraduate program of the School of Journalism in a program leading to the Bachelor of Journalism degree.

Students so admitted are required to complete all specific entrance requirements which they did not complete as undergraduates, including the advanced course in a foreign language. Advertising majors must complete at least six hours of marketing, before or after admission.

An acceptable degree is one for which the student has completed at least 120 semester hours or the equivalent, including at least 90 hours of liberal arts, science and social science credit as determined by the Journalism Admissions Committee.

### GRADUATION REQUIREMENTS

Upon admission to the School of Journalism, students choose advisers in their major field who assist them in planning a program. How-



ever, fulfillment of all requirements for graduation is the responsibility of the student.

Early in the semester preceding the one in which the student expects to complete degree requirements, the student must file with the dean an application for graduation, and at the same time supply requested information for his or her permanent file.

The School of Journalism confers one undergraduate degree, Bachelor of Journalism (BJ). To obtain the degree, students must fulfill the following conditions: They must be regularly admitted to the School, must complete at least 30 hours of acceptable journalism coursework, must complete at least 30 hours of acceptable coursework outside the School, must earn a cumulative GPA of at least 2.0 for all work taken while in the School of Journalism and a GPA of at least 2.0 for all journalism courses.

## COURSES REQUIRED OUTSIDE JOURNALISM

A. Fifteen hours numbered 100 or above from these areas:

1. Behavioral, biological, physical and mathematical science. At least three hours must come from one of six areas: anthropology, biology, psychology, physical science, sociology, mathematics.

2. Social Science: At least six hours from two of four areas: economics, geography, history, political science (to meet Missouri state law requirements, students must take at least one course in either U.S. History or American Government).

3. Humanities: At least six hours from two of five areas: appreciation of art, music; foreign civilization, classics; literature; philosophy; speech and dramatic art (approved SDA courses include 110, 233, 243, 244, 283, 341, 342, 345, 361, 363, 364, 367, 368, and 381).

B. Upperclass Non-Journalism Electives: Nine hours are required, and all must be numbered 200 or above or 100 GH.

C. General Electives: Six hours are required. Any non-journalism course acceptable to the adviser is allowed.

The advanced course in the foreign language must be completed, the credit to count only in the six hours of general electives.

Some students will enter Journalism with more than the required 60 hours. The excess over 60 may be counted in the elective credit for graduation or upperclass hours may be counted in appropriate categories.

## COURSES REQUIRED IN JOURNALISM

Students must complete 30 credit hours in professional journalism, including these basic courses:

- 120 Advertising Principles & Practice (2-3)
- 189 Journalism Careers (0)
- 300 Mass Media and Society (2)
- 309 History & Principles of Journalism (3)

Three hours of Advertising Principles is a prerequisite for all other advertising courses.

## SEQUENCE REQUIREMENTS

**Advertising Major** An additional 11 credit hours required:

- 105 News (3) or 119 Promotional Writing (3)
- 321 Advertising Copy, Layout & Production (3)
- 318 Introduction to Selling (3)
- 336 The Graphics of Journalism (2)

Advertising majors also must complete at least six hours of marketing.

At least 10 hours from the following group:

- 322 Psychology in Advertising (2)
- 323 Advertising Salesmanship (3)
- 324 Advertising Campaigns (2)
- 326 Broadcast Advertising (3)
- 327 Direct & Mail Order Advertising (2)
- 328 Retail Advertising (2)
- 329 Creative Strategy and Tactics (2)
- 330 Advertising Markets & Media (2)
- 331 Advertising Management (2)
- 332 Public Relations (3)
- 333 Research in Advertising (2)
- 334 International Advertising (2)
- 335 Sales Promotion (2)

**Suggested Electives:**

- 110 Editing (3)
- 140 Basic Press Photography (3)
- 304 Communications Law (3)
- 306 Reporting (3)
- 310 Newspaper Editing (3)
- 338 Business and Economics Reporting (3)
- 340 Visual Communication (3)
- 345 General Semantics in Journalism (2)
- 362 Magazine Design (3)
- 364 Organization Communications in Public Relations (2)
- 375 Newspaper Management (2)
- 376 Newspaper Circulation and Marketing (2)
- 387 Journalism as Communications (2)

**Magazine Major** An additional 20 credit hours required:

- 105 News (3)
- 110 Editing (3)
- 306 Reporting (3)
- 336 The Graphics of Journalism (2)
- 360 Intermediate Writing (3)
- 362 Magazine Design (3)
- 363 Magazine Editing (3)

**Suggested Electives:**

- 140 Basic Press Photography (3)
- 302 The Foreign Press (2)
- 304 Communications Law (3)
- 305 Critical Reviewing (2)
- 307 Advanced Reporting (3)
- 316 Science Writing (3)
- 332 Public Relations (3)
- 340 Visual Communication (3)

- 345 General Semantics in Journalism (2)
- 361 Advanced Writing (3)
- 364 Organization Communications in Public Relations (2)
- 365 Magazine Production (3)
- 366 Advanced Design (2)
- 368 Magazine Publishing (2)
- 387 Journalism as Communication (2)

**News-Editorial Major** An additional 18 credit hours required:

- 105 News (3)
- 110 Editing (3)
- 304 Communications Law (3)
- 306 Reporting (3)
- 307 Advanced Reporting (3)
- 310 Newspaper Editing (3)

At least one of the following:

- 311 Advanced Newspaper Editing (3)
- 315 Reporting of Public Affairs (3)
- 316 Science Writing (3)
- 338 Business and Economics Reporting (3)
- 352 Editorial Writing (3)
- 360 Intermediate Writing (3)

**Suggested Electives:**

- 140 Basic Press Photography (3)
- 302 The Foreign Press (2)
- 308 Law and the Courts (2)
- 315 Reporting of Public Affairs (3)
- 316 Science Writing (3)
- 336 The Graphics of Journalism (2)
- 338 Business and Economics Reporting (3)
- 340 Visual Communication (3)
- 353 Broadcast Reporting (3)
- 360 Intermediate Writing (3)
- 373 The Community Newspaper (3)
- 374 The Suburban Press (2)
- 375 Newspaper Management (2)
- 387 Journalism as Communication (2)

**Newspaper Publishing Major** An additional 19 credit hours required:

- 105 News (3)
  - 110 Editing (3)
  - 306 Reporting (3)
  - 310 Newspaper Editing (3)
  - 336 The Graphics of Journalism (2)
  - 373 The Community Newspaper (3)
  - 375 Newspaper Management (2)
- Suggested Electives:**
- 140 Basic Press Photography (3)
  - 304 Communications Law (3)
  - 321 Advertising Copy, Layout & Production (3)
  - 325 Media Promotion (2)
  - 338 Business and Economics Reporting (3)
  - 340 Visual Communication (3)
  - 345 General Semantics in Journalism (2)
  - 360 Intermediate Writing (3)
  - 374 The Suburban Press (2)
  - 387 Journalism as Communications (2)

**Photojournalism Major** An additional 21 credit hours required:

- 105 News (3)
- 110 Editing (3)
- 140 Basic Press Photography (3)
- 144 Intermediate Press Photography (2)
- 306 Reporting (3)
- 341 Staff Photography (3)
- 342 Photojournalism (4)

**Suggested Electives:**

- 304 Communications Law (3)
- 336 The Graphics of Journalism (2)
- 345 General Semantics in Journalism (2)
- 360 Intermediate Writing (3)
- 362 Magazine Design (3)
- 363 Magazine Editing (3)

- 373 The Community Newspaper (3)
- 387 Journalism as Communication (2)

**Radio-Television Major** An additional 18 credit hours required:

- 101 Introduction to Broadcast News (3)
- 105 News (3)
- 304 Communications Law (3)
- 353 Broadcast Reporting (3)
- 355 Radio Reporting and Editing (3)
- 358 Television Reporting and Editing (3)

**Suggested Electives:**

- 110 Editing (3)
- 140 Basic Press Photography (3)
- 306 Reporting (3)
- 308 Law and the Courts (2)
- 326 Broadcast Advertising (3)
- 328 Retail Advertising (2)
- 332 Public Relations (3)
- 345 General Semantics in Journalism (2)
- 351 Television News Photography (2)
- 356 Television News Production (3)
- 357 Issues in Broadcast Management
- 359 Television Seminar (3)
- 382 Broadcast Public Affairs (3)
- 387 Journalism as Communication (2)

## SEQUENCE OF REQUIRED COURSES FIRST SEMESTER

**Advertising:** News (3) or Promotional Writing; (3) Advertising Principles (3); The Graphics of Journalism (2); Marketing course.

**Magazine:** History and Principles (3); Mass Media and Society (2); News (3).

**News-Editorial:** News (3); History and Principles (3); Mass Media and Society (2).

**Photojournalism:** News (3); History and Principles (3) or Mass Media and Society (2); Basic Press Photography (3).

**Publishing:** History and Principles (3) or Mass Media and Society (2); News (3); Advertising Principles (3).

**Radio-Television:** News (3); Advertising Principles (2-3); Introduction to Broadcast News (3).

## SECOND SEMESTER

**Advertising:** History and Principles (3) or Mass Media and Society (2); Advertising Copy, Layout and Production (3); Introduction to Selling (3); Marketing course.

**Magazine:** Advertising Principles (2-3) or The Graphics of Journalism (2); Editing (3); Reporting (3).

**News-Editorial:** Advertising Principles (2-3); Editing (3); Reporting (3).

**Photojournalism:** History and Principles (3) or Mass Media and Society (2); Advertising Principles (2-3) or Editing (3); Intermediate Press Photography (2).

**Publishing:** Editing (3); Reporting (3) or The Graphics of Journalism (2); History and Principles (3) or Mass Media and Society (2).

**Radio-Television:** History and Principles (3) or Mass Media and Society (2); Communications Law (3); Broadcast Reporting (3).

## THIRD SEMESTER

**Advertising:** History and Principles (3) or Mass Media (2) plus electives: Journalism Careers (0).

**Magazine:** Magazine Editing (3); Magazine Production (3) or Magazine Article Writing (3) or Advertising Principles (2-3) or The Graphics of Journalism (2); Journalism Careers (0).

**News-Editorial:** Newspaper Editing (3); Advanced Reporting (3); Communications Law (3); Journalism Careers (0).

**Photojournalism:** Advertising Principles (2-3) or Editing (3); Staff Photography (3); Reporting (3); Journalism Careers (0).

**Publishing:** Newspaper Editing (3); Newspaper Management (3); Reporting (3) or The Graphics of Journalism (2); Journalism Careers (0).

**Radio-Television:** History and Principles (3) or Mass Media and Society (2); Radio Reporting and Editing (3) or

Television Reporting and Editing (3) plus electives; Journalism Careers (0).

#### **FOURTH SEMESTER**

**Advertising:** Electives

**Magazine:** Magazine Article Writing (3); or Magazine Editing (3) or Magazine Production (3) plus electives.

**News-Editorial:** Advanced Newspaper Editing (3) plus electives.

**Photojournalism:** Photojournalism (4) plus electives.

**Publishing:** The Community Newspaper (3) plus electives.

**Radio-Television:** Television Reporting and Editing (3) or Radio Reporting and Editing (3) plus electives.

## **SPECIALIZATIONS AND COOPERATIVE AGREEMENTS**

The School of Journalism welcomes cooperative agreements with other disciplines. It expects those programs to enhance the education of journalism students and to provide a base for graduate work later.

The School offers students from other disciplines a program designed to provide an understanding of the news process—an understanding valuable to students and to the communications industry—and to allow them to enter the School's graduate program without delay upon completion of a bachelor's degree.

The School expects that cooperative agreements will result in formal programs for 12 to 15 hours of undergraduate study in each discipline by interested journalism students.

Students from other divisions with junior or higher standing may take non-laboratory courses in journalism without being admitted to the School. Permission of the journalism dean (initials on enrollment card) is required. Because of crowding in the School's media, courses directly related to the three media are usually not open to the outside students while they are undergraduates in another discipline.

### **AB-BJ COMBINATION**

Students who combine their studies in the School of Journalism with studies in the College of Arts and Science may obtain degrees from both. Two degrees may be granted to students when they have completed all requirements for the BJ degree and in addition have completed the equivalent of one semester's work amounting to at least 12 hours of credit (a total of at least 132 credit hours) and all other requirements for the arts and science degree.

### **BUSINESS AND ECONOMICS REPORTING**

To obtain the degree of Bachelor of Journalism with a concentration in business and economics reporting, students must meet requirements for the news-editorial major and pass 338, Business and Economics Reporting. They also must complete 12 hours of courses in the College of Business Administration or in the Department of Economics. A student interested in pursuing work toward a master's degree in journalism with some specialization in business journalism may do so by completing the professional and research courses regularly required for the degree and including in the program a selection of graduate-level courses in the College of Business Administration or in the Department of Economics, which are approved by the student's adviser.

## **MEDIA MANAGEMENT**

The School offers an area of concentration in media management to allow students with aspirations in that area to work with an adviser to choose a curriculum which can prepare them for positions in newsroom management, in newspaper business offices and in offices of broadcast management.

To obtain the degree of Bachelor of Journalism with a concentration in management, students must fulfill the following conditions:

1. They must be regularly admitted to the School.

2. They must meet the requirements for any one of the six sequences in the School and pass Journalism 399, Management in Media.

3. They must complete 12 credit hours of courses in the College of Business Administration. The following courses are highly recommended: Accountancy 36; Accountancy 37; Management 310, Personnel Management; Management 311, Collective Bargaining; Management 329, Organizational Behavior; Marketing 204, Principles of Marketing; Marketing 312, Marketing Management; and Finance 203, Corporation Finance.

4. They must pass one of the following courses in the School of Journalism: Journalism 328, Retail Advertising; Journalism 331, Advertising Management; Journalism 357, Issues in Broadcast Management; Journalism 368, Magazine Publishing; Journalism 375, Newspaper Management; or Journalism 376, Newspaper Circulation and Marketing.

5. They must complete a total of 120 credit hours and otherwise meet the conditions and regulations governing the awarding of the BJ degree. Students may earn six hours of upper-class credit in the College of Business and Public Administration.

## **SCIENCE, MEDICAL AND ENVIRONMENTAL REPORTING**

Students who wish to take science, medical, environmental or outdoor writing as an area of concentration may do so while enrolled in the news-editorial or magazine sequence leading to a Bachelor of Journalism degree. Requirements for these areas include the following:

1. Be regularly admitted to the School of Journalism.

2. Complete at least 30 hours in journalism, including History and Principles, News, Editing, Newspaper Editing, Advertising Principles and Practice, Journalism Careers, Mass Media and Society, Reporting, and Science Writing.

3. Complete at least 30 hours in the physical, biological and social sciences, and environment studies. See the faculty coordinator for these areas for listings of suggested courses.

4. Complete a total of 120 credit hours and otherwise meet requirements for the BJ degree.

## **PUBLIC RELATIONS**

There is no public relations sequence in the School of Journalism, but students can prepare themselves for work in that area by selecting appropriate courses to supplement their major requirements. They should arrange for advisement by the teacher of the public relations courses.

## **SOCIOLOGY-JOURNALISM**

This program permits journalism undergraduates to enter the Graduate School for work in sociology, and sociology undergraduates to enter the Graduate School for work in journalism, having already taken as many required courses as possible.

Journalism undergraduates may take up to 12 hours of sociology courses under the direction of an adviser in sociology; sociology undergraduates may take up to 16 hours of non-media courses in journalism, with the help of a journalism adviser.

Sociology students become eligible to take journalism courses when they have earned 60 credit hours. Journalism students may take sociology courses without being part of a formal program.

## **PUBLIC AFFAIRS JOURNALISM**

The basic aim of this program is similar to that of the sociology-journalism program: to prepare students for graduate work. Political science students with a minimum of 60 credit hours may take up to 13 hours of journalism in the public affairs option of a BS in Public Administration. Journalism courses recommended include History and Principles, News, Editing, Advertising Principles, and Mass Media and Society. While it is hoped the students will go on to Graduate School in journalism, the values of journalism courses are obvious for city officials who may never go beyond the bachelor's degree.

## **ACADEMIC POLICIES**

### **SEMESTER CREDIT HOURS (Maximums and Minimums)**

The hour, which is the unit of credit given at the University, is the equivalent of a subject pursued one period a week for one semester of 16 weeks.

A student in the School of Journalism may take no more than 16 hours a semester, except that an undergraduate student who has established a B average the year before may carry 17 or 18 hours, and one who has established an A average may carry 19 hours. In both instances, special permission of the dean is required.

A student may take no more than 10 hours of journalism courses per semester.

No student may take less than 12 hours of work in one semester, except that the dean may reduce the minimum in necessary cases. The maximum for students employed as graduate teaching assistants is 12 hours a semester; the minimum is 8 hours.

### **ADDITIVE HOURS**

The hours required for the BJ degree shall be increased when a student's unexcused absences from faculty-designated events exceed the allowable maximum announced by the faculty prior to the event.

## **PROBATION, SUSPENSION AND DISMISSAL**

Journalism students are placed on probation when, either their journalism or their overall, (term or cumulative) GPA falls below 2.0. Students may remain on probation no more than one term. They regain good standing when both their term and cumulative GPAs, for journalism and overall, climb to 2.0 or higher.

Students may be placed on academic probation and may be declared ineligible to enroll if they neglect their academic duties.

Students become ineligible to enroll for a period of one regular semester [suspended] when their term GPA (journalism or overall) is below 1.5; when they pass less than one-half of their work in any term; or when they are on probation and their term GPA is 2.0 or lower.

Students become ineligible to enroll for a period of one calendar year [dismissed] when their term GPA (journalism or overall) is below 1.0; when they pass less than one-fourth of their work in any term; or when they fail to perform their academic duties.

A student who has been declared ineligible to enroll may be readmitted only upon the approval of the dean of the school or college in which the student desires to enroll. As a condition of readmission, the dean may set forth stipulations with regard to minimum standards of academic work which must be maintained by the student. If the student, after readmission, again becomes ineligible to re-enroll, his ineligibility normally is considered permanent.

#### **'PASS/FAIL' GRADING**

A student may take a maximum of one Satisfactory/Unsatisfactory course each academic term and may present a maximum of 12 hours of S/U credit for admission to the School of Journalism. After admission to journalism, a student may take, on an S/U basis, up to 12 of the 60 hours required for the BJ degree.

A student receives a grade of Satisfactory for C or higher, and Unsatisfactory for D or lower. S/U courses are not available to students on scholastic probation.

Courses taken on an S/U basis are not used in calculating a student's grade point average.

No student may take a course specified as a requirement in his major on an S/U basis.

#### **ETHICS OF JOURNALISM**

The School of Journalism is committed to the highest standards of academic and professional ethics and expects its students to adhere to those standards. Students are expected to observe strict honesty in academic programs and as representatives of school-related media.

Should any students be guilty of plagiarism, falsification, misrepresentation or other forms of dishonesty in assigned work, they may be subject to a failing grade from the course teacher and such disciplinary action as may be recommended pursuant to University regulations.

#### **ADDING AND DROPPING CLASSES**

Students may change their original enrollment only with the approval of their adviser and the dean. No student may register in the School or in any course, other than Problems, Special Readings, or Research, after the expiration of two weeks following the first day of classes in regular session or the equivalent thereof in a shorter session.

Students may withdraw from a course without penalty until six weeks after the semester begins, so long as their total enrollment does not fall below the 12-hour minimum requirement.

Students who withdraw from a course after

the six-week period are eligible to receive a grade of W if they are making a grade of D or better in the course.

Students who wish to withdraw from a course must process the appropriate form no later than two weeks before the last scheduled day of classes.

The petitioning procedure may begin on the third classwork day of each term and can be initiated only by the student.

Cessation of attendance in a given class does not constitute a formal withdrawal, and attending a course without officially petitioning does not entitle a student to receive credit for the course. Petitions are not approved retroactively; therefore, changes in class schedules should be effected immediately. Add-drop forms are available in Office of the Dean, 122 Neff Hall.

#### **SUMMER SESSIONS**

The School of Journalism offers two summer sessions in which most of its media laboratory courses are offered. The first session begins in mid-May; the second in early July. Students may combine one or both of the sessions with the regular University summer session if their enrollment does not exceed nine hours at any one time.

Many non-media journalism courses, including graduate courses, are offered in the regular University summer session. Courses offered in the journalism summer sessions include those courses in which lab work is completed under faculty supervision on the *Missourian*, KBIA and KOMU-TV.

Classes are smaller in the summer sessions, and students have a maximum opportunity to consult on a one-to-one basis with faculty members. Because labs are smaller, students' opportunities are much greater for publishing and broadcasting experience on the media.

#### **INTERSESSION**

An intercession is offered during the Christmas holidays. Enrollment is limited, and work is in laboratory courses only.

In a term preceding a student's enrollment in intercession, the student must enroll for the lecture portion of the intercession course, in 102, Intercession Colloquium (0).

Students who wish to do some of their work in intercession should make arrangements for enrollment with the instructor of the intercession courses as soon as possible after they are admitted to the School.

#### **INDEPENDENT STUDY**

History and Principles of Journalism and High School Journalism are offered by correspondence for students who have completed at least 60 hours of college work. Students taking the BJ degree are required to take History and Principles of Journalism on the campus. Students who are interested in High School Journalism but unable to attend summer school are urged to take this course through the Center for Independent Study.

A maximum of six hours credit, approved in advance by the dean of the School of Journalism, may be earned through independent study and accepted as partial fulfillment of the requirements for upperclass arts and sciences.

#### **GRADUATE-LEVEL COURSES**

Undergraduate students should not be en-

rolled in 400-numbered courses which are intended for graduate students only. The exception is undergraduates who have dually enrolled in journalism and the Graduate School.

Students may dually enroll if they are in the top half of their class, are within 15 hours of graduation and have the approval of both deans.

## **STUDENT SERVICES**

### **ADVISING AND COUNSELING**

The University provides many services for students in the areas of academic, career, and personal advising and counseling.

The faculty of the School of Journalism serve as academic advisers to prejournalism and journalism students. Students are expected regularly to seek the advice of the faculty in the selection of appropriate courses and the development of the student's career interests.

The School provides advisement forms on which the student is expected to maintain the record of his academic course work. The forms will be used by student and adviser to plan the student's program.

The responsibility for meeting the admissions and graduation requirements rests with the student.

### **PLACEMENT SERVICES**

The School of Journalism maintains a Placement Office to help its graduates find positions for which they are qualified. During the 1980-81 school year, the office processed 1,591 job openings. The office referred 1,019 students and alumni to these jobs; arranged 37 groups of interviews for graduating seniors with newspapers, magazines, advertising agencies, industry, and press associations; placed students for 65 summer jobs; and placed 290 graduates in journalism-related jobs. The School of Journalism does not guarantee placement, but does assist in every way possible those graduates seeking employment.

### **STUDENT ORGANIZATIONS**

The **University of Missouri Journalism Students Association Inc.**, was granted a state charter May 13, 1922. All students regularly enrolled in the School of Journalism automatically become members of the Association, with administrative officers elected annually.

**Kappa Tau Alpha** is an honorary national society for journalism students. Membership is based on scholastic standing, with the top 10 percent of students eligible. The object of the society is the promotion of scholarship and high ideals among students preparing for journalism. Kappa Tau Alpha was founded March 31, 1910, at the University of Missouri-Columbia. This chapter is now named the Frank Luther Mott Chapter. Each year the national fraternity presents the Frank Luther Mott Kappa Tau Alpha Award for Printed Research in Journalism. The monetary value is \$250. National headquarters of Kappa Tau Alpha is located at the School of Journalism.

**Alpha Delta Sigma** is a national honorary society that recognizes outstanding scholastic achievement among students of advertising. Founded on this campus in 1913, the society now is sponsored by the American Advertising Federation and honors those students who have demonstrated distinctive talent and ability in their academic endeavors.

**University of Missouri AAF College Chapter Advertising Club** is an organization of students whose primary interest is in advertising. The club is affiliated with the American Advertising Federation, the only national association that brings together all segments of advertising.

**Chi Omicron Mu** is a quantitative research fraternity established by graduate students in journalism in 1965. Its purpose is to stimulate interest in communications research and to provide a forum for the discussion of topics in this field. Membership is open to graduate students in various communications disciplines and is by invitation only. The principal qualifications are activity in communications re-

search and demonstration of a relatively high aptitude for creative work in communications.

**Kappa Alpha Mu**, a national professional photojournalism fraternity, was founded April 20, 1945, at the University of Missouri-Columbia to promote better photographic journalism. A grade of C or better in all other subjects, a probationary period of pledgeship and a grade of B in photographic work are required.

**The Society of Professional Journalists**, Sigma Delta Chi, was founded at DePauw University April 7, 1909. The Missouri chapter was installed Feb. 22, 1913. Sigma Delta Chi defined the term "journalism" to include: the direction of the editorial policy of, editing of, and the writing of news and opinion for newspapers, magazines, press or syndicate services, professional or business publications, and radio or television stations.

**Women in Communications** is a national professional journalism fraternity for women, founded as Theta Sigma Phi at the University of Washington, April 9, 1909. It aims to bring college-trained women together in the profession of journalism, to improve the working conditions for women in this profession and to inspire its members to great efforts in this field. A grade average of C or higher, and grades of B in six hours of professional work in journalism are required for initiation.

## FINANCIAL AID TO STUDENTS

Financial aid to students enrolled in residence at UMC is offered in the form of fellowships, scholarships, assistantships, student loans, and student grants and employment. Students in need of financial aid should apply directly to Student Financial Aids, 11 Jesse Hall, UMC, Columbia, Mo. 65211.

In addition to financial aid given through the campus financial aid officer, the School of Journalism has an excellent scholarship foundation program. About \$100,000 is awarded annually. Most of the awards require recipients to be enrolled full-time in the School of Journalism to be eligible.

The school also employs many of its students as assistants in the School's media or to assist the faculty in conducting the non-media laboratory courses.

Applications for Journalism Scholarships should be sent to the chairman of the scholarship committee at the School of Journalism. The deadline for application is Feb. 1. Applications for the assistantships should be made to the faculty members who supervise the work.

## SCHOLARSHIPS

In addition to grants open to all students, the scholarships, fellowships, prizes and loan funds listed on the following pages are offered each year for students in journalism. Applications should be directed to the chairman of the scholarship committee, School of Journalism, before Feb. 1.

Verification of financial aid is made through the Office of Student Financial Aids, 11 Jesse Hall, UMC. The forms must be on file to conform with the School of Journalism deadline of Feb. 1.

**Beatrice Adams Scholarship in Journalism:** An annual award of \$1,000. A gift to the School from Bea Adams, one of the outstanding advertising women in the world, to the woman student who shows highest creative promise in advertising.

**Philip L. Blazer Memorial Scholarship:** Income from a gift of \$15,000 awarded annually to a Missouri resident.

**Oliver K. Bovard Memorial Journalism Scholarship:** A stipend of \$300, plus summer employment on the *St. Louis Post-Dispatch*, awarded annually to a student who has completed the first year in journalism.

**Hal Boyle Scholarship:** An annual award, consisting of the interest on a fund created by the friends of Hal Boyle, BJ

'32, to a student or students demonstrating excellence in journalism.

**Olive Coates Memorial Scholarship:** Awards paid annually from income on a gift of \$50,000 to undergraduate or graduate students.

**Tilghman R. Cloud Memorial Scholarship:** An annual award of \$200 made possible by the family and friends of the late Missouri publisher and UMC alumnus Tilghman R. Cloud of Pleasant Hill.

**David E. Dexter Scholarship:** Income from a \$6,000 gift from Richard Dexter awarded annually to a student in the School of Journalism who also is a varsity athlete in football or wrestling, with a C or better average in all subjects except foreign language and mathematics.

**Fairchild Publications Scholarship:** A stipend of \$2,000 to a student who demonstrates serious intent to pursue a career in business journalism. The scholarship may be renewed for an additional year.

**Eugene Field Scholarship:** Open to all students in journalism, and awarded annually to one who is well equipped in professional ideas and in general newspaper-making ability. The scholarship consists of the income from \$1,500.

**Ann M. Frank Scholarship:** A \$1,000 stipend offered annually to a student in the Washington reporting program of the School of Journalism, the gift of Mr. and Mrs. Maurice Frank.

**Benjamin Franklin Scholarship:** A \$1,000 stipend offered annually to a student in journalism. The scholarship is endowed by the late John P. Herrick in memory of Benjamin Franklin.

**Margaret Ann Wheeler Gilbert Memorial Scholarship:** A \$1,000 stipend to a third- or fourth-year undergraduate student in the School of Journalism who has attained a 3.5 GPA.

**Bob Goddard Memorial Scholarship:** Income from a fund established by friends of the long-time *St. Louis Globe-Democrat* columnist and an alumnus of the School of Journalism, provides the stipend for an award to an undergraduate majoring in print journalism.

**John P. Herrick Scholarships:** Two \$1,000 stipends offered annually to students entering the School of Journalism. Residents of New York state are given preference.

**Mrs. John Pierce Herrick Scholarships:** Two \$1,000 stipends awarded annually to two young women enrolled in journalism.

**Robert M. Ibrahim Scholarship:** Income from a grant of \$10,000 awarded annually to an undergraduate student who demonstrates interest in work in Asia or the Middle East.

**INGAA Scholarships in Business Communications:** Two \$300 scholarships awarded to graduate or undergraduate students in journalism who demonstrates a need, interest and talent in business news writing. Funds are provided by the Interstate Natural Gas Association of America. Deadline for applications is Oct. 1.

**Robert M. Jackson Scholarship:** A \$250 scholarship awarded once each year to a graduate student in journalism.

**H.S. Jewell Scholarship:** Awarded annually to assist a student in journalism, the scholarship represents the annual income on a \$5,000 gift.

**John W. Jewell Scholarship:** Paid from the income on a \$5,000 gift, this scholarship is awarded annually to a student in journalism.

**Journalism Alumni Scholarship:** Open to all students in the School of Journalism and awarded annually to one chosen on a basis of meritorious class work, this scholarship, given by journalism alumni, consists of the interest on \$1,500.

**Kansas City Star Award for Excellence in Journalism:** An annual scholarship of \$500 given to a junior journalism student for use in the student's senior year.

**Kansas City Press Club Scholarship:** An award of \$500 made annually by the Kansas City Press Club, professional chapter of Sigma Delta Chi, to a junior in journalism.

**Kobayashi Scholarship:** Fuji Photo Film USA Inc. awards \$1,000 annually in honor of Mr. Setsutaro Kobayashi, board chairman of the firm's parent company in Tokyo. The scholarship is awarded to a senior in the School of Journalism.

**KTVI Journalism Scholarship:** A total of \$6,500 awarded to minority students on the basis of the student's potential for a successful career in journalism, preferably broadcast journalism.

**Besse Marks Memorial Journalism Scholarship:** Awarded annually to a student in journalism or one entering the School, with half of the annual stipend of \$600 paid at the beginning of each semester. Preference is given to applicants from Wayne County, N.Y., and Kansas City, Mo.

**Carol Jean Cherry Mehler Memorial Scholarship:** Income from an endowment offered to a member of Alpha Mu Chapter of Kappa Alpha Theta.

**Edward R. Murrow Scholarship:** A stipend of \$1,000

provided by Edward Asner, awarded to a broadcast journalism student.

**Mary S. Pryor Scholarship:** A \$500 stipend offered annually for one academic year to a woman student in journalism.

**Donald W. Reynolds Foundation Scholarship:** \$4,000 to a junior student in upper 10 percent of class, renewed for senior year. Awarded by judges selected by the Reynolds Foundation.

**Bruce Rice Scholarship:** A \$1,500 stipend granted by the Bruce Rice Scholarship Committee to a junior who plans a career in broadcast journalism or music at UMC. Scholarship may be renewed for senior year. Preference is given to applicants from the Kansas City area. Apply to Bruce Rice Scholarship Fund, Harry S. Truman Sports Complex, P.O. Box 7957, Kansas City, Mo. 64129.

**Inez Callaway Robb Scholarship:** Interest on \$10,000 awarded to students enrolled in the School of Journalism.

**Theodore Roosevelt Scholarships:** Two \$1,000 stipends offered annually to students in journalism. The scholarships are endowed by John P. Herrick in memory of Theodore Roosevelt.

**J. Richard Sage Scholarship:** Annual scholarship to student enrolled in the School of Journalism with preference to seniors.

**St. Louis Post-Dispatch Guild Unit Advertising Scholarship:** Half of a \$300 stipend awarded at the beginning of each semester to a journalism student majoring in advertising.

**St. Louis Post-Dispatch Scholarships:** (up to four each year for minority students). The *St. Louis Post-Dispatch* selects a senior resident in an accredited high school or junior college in Jefferson, St. Charles, or St. Louis counties or the city of St. Louis, Mo., or Madison or St. Clair, Ill., counties. Renewable, based on satisfactory scholastic record; apply by April 1 to Mr. James Millstone, assistant managing editor, *St. Louis Post-Dispatch*; \$1,800.

**Virginia McElroy Schwartz Scholarships:** Awards made annually from the income on a gift of \$66,000 from the estate of Mrs. Robert P. Schwartz.

**Science Writing Scholarship:** An annual award of \$600 given by a friend of the University to recognize outstanding achievement in science writing.

**Scripps-Howard Scholarship:** A \$1,000 stipend granted by the Scripps-Howard Foundation to a student who plans a career in journalism. Application forms are available from the Foundation, 1100 Central Trust Tower, Cincinnati, Ohio 45202.

**Eugene W. Sharp Scholarship:** Income from a fund established by journalism alumni in honor of Professor Sharp, who was a member of the faculty for 45 years. The stipend approximates \$450 annually.

**John H. Shea Memorial Fund:** Income from interest will be used for a scholarship award for students enrolled in the School of Journalism with preference given to those students who reside in Lafayette and Macon, Mo., counties.

**Sigma Delta Chi Undergraduate Scholarships:** Annual awards of \$100 each to the two highest ranking journalism students. One of them is awarded to the highest ranking member of Sigma Delta Chi. Established by the Missouri chapter of the Professional Journalism Society.

**Jay L. Torrey Scholarship:** Awarded annually to a woman student in journalism considered well prepared to do the work of a journalist. The scholarship consists of the income from \$2,000.

**Norman Hurst Trenholme Journalism Scholarship:** The income from a gift of \$5,000 awarded annually to a junior, senior or graduate student in journalism.

**Sara Lockwood Williams Scholarship:** An annual stipend of \$500 paid from interest on a bequest by the late Mrs. Walter Williams, a member of the faculty. In consideration of her keen interest in women in journalism, the scholarship committee gives preference to women students.

**Walter Williams Scholarships:** Two \$1,000 stipends offered annually to students upon entering the School of Journalism.

**Lyle Wilson Scholarship:** An award of \$1,000 presented annually by the Scripps-Howard Foundation, in honor of the late correspondent and columnist.

**Lafayette Young Scholarships:** Two \$1,000 stipends offered annually to students upon entering the School of Journalism.

## FELLOWSHIPS

**Morris E. Jacobs Fellowship:** A grant of \$1,000 awarded each year to a student in journalism or a candidate for the master's degree.

**Walter Williams Memorial Fellowship in International Press Problems:** Interest on funds of the Walter Williams

Memorial Foundation available every third year for a fellowship to be awarded to a candidate with a master of arts degree in journalism who has passed the language examinations and is proceeding for the PhD degree. The candidate should have spent two preceding graduate years specializing in the field of study roughly defined as the international press.

## PRIZES AND AWARDS

**Sara Allen Award:** A \$50 prize honoring retired Professor Allen presented to a woman student who writes an outstanding feature story for the *Missourian*.

**W.B. Bickley Award in Newspaper Editing and Design:** Income from a fund established by alumni and friends honoring Professor Bickley, a member of the journalism faculty from 1941 until his death in 1973, in recognition of excellence in newspaper editing.

**Cowgill Blair Annual Incentive Award:** Award for a senior journalism student in editorial writing or newspaper management from the income of a gift of \$4,000 in memory of the former chairman and president of Joplin, Mo. Globe Publishing Co. and former member of the University Board of Curators.

**Dennis Briskin Cable Awards:** Two awards of \$100 each, one to an undergraduate and one to a graduate student in journalism, whose writing best embodies the qualities of clarity, accuracy, brevity, logical organization and effectiveness.

**Sam Bronstein Prizes in Journalism:** Three prizes: \$300, \$250 and \$200 each, awarded annually for the best news features written by journalism students in 307, and three for 306.

**Chinese-American Essay Prize:** The income from \$4,000 awarded annually in cash for the best essay on Chinese-American affairs, under conditions announced annually by the School of Journalism. Eligible for competition are regularly enrolled UMC Journalism students of American or Chinese nationality.

**Clinton H. Denman Freedom of Information Award:** An annual award of \$250 to the student in journalism who does the best research and writing in the area of Freedom of Information.

**Tom Duffy Feature Award:** An annual prize of \$25 from a gift of a former student honors retired Professor G. Thomas Duffy. The winner is chosen on the basis of performance in feature writing for the *Missourian*.

**Cal Fussman Sports Reporting Award:** \$50 to Missouri's "finest" sports reporter.

**Cal Fussman Sports Writing Award:** \$50 to "finest" sports writer.

**Dorothea Florence Gaston Media Promotion Award:** \$75 for academic and professional performance.

**The Betty Luker Haverfield Magazine Prize:** An annual prize of \$250. Awarded to an outstanding journalism student selected by the magazine faculty.

**Kappa Alpha Mu Prize:** An annual prize of \$40 to a graduating senior in recognition of outstanding individual progress in photographic work.

**Kappa Tau Alpha Prize:** An annual prize of \$100 to the highest ranking graduating senior in the School of Journalism.

**Edward C. Lambert Award:** Income from a fund established by alumni of the broadcast program of the School. The winner is the student who promises most potential in broadcast management.

**Men's Fashion Association of America Prize:** Twice each year the MFAA presents an award to a *Missourian* reporter, providing funds to cover the press preview of men's fashions usually held in Spring Lake, N.J.

**Frank Luther Mott Historical Research Graduate Award:** One or two awards of \$1,000 granted each year to an outstanding student who is working on a thesis relating to the history of journalism.

**Donald W. Reynolds Foundation Advertising Salesmanship Award Fund:** Awards amounting to \$2,000 a year distributed to outstanding students in the course, Advertising Salesmanship, at the end of each month and of each term.

**Kosti Ruohomaa Award:** An annual stipend of \$150 given by Black Star Publishing Co., to the photojournalism student whose work best exemplified the tradition and philosophy of the late Kosti Ruohomaa.

**Carl Sall Retail Advertising Award:** \$100 to recognize achievement in retail advertising.

**St. Louis Advertising Club Awards:** Each year since 1947, two senior advertising students have been guests of the Advertising Club of Greater St. Louis for three days of tours, demonstrations and seminars.

**Steve Trenkman Award in Television News:** A \$50 stipend in recognition of excellence in television news work in the School of Journalism.

**Vernon E. Wilson Medical Writing Award:** An award of \$25 presented annually to a student who has demonstrated exceptional ability in writing about health or medicine for publications directed to a general audience.

## SPECIAL FUNDS

**Mary Jo Rigler Clendenon Loan Fund:** A \$500 fund established by Mrs. Helen G. Rigler.

**Dorothy Flynn Loan Fund:** A gift of \$1,500 from the family and friends of Mrs. L. Doral Flynn.

**Clara Virginia Forrest Loan Fund:** Grants of \$100 each from a \$500 gift from the estate of Clara V. Forrest. Students are requested to repay the money without interest after graduation.

**Clarence Dodds Lockwood Memorial Student Loan Fund:** A \$50,000 bequest of Earline A. Lockwood.

**Missouri Press Women Loan Fund:** A gift of \$1,500 from the Missouri Press Women used for loans to women students in the School of Journalism.

**Reader's Digest Travel Fund:** A gift of \$1,000 from the Reader's Digest Foundation pays expenses of students in journalism for necessary travel to gather material for feature stories, magazine articles, and research in connection with their class work.

**Donald W. Reynolds Foundation Loan Fund:** A \$5,000 annual loan fund for the study of journalism and allied fields.

**Stern Placement Loan Fund for Magazine Majors:** A \$3,000 fund established by the Philip M. Stern Family Fund to make interest-free loans to magazine majors who are about to graduate, and who need financial assistance to find employment in the field of journalism.

## FACULTY

### ADMINISTRATION

**James D. Atwater,** dean, AB, Yale University

**Donald J. Brenner,** associate dean, professor, PhD, University of Missouri-Columbia

**Roger A. Gafke,** associate dean, professor, MA, University of Missouri-Columbia

### ADVERTISING

**Linda J. Shipley,** chairperson, associate professor, PhD, University of Pennsylvania

**Jesse Oscar "Jay" Anthony,** instructor, MA, University of Missouri-Columbia

**Gail Felicia Baker,** instructor, MA, Roosevelt University

**Ruth B. Bratek,** associate professor, MA, University of Missouri-Columbia

**William A. Bray,** associate professor, BJ, University of Missouri-Columbia

**Won H. Chang,** professor, PhD, University of Iowa

**Frank L. Dobyns,** professor emeritus, MA, University of Missouri-Columbia

**Russ Doerner,** associate professor, BJ, University of Missouri-Columbia

**Dale L. Gaston,** associate professor, AM, University of Oklahoma

**Milton Gross,** professor emeritus, MA, University of Missouri-Columbia

**Robert W. Haverfield,** professor, MA, University of Missouri-Columbia

**J. Robert Humphreys,** associate professor, MA, University of Missouri-Columbia

**William Stephenson,** professor emeritus, PhD, Oxford (England)

**Guy W. Tunncliffe,** associate professor, MBA, Case Western Reserve University

**Thomas A. Turner,** instructor, MA, University of Missouri-Columbia

### BROADCASTING

**Mackie Morris,** chairman, instructor, MA, University of Missouri-Columbia

**Roger H. Allbee Jr.,** instructor, AB, University of Missouri-Columbia

**Phillips R. Brooks,** assistant professor, MA, University of Missouri-Columbia

**W. David Dugan Jr.,** professor, AM, St. Bonaventure University

**Rod G. Gelatt,** professor, AM, University of Iowa

**Edward C. Lambert,** professor emeritus, PhD, University of Missouri-Columbia

**W. Richard Nelson Jr.,** associate professor, MA, University of Missouri-Columbia

**Harvey Dan Spaulding,** instructor, MA, University of Michigan

**Patricia Gorman Spaulding,** instructor, BA, Western Illinois University

## NEWS-EDITORIAL

**Daryl R. Moen,** chairman, professor, MA, University of Minnesota

**Stanley E. Abbott,** instructor, BA, California State University at Los Angeles

**John Angelides,** adjunct professor, BJ, University of Missouri-Columbia

**Brian S. Brooks,** associate professor, MA, University of Missouri-Columbia

**Jay Buskinsky,** assistant professor, MS, Columbia University

**Jane E. Clark,** associate professor, MA, University of Missouri-Columbia

**Ruth C. D'Arcy,** professor, BA, Wayne State University

**G. Thomas Duffy,** professor emeritus, High School, East St. Louis, Ill.

**Clifton C. Edom,** professor emeritus, BJ, University of Missouri-Columbia

**Paul L. Fisher,** professor, PhD, University of Missouri-Columbia

**Roy M. Fisher,** professor, BJ, Kansas State University

**James K. Gentry,** instructor, MA, University of Missouri-Columbia

**Mark Godich,** instructor, BJ, University of Missouri-Columbia

**A. Edward Heins,** associate professor, BJ, University of Wisconsin

**David Hending,** adjunct professor, MA, University of Missouri-Columbia

**George Kennedy,** associate professor, PhD, University of Missouri-Columbia

**Robert P. Knight,** professor, PhD, University of Missouri-Columbia

**Ken Kobre,** associate professor, MA, Brown University

**Karen K. List,** assistant professor, PhD, University of Wisconsin

**Harold Lister,** associate professor, MA, University of Missouri-Columbia

**Barbara F. Luebke,** assistant professor, PhD, University of Missouri-Columbia

**Angus McDougall,** professor, MA, Northwestern University

**Daryl R. Moen,** professor, MA, University of Minnesota

**Thomas C. Morelock,** professor emeritus, MA, University of Missouri-Columbia

**Ernest C. Morgan,** professor, PhD, University of Texas-Austin

**J. Philip Norman,** professor emeritus, MA, University of Missouri-Columbia

**Joye Patterson,** associate professor, PhD, University of Missouri-Columbia

**George Plea,** instructor, MA, Sangamon State University

**Daniel Steven Potter,** instructor, BJ, University of Missouri-Columbia

**Donald P. Ranly,** professor, PhD, University of Missouri-Columbia

**Donald G. Romero,** associate professor emeritus, PhD, Brown University

**Keith P. Sanders,** professor, PhD, University of Iowa

**Regina Sherard,** instructor, MA, Michigan State University

**Eugene W. Sharp,** professor emeritus, MA, University of Missouri-Columbia

**Pat Smith,** instructor, MA, University of Missouri-Columbia

**Dale R. Spencer,** professor, JD, University of Missouri-Columbia

**William H. Taft,** professor emeritus, PhD, Case Western Reserve University

**Robert L. Terrell,** associate professor, PhD, University of California-Berkeley

**Russell G. Todd,** assistant professor, PhD, Stanford University

**Steve Weinberg,** assistant professor, MA, University of Missouri-Columbia

**John Whale,** assistant professor, AM, Corpus Christi College, Oxford (England)



# SCHOOL OF NURSING

## HISTORY

Nursing education at the University of Missouri-Columbia began in 1901 with the establishment of Parker Memorial Hospital Training School of Nurses. In 1920, the University assumed responsibility for the School, changing the curriculum to a five-year program of nursing and arts and science courses. The Board of Curators established the Department of Nursing Education within the School of Medicine in 1949. The name was changed to School of Nursing in 1954, and in 1973 the School became autonomous. The University of Missouri-Columbia has offered a program leading to a Bachelor of Science in Nursing since 1939. A graduate program leading to the master of science degree has been offered since 1968.

The Nursing School Building is the latest addition to the health sciences complex, which also includes the Medical Sciences Building; a library; the 500-bed teaching hospital (including 44 bassinets in both well-baby and neonatal intensive care units) with its corresponding outpatient department, and emergency service the 52-bed Howard A. Rusk Rehabilitation Center and its outpatient clinics; the 87-bed Mid-Missouri Mental Health Center; and the 460-bed Harry S. Truman Memorial Veterans Administration Hospital.

## PHILOSOPHY

The School of Nursing, an autonomous educational division within the University of Missouri-Columbia, derives the broad outline of the philosophy and purposes from those of the University. The faculty has the responsibility for implementing the three major functions of the University—teaching, research and service. The faculty of the School believes that nursing is a practice discipline which is developing a structured body of knowledge. As a practice discipline, the education of professional nurses focuses both on the theoretical base and on the applied base. The faculty accepts Orem's self-care-deficit theory of nursing as a valid and reliable general concept of nursing upon which to structure nursing knowledge and develop nursing curriculum and nursing practice.

Man, used in the sense of human beings collectively, is a social organism with rational powers and as such symbolizes and formulates purposes about, and acts on, self, others and the environment. The person, or individual human being, is an existent entity, a dynamic being in a continuing process of development. Unity is integral to a person as a human being. Each adult person has the right and responsibility to care for self, to maintain rational life and health, and also may have such responsibility for others.

Health is a term which describes the state of wholeness or integrity of the individual human

being. The essence of health is the capacity to live as a human being within one's physical, biological, and social environment, achieving some measure of the life potential unique to man. It further implies the ability of the individual to function in a manner acceptable to self, social and cultural reference groups. The responsibility for one's own health implies that the individual is the central figure in the health care team.

Nursing, as a human service, has as its special concern the individual's need for self-care action and the provision and management of it on a continuous basis in order to sustain life and health, recover from disease or injury, and cope with their effects. Individuals who have needs for self-care of a positive, therapeutic quality and who have limitations for its management and maintenance seek or receive assistance from individuals with specialized nursing knowledge, skills and attitudes. The creative end product of nursing is a nursing system, that is, a system of concrete actions produced from deliberate, discrete actions of nurses and clients/patients.

Nursing is a helping profession which has caring and assisting as two of its major characteristics. It is a form of action which assists persons with actual or potential self-care limitations to achieve health results. Nursing provides service to individuals and groups of persons in a variety of settings. Nursing is viewed as a system and which, though frequently interactive, has the capacity of functioning autonomously.

Nursing uses a professional process to assess and meet the self-care needs of clients/patients. This nursing process is unique because of the particular philosophy, goals, knowledges, skills, and client relationships which are maintained. When this process is applied within a general concept of nursing, there exists a cognitive framework within which to develop deliberative and creative nursing action. Such a framework makes it possible to relate relevant content from the natural, social, behavioral, and medical sciences, the humanities and education. Furthermore, it promotes the development of prescriptive nursing theory.

Nursing education within this University focuses on professional nursing education and practice. Through nursing education with a broad liberal base, the practitioner is able to design systems of nursing care for individuals and groups and to perform in any setting where the need for nursing manifests itself. Professional nursing requires a value system within which to make practice decisions. This value system, though individually derived or held, is based on belief in the inherent uniqueness and dignity of man and is derived from deliberative thought.

Because of individual learning styles and

personality, alternative methods of reaching the same outcome criteria are provided. The faculty believes that responsibility for learning rests primarily on the learner and that learning takes place through the active behavior of the student. This responsibility for learning continues throughout the professional career. The faculty's role is to specify what should be learned, state the expected performance objectives, suggest ways of learning, facilitate achievement by preparing or making available necessary materials, make an evaluation of the level of accomplishment and provide corrective feedback. Education for a practice discipline requires genuine collaboration between educational and service institutions to provide real life experiences for learning.

## PURPOSE

The purposes of the School of Nursing reflect the commitment to the teaching, research and service missions of the University. The education programs within the School—baccalaureate, graduate and continuing education—are designed to:

- 1) prepare a professional nurse whose practice reflects:
  - a) the ever-changing needs of society for health care in general and assistance with self-care in particular;
  - b) the use of a dynamic concept of nursing which provides the focus for practice;
  - c) the ability to use or contribute to the continuing development of nursing as a practice discipline with a theoretical base;
  - d) creativity, self-direction and critical thinking;
  - e) application of knowledge from the natural, social behavioral and medical sciences; the humanities; and education;
- 2) prepare a person who can perform as a self-directing citizen in a democratic society;
- 3) provide opportunities for continuing development of professional nursing practice and individual professional growth; and
- 4) contribute to the development and improvement of nursing through evaluation and research.

## ACCREDITATION

The UMC School of Nursing is fully accredited by the Missouri State Board of Nursing and by the National League for Nursing. The baccalaureate graduate, if not previously licensed, is eligible to apply to write the state licensing examinations to become a registered professional nurse.

## ADMISSION

The undergraduate nursing program is planned for a five-semester sequence, with the student completing three semesters (second semester sophomore level) before admission to the School of Nursing. Preference is given to Missouri residents for admission to the undergraduate program.

Applications are evaluated by the School of Nursing Undergraduate Admissions and Progression Committee each March and October. Applicants are responsible for ensuring the materials are received in the UMC Admissions Office, 130 Jesse Hall, by March 1 for admission in the summer or fall semester and by Oct. 1 for admission in the winter semester. An application is considered complete when the following materials are in the applicant's file in 130 Jesse Hall:

1. UMC application for admission or, for current UMC students, the application for transfer of divisions.
2. Official transcripts of all college course work.
3. A record of current course enrollment.
4. Standardized test results.

Applicants, whose files are still incomplete after March 1 or Oct. 1, must reapply the following year. Admission is provisional and dependent upon completion of the remaining specified pre-nursing courses and maintenance of the minimum grade point average.

### ADMISSION REQUIREMENTS

#### Pre-Nursing Curriculum (Freshman Year)

##### Required Courses

- English Composition (3)  
(if exempted, a literature course)
- Introductory Chemistry (5)
- \*Introductory Zoology or General Biology (5)  
(including laboratory)
- American History or Government (3-5)  
(Missouri State Law Requirement)
- General Sociology or General Anthropology (3)  
(Cultural Anthropology)
- General Psychology (3)
- Logic (3)
- Literature (2-3)
- College Algebra or Statistics (3)  
\*Zoology is preferred.

Recommended schedules for the 1st semester Sophomore year are:

Anatomy 202	5	Physiology 201	5
Microbiology 205	4	Prin. of Hum. Devel.	3
Adv. Behavioral/ Social Science	OR	English/Lit. Philosophy	3
English/Literature	3	Adv. Behav/Soc. Science	3
	15		17

### ADMISSION CRITERIA

A formula that gives equal weight to each of the criteria is used to rank School of Nursing applicants. Applicants (both new and readmitting) are considered on a competitive basis within the current pool of applications for each admission period. Admission criteria are:

1. Completion of 30-33 graded semester hours in prescribed pre-nursing courses listed above, with a minimum cumulative grade point average of 2.50 (A = 4.0); and verification of current enrollment in the recommended first-semester sophomore schedule.
2. High school rank (as recorded on high school transcript).
3. School and College Ability Test Score (SCAT) Form 1C.

At least five graded hours of both biological

science and chemistry must be completed before an applicant is considered for admission.

### REGISTERED NURSE STUDENTS

Registered nurse applicants must meet the same admission standards except that RNs are excused from the zoology requirement. They must be currently licensed to practice nursing or be eligible to take the state board of nursing examination before the end of the first semester of enrollment (the latter are admitted provisionally).

### TRANSFER STUDENTS

Students wishing to transfer to UMC from another accredited college or university are subject to the academic regulations established by the UMC Faculty Council concerning transfer of credit. Transfer of credit is described in the Academic Regulation section of this catalog.

To be admitted to the School of Nursing transfer students must have completed the required courses and met the admission criteria described above.

A maximum of 64 semester hours of credit may be transferred from a community/junior college. The last 24 hours must be taken in residence.

Missouri residents are given preference for admission. No non-resident has been admitted for the past two years because of the increase in the number of qualified Missouri residents applying.

## STUDENT SERVICES

### ADVISING

Each student in the School of Nursing is assigned a faculty adviser who helps plan schedules, gives information concerning UMC and the School of Nursing policies, and is available for consultation about academic or professional matters.

### HEALTH

Information about the Student Health Service is located in the General Information section of this catalog. Nursing students participate in a variety of educational experiences both on-campus and off-campus. The School of Nursing does not assume responsibility for health care expenses incurred in either setting. Students assume responsibility for all health care for illness and injury, including emergency treatment.

### PLACEMENT

The large number of employment opportunities available to nursing graduates has precluded the need for a placement office within the School.

## STUDENT ORGANIZATIONS

**Undergraduate Nursing Association.** All undergraduate nursing students are members of the UNA. Executive power is vested in the Nursing Student Council, which is composed of elected executive officers, class officers and student representatives to the student faculty committees. Council meetings are open to all students, and all UNA members have voting privileges. The UNA gives nursing students a voice in affairs affecting their academic and social lives; serves to enhance students' educational and social environment; improves communications among students, faculty and administrators; assists in the development and improvement of nursing school policies; and coordinates the various student organizations in the School. A copy of the charter is given to each student upon request.

**Student Nurses' Association.** Students belong to the

Sixth District, Missouri Student Nurses' Association. District, state and national membership as well as the National Student Nurses' Association magazine *Imprint*, are provided through a membership fee. Participation in the organization gives student nurses a chance to have their voices heard in state legislatures, Congress, nursing organizations and communities. Officers are elected each spring; class representatives are selected each fall. Activities on the district (local) level include monthly meetings with programs, a picnic and activities in the hospital. Delegates are sent to two state conventions each year and to the annual national convention. All students are encouraged to become involved.

**Student Organization of Registered Nurses.** The organization helps registered nurse students enrolled in the baccalaureate program adjust to campus life, prepare for advanced standing credit examinations, and identify common concerns for action. Students participating in the University Educational Assistance Program and other part-time RN students are encouraged to attend the meetings.

**Sigma Theta Tau.** The Alpha Iota Chapter of Sigma Theta Tau, national honor society of nursing, was installed at the University of Missouri-Columbia Dec. 12, 1964. The purposes of the society are to (1) foster high professional standards; (2) encourage creative work; (3) promote maximum development of the individual and thus increase one's capacity to serve the profession, and through it, society; (4) promote the spirit of fellowship among members of the nursing profession; (5) develop an abiding interest in the advancement of nursing; and (6) promote continuous participation as responsible members of the profession.

Candidates for membership must demonstrate both leadership qualities and a capacity for professional growth and possess desirable personal qualifications. Candidates must rank in the upper one-third of their class and must have a grade point average of 3.0 (A = 4.0). Upon initiation, the member receives a key, the emblem of the society. The chapter has four regular meetings each year, two of which are of an educational or scientific nature.

## AWARDS

**Women's Auxiliary to Boone County Medical Society.** Awarded to a student who has completed one calendar year in the nursing program, based on academic achievement and financial need.

**Alumni Association of the School of Nursing Awards.** A monetary award is given to a member of the graduating class in nursing who has demonstrated academic excellence and shows outstanding ability in the nursing field. Established in 1931. An award also is given to an outstanding member of the junior class in nursing. Awards are given each fall and winter semester, and recipients' names are engraved on a plaque displayed at the School of Nursing.

**Janet Joy Thompson Fund.** Endowed by Thomas Thompson in memory of his wife, Janet Joy Thompson. Recipient is chosen from the May graduating senior class. Award is presented to the student who is an outstanding student and has demonstrated the natural ability to bring solace to those in his or her care.

## SCHOLARSHIPS

**Hertha Eitzen Scholarship.** Fund incomes are used for scholarships for nursing students who need financial assistance and meet the scholastic qualifications of the School.

**Myrtle Longenbach.** Fund incomes are used for scholarships for nursing students who need financial assistance and meet the scholastic qualification of the School.

**Richard Boyd Endowment Fund.** A gift of stock given by Mr. and Mrs. Richard G. Boyd for the purpose of establishing an endowed scholarship. The recipient must demonstrate financial need, meet School of Nursing admission criteria and obtain a cumulative grade point average of 2.75 or better.

**Missouri Federation of Women's Clubs-Alice Holliday Scholarship in Mental Health.** Established by Missouri Federation of Women's Clubs. A \$500 stipend is awarded to a student interested in working in the mental health field. Recipient is selected on the basis of scholastic attainment and financial need.

**Flo Dickey Funk.** Given by Dr. Ernest M. Funk in honor of his wife, Flo Dickey Funk. Recipient of this scholarship must be enrolled in the clinical nursing sequence, demonstrate financial need and obtain a cumulative GPA average of 2.75 or better.

**Dorothy Gillette Meyer Memorial Scholarship Fund.** Money given by Dr. B. Frank Gillette in memory of his sister, Dorothy Gillette Meyer. A St. Charles High School graduate is preferred. Minimum qualifications for recipient include sophomore standing (or higher) and a minimum GPA of 2.0.

**Merle Dozier Strange Scholarship Fund.** Established by Thomas T. Strange in memory of Merle Dozier Strange. Recipient must be enrolled in the School of Nursing with a cumulative grade point average of 2.75 or better.

## LOANS

**Margaret C. Gooch Emergency Loan Fund.** Established by family and friends of Margaret C. Gooch. Undergraduate nursing student may borrow up to \$100 in emergency funds on a short-term basis.

**Susan Hanson Memorial Loan Fund.** Established by family and friends of Susan Hanson. Available for short-term or calculated need during a given semester. Recipient must demonstrate a short term financial need and be enrolled in the School of Nursing.

## PROFESSIONAL OPPORTUNITIES

Professional opportunities in nursing continue to be unlimited in the Midwest. The average beginning salary for recent baccalaureate graduates is \$18,131.

A number of opportunities for part-time employment are available to nursing students. Columbia hospitals employing nursing students are the University of Missouri-Columbia Hospital and Clinics, Mid-Missouri Mental Health Center, Ellis Fischel State Cancer Center, Boone Hospital Center and Columbia Regional Hospital.

Graduate students or undergraduate registered nursing students who wish to nurse for compensation must obtain licensure in Missouri. Short-term provisional licensure is usually possible as an interim measure. For further information, write to the Executive Secretary, State Board of Nursing, P.O. Box 656, 3523 North Ten Mile Drive, Jefferson City, Mo. 65102.

## BACHELOR OF SCIENCE IN NURSING

### GENERAL REQUIREMENTS

The Bachelor of Science in Nursing is granted to candidates who have successfully fulfilled all prescribed requirements, including the following: a minimum of 120 credit hours is required with a cumulative GPA of at least 2.0; the last 24 semester hours completed for the degree must have been taken in residency at the University of Missouri-Columbia; no more than 30 credit hours applied toward graduation may be earned through a combination of credit by Independent Study or extension courses.

### UNDERGRADUATE CURRICULUM

Individual student programs are planned on the basis of prerequisite or concurrent courses. Nursing courses with combined theory and practice are sequential. Samples of program plans are available from the assistant dean for the undergraduate program or an academic adviser, S235 Nursing School Building.

A minimum of 120 credit hours, 66 credit hours of non-nursing courses and 54 credit hours in nursing is requisite to the degree. The nursing program currently is designed to be completed five semesters after admission to the School.

Instructional facilities for students are abundant and varied. Opportunities for observation and patient care are available for students in a variety of health, social and educational agencies, including the Harry S. Truman Memorial

Veterans Administration Hospital, Fulton State Hospital and various county health departments. Students provide their own transportation for those experiences which may occur in each of the five semesters.

### REQUIRED COURSES AND HOURS

#### English Composition and Literature (7-9)

English 1 Composition (3) and English 60 Exposition (3) or if exempted from English 1, English 60 (3) and a literature course (2-3) or English 65GH (3) and a literature course (2-3)

#### Behavioral Sciences (12 hrs.)

Psychology 1 General Psychology (3)  
Sociology 1 General Sociology (3) or General Cultural Anthropology (3)  
Advanced Psychology (6) or Advanced Sociology (6) or Advanced Anthropology (6)

#### Biological and Physical Science (27)

Anatomy 202 Elementary Anatomy Human (5)  
Biological Science 11 Introductory Zoology (5) (preferred) or 1 & 2 Gen. Biology (3) and Lab (2). R.N.s excused.  
Chemistry 1 Introductory Chemistry or Chemistry 11 General Chemistry  
Microbiology 205 Fundamentals of Medical and Public Health Microbiology (4)  
Pharmacology 204 Elements of Pharmacology (3)  
Physiology 201 Elements of Physiology (5)

#### Humanities (9)

Philosophy 5 Introduction to Ethics (3)  
Philosophy 11 Introduction to Logic (3)  
Philosophy 130 Philosophy and Human Nature (3)

#### Other Required Courses (12-14)

Child and Family Development 66 Principles of Human Development (3)  
Human Nutrition, Foods and Food Systems Mgmt. 234 Human Nutrition (3)  
Mathematics 10 College Algebra or Statistics 31 Elementary Statistics (3)  
Missouri State Law Requirement - one of the following:  
Political Science 1 American Government (5) or 11 Introduction to Political Science (3) or History 3 Survey of American History to 1865 (3) or History 11 Themes in American History (3) or History 20 American History (5)

#### Nursing (54)

Nursing 71 - Concepts of Nursing (2)  
Nursing 72 - Concepts of Health and Health Care (3)  
Nursing 73 - Nursing and the Healthy Individual (4)  
Nursing 102 - Nursing in Multiperson Units (2)  
Nursing 103 - Nursing in the Expanding Family: Childbearing (4)  
Nursing 141 - Pathology and Therapeutics I (3)  
Nursing 142 - Methods of Assisting I (3)  
Nursing 143 - Pathology and Therapeutics II (2)  
Nursing 144 - Methods of Assisting II (2)  
Nursing 150 - Nursing in Child Health Deviations (5)  
Nursing 151 - Nursing in Adult Physiologic Health Deviations (5)  
Nursing 152 - Restorative Dimensions of Psychosocial Nursing Care (4)  
Nursing 153 - Gerontologic Nursing (2)  
Nursing 170 - Community Nursing (5)  
Nursing 180 - Leadership and Management in Nursing (2)  
Nursing 181 - Professional Practicum (4)  
Nursing 182 - Professional Perspectives (2)  
**Nursing Electives**  
120 Basic Cardiac Dysrhythmias (1)  
121 Critical Care Nursing (2)  
190 Individual Study (cr.arr.)

## RN OPTION

The length of the program for the registered nurse student depends upon the amount of transfer credit obtained and the successful completion of advanced standing credit examinations. A minimum of 66 non-nursing semester hours, as outlined in the undergraduate curriculum, is required and must follow the program planning sequence of prerequisites. Upon fulfillment of all science requirements, the RN enters the following sequence of nursing courses.

**Enrollment:** N90 (6hrs). Offered only during the summer session. N91 (3 hrs). Offered only during the fall session.

**Advanced Standing Credit Examinations.** Upon successful completion of N90, the Registered Nurse student is

eligible to take Advanced Standing Credit Examination for the following courses: Nursing 102 (2), Nursing 103 (4), Nursing 141 (3), Nursing 142 (3), Nursing 143 (2), Nursing 144 (2), Nursing 150 (5), Nursing 151 (5), Nursing 152 (4), Nursing 153 (2). If unsuccessful, the RN must enroll in the course.

**Enrollment:** Nursing 170 (5), Nursing 180 (2), Nursing 181 (4), Nursing (2)

#### Summary.

**Enrollment:** 22 hours

**Advanced Standing by Exam:** 32 hours

A faculty adviser will assist the RN student in planning a study program. Information on study aides and scheduling for advanced standing credit examinations may be obtained from the School of Nursing.

## FACULTY

### ADMINISTRATION

**Phyllis D. Drennan**, dean, professor, PhD, University of Iowa

**Irma I. Fleeman**, assistant dean, assistant professor, M Ed, University of Missouri-Columbia

**Virginia Hagemann**, assistant dean professor, PhD, University of Pittsburgh

### NURSING

**Eleanor Baker**, assistant professor emeritus, MSN, Wayne State University

**Mary Margaret Bayer**, instructor, M Ed, University of Missouri-Columbia

**Mary M. Beck**, instructor, MS, St. Louis University

**Ruth Benson**, assistant professor emeritus, MS, University of Washington

**Jane Brinton**, professor emeritus, MS Ed, University of Pennsylvania

**Gerald T. Brouder**, associate provost associate professor, PhD, University of Texas-Austin

**Maureen Brown**, instructor, MS, University of Illinois

**Virginia Bzdek**, assistant professor, PhD, University of Oregon

**Jeanne B. Chambers**, instructor, MS, State University of New York at Buffalo

**Becky J. Christian**, instructor, MS, University of Missouri-Columbia

**Steven B. Cochran**, instructor, MSN, Medical College of Georgia

**Betty J. Crim**, associate professor, M Ed, University of Missouri-Columbia

**Janis C. Dally**, instructor, MS PH, University of Missouri-Columbia

**C. Jane Dey**, adjunct assistant professor, MPA, University of Missouri-Kansas City

**Elaine Doyle**, instructor, M Ed, Lincoln University

**Susan Egizii**, instructor, MSN, Medical College of Georgia

**Shirley Jean Farrah**, instructor, MSN, University of Illinois

**Lawrence H. Ganong**, assistant professor, PhD, University of Missouri-Columbia

**James Garb**, adjunct assistant professor, MD, Creighton University School of Medicine

**Carol E. Garretson**, adjunct assistant professor, MS, University of Colorado

**Elizabeth Geden**, associate professor, PhD, University of Missouri-Columbia

**Geraldine Goosen**, assistant professor, MS, Texas Women's University

**M. Gean Hagan**, assistant professor, PhD, International Graduate University

**Linda W. Hancik**, adjunct assistant professor, MS PH, University of Missouri-Columbia

**John H. Hewett**, associate professor, PhD, University of Iowa

**Gail Hille**, instructor, MSN, University of Maryland

**Darlene Huff**, adjunct assistant professor, MS, University of Missouri-Columbia

**Janet R. Huggans**, adjunct assistant professor, BA, Stephens College

**Kathleen Kaiser**, assistant professor, MS, University of Maryland

**Ruth Ann Kroth**, assistant professor, MS, University of Missouri-Columbia

**Sharon K. Krumm**, adjunct assistant professor, MS, University of Missouri-Columbia

**Christine Edgar Kunz**, instructor, MS, University of Missouri-Columbia

**Rose Mary Langland**, instructor, MS, University of Missouri-Columbia

**M. Kay Libbus**, instructor, MS PH, University of Missouri-Columbia



**Mary Manderino**, assistant professor, PhD, University of Arizona  
**Brenda K. McSherry**, instructor, MS, University of Missouri-Columbia  
**Martha E. Nahikian**, associate professor emeritus, MS, Washington University (St. Louis)  
**Elizabeth O'Connell**, instructor, MSN, Yale University  
**Carol Pastoret**, instructor, MS PH, University of Missouri-Columbia  
**Carrie A. Pike**, adjunct assistant professor, MSN, University of California-San Francisco  
**Rosemary T. Porter**, instructor, MA, University of Iowa  
**Ruby M. Potter**, dean emeritus, EdD, University of Colorado  
**Verna Rhodes**, assistant professor, EdS, University of Missouri-Columbia  
**Roselyn Robbins**, adjunct assistant professor, MSN, Univer-

sity of Cincinnati  
**Judy Rossow Sebring**, adjunct assistant professor, MS, Catholic University of America  
**Judith B. Sanders**, adjunct assistant professor, MSN, University of Maryland  
**Lee Sennott-Miller**, assistant professor, PhD, University of Arizona  
**Barbara J. Shelton**, associate professor, PhD, St. Louis University  
**Lucille S. Spalding**, professor emeritus, MSN, Case Western Reserve University  
**Phylis Spene**, adjunct assistant professor, MS, University of Missouri-Columbia  
**Carol D. Spengler**, adjunct assistant professor, PhD, University of Missouri-Columbia  
**Rita Ann Tadych**, instructor, MS, University of Missouri-Columbia

**Susan G. Taylor**, associate professor, PhD, Catholic University of America  
**Barbara Warner**, assistant professor, MS, Boston University  
**Phyllis Watson**, instructor, PhD, University of Missouri-Columbia  
**Von B. Whitaker**, assistant professor, PhD, University of North Carolina at Chapel Hill  
**William R. Whetstone**, assistant professor, PhD, University of Michigan  
**Alice Wondra**, adjunct assistant professor, MS, University of Arizona  
**Linda Lou Workman**, instructor, MSN, Texas Women's University  
**Carol Ann Yonkman**, instructor, MS, University of Missouri-Columbia



# COLLEGE OF PUBLIC & COMMUNITY SERVICES

The College of Public and Community Services was established in 1965. The College is organized into the School of Social Work and the Departments of Recreation and Park Administration and of Community Development. The major purpose of the College is to prepare students for productive professional careers in the several social, human-serving professions. The College offers two baccalaureate degrees, the Bachelor of Science degree in recreation and the Bachelor of Social Work degree.

The major educational objective of the School of Social Work undergraduate program is to provide base content which will enable students to function competently at a beginning level of social work practice. Social work is a dynamic and growing human service profession which plays an increasingly important and visible role in our everyday lives. Contemporary society is beset by many social problems, rapid social change, the breakdown of community life and individual maladjustment. Social work addresses these conditions by assisting in the prevention of community breakdown, by facilitating the restoration of individuals to more fulfilling lives and by developing new resources to meet human needs.

The purpose of the Department of Recreation and Park Administration undergraduate curriculum is to provide the student with substantial liberal education knowledge in conjunction with preparing the students with appropriate professional skills to perform in entry level positions within the leisure service profession. Recreation is a common household word. However, the components of quality leisure services and experiences are as complex as mankind. People, resources, activities and leadership unite to form one of the fastest growing professions in America today—recreation and park administration.

The Department of Community Development offers some undergraduate courses for upper-division students and a diploma program. The diploma program is a non-degree program designed for community leaders and

professionals who are unable to spend the required time to complete a master's degree or who have life and work experience but no formal college preparation. The Institute of Law Enforcement and Missouri Fire and Rescue Training, extension teaching programs administered by the College of Public and Community Services. All departments of the College cooperate with the University Extension Division to make available services to communities, citizens and organizations throughout Missouri.

UMC's recreation and park administration department was one of the first accredited by the National Recreation and Park Administration Accreditation Council. Because of the recommended order of studies, it generally is possible for students who have a broad liberal education foundation to transfer into the Department of Recreation and Park Administration as late as the first semester of their junior year and still graduate within the usual academic period. In some cases, additional academic work is required.

The School of Social Work is accredited by the Council on Social Work Education, of which the School is a charter member. Students receiving a BSW are eligible for regular or full membership in the National Association of Social Workers. The undergraduate curricula are built upon a base of studies which prepares students for general practice in social work. Within this framework, the student is prepared to apply a configuration of knowledge, methods, skills and values to a broad range of individual, institutional and community problems.

## ADMISSION

The undergraduate admission requirements differ for the School of Social Work and the Department of Recreation and Park Administration. Admission to the professional program of the School of Social Work is in the junior year. Students are, however, accepted by the

School for advisement as freshmen or sophomores. Students who are interested in majoring in recreation and park administration may enter the program as early as their freshman year.

## SCHOOL OF SOCIAL WORK

For admission to the professional program of the School in the junior year of study, a student must have completed 60 hours of college credit, maintaining a cumulative grade point average of 2.0 (A = 4.0) for all work attempted. Entry is in the fall semester. As freshmen and sophomores, advisees are required to take a wide range of courses in the liberal arts and a few in social work to help them prepare for the professional major.

Criteria for admission, other than GPA, include the following: student's responses to application questions; student's community activities; and social service experience. Freshmen and sophomore students who declare an interest in social work when admitted to the University, are assigned to the School for preprofessional advisement.

Individual consideration can be given, provided criteria other than GPA have been adequately met. To assure consideration for the fall semester, applications should be submitted by Feb. 15. Application forms are available through the School's admission office, 701 Clark Hall, or from the Admissions Office in Jesse Hall.

## DEPARTMENT OF RECREATION AND PARK ADMINISTRATION

Students must be accepted for advisement by the department. All students enrolling in the Department of Recreation and Park Administration with fewer than 30 hours of college credit are required to complete a Freshman Placement Test administered by UMC prior to registration. These tests are administered during orientation and during the spring. The results of these tests are useful in planning the student's program.

Transfer students are required to have a 2.0 GPA (C average) for acceptance into the Department of Recreation and Park Administration.

## TRANSFER STUDENTS

The College of Public and Community Services follows the transfer of credit policy established by the UMC Faculty Council. UMC regulations concerning the transfer of credit are in the Academic Regulations section of this catalog.

## STUDENT SERVICES

### ADVISEMENT

Students are assigned to an academic adviser soon after registering in the College of Public and Community Services. The adviser assists students in planning their schedule of classes and will consult about any academic problems. Students are advised to consult their adviser at least once each semester, and more frequently if the need arises.

### PLACEMENT

Students of the College of Public and Community Services are assisted in placement by UMC's Career Planning and Placement Center.

### STUDENT ORGANIZATIONS

College of Public and Community Services  
Divisional Student Council  
Recreation and Park Association  
Sigma Lambda Sigma (recreation honorary)

## SPECIAL SERVICES

### Media Center for Recreation, Parks and Leisure

The University, in cooperation with the National Recreation and Park Association, operates the Media Center for Recreation, Parks and Leisure. The center contains media related to commercial, outdoor, municipal and therapeutic recreation. Scheduling and rental of films, slides and videotapes are arranged through the Academic Support Center, Materials Scheduling, 505 E. Stewart Road, Columbia, Mo. 65211 or call (314) 882-3601.

## PROFESSIONAL OPPORTUNITIES

### SCHOOL OF SOCIAL WORK

The career prospects for BSW graduates are quite good. Employment data from the Bureau of Labor Statistics indicates that there will be a continuing demand for social workers through the 80's. Job opportunities exist in the fields of child welfare, corrections, juvenile justice, family services, community development and counseling programs.

### DEPARTMENT OF RECREATION AND PARK ADMINISTRATION

**Public Recreation and Park Departments:** Superintendents, directors, center supervisors, program leaders, and park operations and maintenance personnel.

**Governmental Agencies:** Federal and state governmental agencies such as the National Park Service, Corps of Engineers, state park systems, departments of natural resources.

**Therapeutic Recreation:** Directors, supervisors, and leaders in hospitals, nursing homes, penal institutions, school or residential centers, extended care centers, and specialized programs in parks and recreation departments.

**Youth Serving Agencies:** Executives, assistants and specialists in such organizations as the

Boy Scouts, Girl Scouts, Camp Fire Girls, YMCA, YWCA, Boys Clubs of America, 4-H Clubs and others.

**Resource Planners:** Land use and resource planners, park and program planners, designers and architects with federal, state and local units of government, and private consulting agencies.

**Commercial Recreation:** Recreation and social directors in resorts, steamship lines or commercial enterprises.

**Employee Recreation:** Many large business or industrial firms have positions for directors or employee recreation opportunities.

**Recreation in Religious Institutions:** Directors, supervisors, or coordinators with religious education workers and others.

**Education:** Directors in secondary and higher education, and instructional personnel in departments of recreation and park administration curricula.

## DEGREE REQUIREMENTS

The degree of Bachelor of Social Work is conferred upon those students who have completed the requirements of the curriculum in the School of Social Work. The degree of Bachelor of Science in recreation is conferred upon those who have completed the requirements of the recreation and park administration curriculum.

## GRADUATION REQUIREMENTS

### REQUIREMENTS FOR BACHELOR OF SOCIAL WORK

A minimum of 120 semester hours credit are required for graduation. Students are accepted into the professional program at the junior level (approximately 60 semester hours). Professional courses should be taken in proper sequence (see curriculum), and two academic years are required to complete the professional program. During one semester of their senior year, students spend three days a week in a social agency for field instruction.

Credit hours are indicated in parentheses. See Description of Courses section at the end of this catalog for more complete course listings.

#### Required Courses in Social Work (36 hours)

##### JUNIOR YEAR

###### Fall Semester

125 Social Welfare and Social Work (3)  
306 Introduction to SW Practice (3)  
312 Research Methods for Social Work (3)

###### Winter Semester

303 Social Justice and Social Policy (3)  
304 Introduction to Community and Organizational Processes (3)  
320 Social Psychological Perspectives in Human Development for Social Work (3)

330 Interaction Skills Workshop (3)

##### SENIOR YEAR

###### Fall Semester

360 Strategies of Direct Practice (3)  
390 Interventive Processes I (6).

###### Winter Semester

321 Social Deviance (3)  
394 Pro Senior Seminar

#### Courses in Communication Skills (11-12 hours)

English 60 Exposition and Speech 75 are required and remaining hours are taken from English, humanities, public speaking and journalism. English 1 cannot be used to satisfy requirements in this area.

#### Courses in Scientific Orientation (14 hours)

Students must take Mathematics 10 or 12, Biology 1 or 21, Philosophy 1, 5 or 10 and a course in statistics.

#### Courses in Social Science (14-18 hours)

Students must take Anthropology 1, Economics 1 or 51,

History 3, 4, 11, or 20. Political Science 1 or 11.

#### Courses in Behavioral Science (18 hours)

Theories of Personality, Child/Family Development, Social Psychology 260 and Sociology 1 are required. The remaining 6 hours must be selected in psychology and/or sociology.

#### Cultural, Ethnic and Racial Diversity (6 hours)

Students must complete 6 credits (two courses) in this area from courses selected in consultation with the student's adviser.

#### Elective Courses (19-24 hours)

## REQUIREMENTS FOR BACHELOR OF SCIENCE IN RECREATION

### LIBERAL EDUCATION

The purpose of liberal education is to provide the undergraduate student with opportunities to broaden individual perspectives, values and viewpoints; and to foster the spirit of inquiry and independent thinking to allow the existing knowledge in liberal education to be a whetstone for personal development, all of which serve the individual in the art of living within society.

**Communicative Skills.** (15 credit hours) Students may test out of English 1 Composition through the UMC Placement Tests and may be allowed to take English 60 Exposition as early as the sophomore year. If they score high enough on the placement tests, they may take English 65GH Honors English which is open to freshmen only. Students receiving a passing grade in English 65GH Honors English will receive an additional 3 credits toward graduation. Students who test out of English 1 Composition into English 60 Exposition will take 12 credits rather than 15 credits in communicative skills.

English 1 Composition (3)

English 60 Exposition (3)

English 161 Technical Writing (3)

Speech and Dramatic Art 75 Introduction to Speech Communication (3)

Approved Graphic Media Selection

**Humanities.** (9 credit hours) Courses may be selected from the areas of fine arts appreciation, philosophy, religion, foreign language, literature and related literature courses. A minimum of one upper-division course is required.

**Science and Mathematics.** (13 credit hours) A minimum of 13 credit hours is required within this category of which 5 credit hours must be a biological or physical science (to include laboratory experience), and 3 credit hours of an approved course in accounting.

**Social and Behavioral Science.** (24 credit hours) A minimum of 24 credit hours is required with a requirement of 3 credit hours of approved course selections in each of the following: economics, history-political science (must satisfy the state history requirement); social science, behavioral science and human growth and development.

### Professional Education

Undergraduate professional preparation in the Department of Recreation and Park Administration consists of four basic categories: a professional core (22 credit hours), applied knowledge and skills (22 credit hours), an area of concentration (15 credit hours), and field internship (12 credit hours). Each student completes at least one area of concentration. A minimum of 18 credit hours of professional recreation courses must be completed in residence at UMC. Upperclass professional courses completed with grades of D are not counted toward the degree without specific waiver by the dean. Each student must achieve a cumulative grade point average of 2.0 for graduation (C average).

**Professional Core.** Each student must complete the professional core courses which provide a fundamental base of general understanding of the park, recreation and leisure service profession.

10 Introduction to Leisure Studies (3)

11 Career Orientation in Recreation, Parks and Leisure Services (1)

111 Introduction to Planning and Evaluating Leisure Environments (3)

151 Introduction to Leisure Service Management (3)

205 Personnel Management and Leadership in Leisure Services (3)

206 Program Development in Leisure Services (3)

226 Introduction to Leisure and Special Populations (3)

230 Introduction to Parks and Outdoor Recreation Services (3)

**Applied Knowledge and Skills.** Each student is required to complete a minimum of 22 credit hours within this area. The category includes a first aid skill requirement and a minimum of 6 credit hours without duplication in cultural and performing arts (music, theater, rhythm and movement, dramatics, arts and crafts). The remaining credits are selected from a variety of approved courses corresponding to the interest and career insight of the student.

**Area of Concentration.** The undergraduate curriculum affords four specific areas of concentrated course selections to reflect student career interest within the profession. Each of the four areas (leisure service management, youth services, park programs and operation, and therapeutic recreation) comprise 15 credit hours of approved course selection. A departmental Certificate of Completion is given to the student to verify fulfillment of the prescribed area of concentration sequence.

**Leisure Service Management.** (15 credit hours)

316 Administration of Leisure Services (3)

333 Park Management (3)

355 Private and Commercial Recreation Principles and Practices (3)

Approved course in computer science

Approved course in marketing/management

Additionally, leisure services management requires that 107 Organization of Aquatic Programs and statistics be taken within the curriculum.

**Youth Services.** (15 credit hours)

315 Senior Seminar in Leisure Services (3)

316 Administration of Leisure Services (3)

342 Principles and Practices of Fund Raising and Evaluation for Human Service Organizations (3)

193 Community Development Approaches to Youth Work (3)

383 The Management of Volunteer Systems (3)

Additionally, youth services requires that 140 Camp Leadership and Management be taken within the applied knowledge and skills category.

**Park Programs and Operations** (15 credit hours)

212 Planning Recreation and Leisure Environments (3)

231 Principles of Interpretive Outdoor Recreation (3) or 340 Recreation Land Management and Planning (3)

316 Administration of Leisure Services (3)

331 Administration of Outdoor Recreation-Education Programs (3)

333 Park Management (3)

Additionally, park programs and operation requires that a total of 15 credit hours of natural sciences be taken within the curriculum.

**Therapeutic Recreation.** (15 credit hours)

315 Senior Seminar in Leisure Services (3)

316 Administration of Leisure Services (3)

327 Operation of Therapeutic Recreation Services in Rehabilitation Settings: Process and Procedures (3)

Approved course in a special population group

Approved course in medical terminology

Additionally, therapeutic recreation requires that 120 Adaptive Equipment/Therapeutic Recreation Applications and 140 Camp Leadership and Management be taken within the area of applied knowledge and skills, and either anatomy or physiology be taken within the curriculum.

**Field Internship.** (12 credit hours)

Each student is required to complete 289.

Additional courses available for undergraduate student selection are:

300 Problems (3)

328 Leisure and Aging (3)

391 Topics in Leisure Studies (1-3)

**Credits and Points.** Students must pass a minimum of 120 semester hours plus a 12 credit hour internship with a cumulative average of C, which does not include the elective underclass courses in ROTC. CLEP credits are accepted and evaluated on an individual basis. Currently, a minimum cumulative grade point average of 2.0 is required for graduation (C average).

**Time Limitation on Degree Credit.** A student whose education has been interrupted for more than one semester may not count toward graduation credit earned eight years prior to the resumption of progress toward the degree.

## FACULTY

### ADMINISTRATION

**George F. Nickolaus**, dean, associate professor, JD, University of Missouri-Columbia

**Glenn A. Gillespie**, associate dean, professor, PhD, University of Missouri-Columbia

### COMMUNITY DEVELOPMENT

**Alvin S. Lackey**, professor, chairman, PhD, Cornell University

**Lee J. Cary**, professor, PhD, Syracuse University

**James B. Cook**, assistant professor, PhD, Walden University

**John A. Croll**, associate professor, MS, University of Missouri-Columbia

**Hugh Denney**, professor emeritus, MA, University of Missouri-Columbia

**Boyd Faulkner**, associate professor emeritus, MS, University of Nebraska

**Lucille S. Gill**, instructor, MA, City University of New York

**John A. Kuehn**, associate professor, PhD, University of Missouri-Columbia

**E. Frederick List**, associate professor, MA Ed, Washington University

**Donald W. Littrell**, associate professor, MS, University of Missouri-Columbia

**George F. Nickolaus**, associate professor, JD, University of Missouri-Columbia

**Bryan Phifer**, professor, PhD, University of Chicago

**William E. Robertson**, professor, PhD, University of Wisconsin

**John D. Timmons**, associate professor, PhD, University of Nebraska

**John M. Woodard**, assistant professor, MS, University of Missouri-Columbia

### RECREATION AND PARK

#### ADMINISTRATION

**David M. Compton**, professor, chairman, EdD, University of Utah

**Hardeep S. Bhullar**, associate professor, PhD, University of Georgia

**Jaelyn A. Card**, assistant professor, PhD, University of Utah

**Alan R. Everson**, associate professor, PhD, Texas A&M University

**Glenn A. Gillespie**, professor, PhD, University of Missouri-Columbia

**Gerald L. Hitzhusen**, assistant professor, MS, University of Missouri-Columbia

**Steven C. Lamphear**, associate professor, PhD, University of Georgia

**Marshall L.R. Masek**, assistant professor, MS, University of Missouri-Columbia

**David W. Ostlund**, lecturer, MS, Central Missouri State University

**Keith B. Roys**, professor, PhD, University of Illinois

**C. Randall Vessell**, associate professor, PhD, University of Iowa

**David J. Szymanski**, assistant professor, MA, College of Saint Rose

**Glenn D. Weaver**, associate professor, MS, University of Missouri-Columbia

### SCHOOL OF SOCIAL WORK

**Judith Burke**, associate professor, PhD, Bryn Mawr College

**John Collins**, assistant professor, MSW, University of Minnesota

**Betty Ann Dubansky**, associate professor, MSW, Washington University

**Vincent Faherty**, associate professor, DSW, University of Utah

**Thompson Fulton**, professor emeritus, AM in SSA, University of Chicago

**Michael Kelly**, assistant professor, MS SW, University of Texas-Austin

**O. Duane Kroeeker**, associate professor, MSW, University of Pennsylvania

**Barry L. Levin**, professor emeritus, PhD, Columbia University

**Marilyn E. Maddux**, associate professor, MSW, Washington University

**Erma A. McMurry**, assistant professor, MSW, University of Nebraska

**Roland G. Meinert**, professor, PhD, St. Louis University

**Paul M. Mengel**, assistant professor emeritus, MSW, University of Kansas

**Joanne Mermelstein**, associate professor, MS SW, University of Missouri-Columbia

**Clotilde Moller**, assistant professor emeritus, AM in SSA,

University of Chicago

**John Moore**, professor emeritus, EdD, Columbia University

**Clara Louise Myers**, professor emeritus, DSW, Washington University

**Arthur W. Nebel**, professor emeritus, MA, University of Missouri-Columbia

**Dwight W. Rieman**, associate professor, MS in SA, Case Western Reserve University

**Araminta Smith**, associate professor, MSW, Washington University

**Paul A. Sundet**, associate professor, MS SW, University of Missouri-Columbia

**Virginia Southwood**, associate professor emeritus, MS SW, University of Missouri-Columbia

**Gerald Westwood**, instructor, MS SW, University of Missouri-Columbia

**Devere Whitesell**, assistant professor emeritus, MSW, Washington University

### LAW

#### ENFORCEMENT

#### INSTITUTE

**Larry L. Brockelsby**, instructor, director, M Ed, University of Missouri-Columbia

**Richard B. Gregory**, assistant professor, MS, Central Missouri State University

**William M. Stephens**, assistant professor, MA, Northeast Missouri State University

### MISSOURI FIRE

#### AND RESCUE

#### TRAINING INSTITUTE

**William Westhoff Jr.**, associate professor, director, MS, Oklahoma State University

**Paul Adams**, instructor, BS, University of Missouri-Columbia



# DESCRIPTION OF COURSES

## HOW TO USE THIS SECTION

The Description of Courses lists and describes all courses approved by the academic departments at UMC. The *Schedule of Courses*, available during registration each semester, lists the specific courses offered that semester, the time of meeting, and building and room number where the course meets.

UMC reserves the right to cancel, without notice, any course listed in the Description of Courses and/or the *Schedule of Courses* for any semester, or withdraw any course which does not have an adequate enrollment at the close of the registration period.

## COURSE LISTINGS

Courses offered at UMC are listed in the Description of Courses by department or field of learning in alphabetical order.

## COURSE NUMBERS

Each course bears a distinguishing number which identifies it within the department and indicates its academic level, according to the following table.

### *Course Number/Type of Course*

- 1 to 99** primarily for freshmen and sophomores.
- 100 to 199** primarily for undergraduates (no graduate credit).
- 200 to 299** for undergraduates, appropriate professional students and graduate students (except those whose graduate major is in the department in which the course is offered).
- 300 to 399** for undergraduates, appropriate professional students and graduate students
- 400 to 499** primarily for graduate students and appropriate professional students; undergraduate students are admitted to 400 level courses only with the approval of the dean of the division in which the course is offered.

The letter L, M or V following a course number indicates that it is a professional course in the Schools of Law and Medicine or College

of Veterinary Medicine, respectively. Some of these courses are not open to graduate students.

The letters GH and EH following a course number designate General Honors and Education Honors, respectively. These courses are restricted to undergraduate students who qualify for admission to the Honors College or to the College of Education Honors courses.

## CREDIT

The unit of credit at UMC is the semester hour, which represents a subject pursued one class period weekly for the entire semester. In general, a course valued at three semester hours meets three periods weekly for one semester.

The number of credit hours for a course is given in parentheses following the course title. If the credit is to be fixed in consultation with the instructor, the fact is shown by "(cr, arr.)," credit arranged, or by "(2-8)" minimum credit allowed two hours, maximum eight hours.

## PREREQUISITES

Often, prior to enrolling in a certain course, other courses must be completed or other requirements fulfilled. These prerequisites are listed after the course description.

If the prerequisite course is in the department being described its number will be given. The prerequisite of Accountancy 37 is Accountancy 36 and is shown "Prerequisite: 36." Prerequisite courses from other UMC departments are listed by the name of the department and course number. One of the prerequisites for Accountancy 457 is Mathematics 60. It is shown "Prerequisites: Mathematics 60."

General prerequisites are listed "Prerequisite: 10 hours organic chemistry," meaning the student must have earned at least 10 semester credit hours in organic chemistry classes.

An academic standing prerequisite is stated by class. Freshmen have accumulated between 1 and 29 semester hours; sophomores between 30 and 59 hours; junior between 60 and 89

hours; seniors more than 90 hours; and graduate students must have been admitted to the Graduate School. "Prerequisite: junior standing" means the student must have at least 60 semester hours.

A minimum grade requirement in a prerequisite course is specified by a capital letter and the course designation. "Prerequisite C in Agronomy 201" means a grade of C or better must have been earned in Agronomy 201.

GPA refers to grade point average.

Courses listed as "Corequisite" or "Concurrent with" are to be taken in the same semester as the course desired. Nursing 159 lists "Corequisites: 140, 158, 160" so a student enrolling in 159 must also enroll in 140, 158 and 160.

## SEMESTER OFFERED

The lower case letters following the credit hours or at the end of a course description indicate which semester the course is generally offered. When no letter follows the course description, the course may be offered during any session. The letter "f" indicates the course usually is offered in the fall semester; "w" indicates the second or winter semester, "s" indicates the summer session; and "ss" indicates an intersession, a period between regular sessions.

The abbreviations alt. f. or alt. w. indicate the course will be offered during alternate fall or alternate winter semesters. The year is indicated by odd years or even years. "alt. w., odd yrs." means the course is offered during the winter semesters of odd-numbered years.

## COURSES BY CORRESPONDENCE

The abbreviation cor. following a course listing indicates it is also available through the Center for Independent Study Through Correspondence.

## ACCOUNTANCY

**36 Accounting I (3).** Introduces field of accounting; fundamentals of financial accounting. Prerequisite: sophomore standing. cor.

**37 Accounting II (3).** Fundamentals of managerial accounting; additional topics in financial accounting. Prerequisite 36. cor.

**136GH Honors Accounting I (3).** Accounting theory and techniques used in the measurement and disclosure of accounting data to meet needs of investors and business managers. Prerequisite: sophomore standing, grade point average of 3.3 or higher, or Honors College.

**137GH Honors Accounting II (3).** Continuation of 136GH. Prerequisite: C or better in 136GH.

**200 Independent Readings (1-3).** Independent readings and examination under the supervision of an accountancy professor. Prerequisite: supervising professor's consent.

**236 Financial Accounting I (3).** Concepts and procedures of measurement and disclosure of accounting information in published financial statements. Prerequisite: 37.

**237 Cost Accounting (3).** Job, process, standard, and variable costing systems and procedures; emphasis on the measurement and internal control of manufacturing costs. Prerequisites: 37 or 137GH and 258 (or 258 concurrently)

**246 Financial Accounting II (3).** Continuation of 236. Prerequisite: 137GH or 236.

**258 Computer-Based Data Systems (3).** Introduces computer and computer-based systems. Includes historical background, systems design, programming concepts, and business applications. Prerequisite: junior standing.

**268 Accounting Information Systems (3).** Methods of processing accounting information, starting with manual production of basic

financial statements and extending to complex computer based managerial accounting applications. Prerequisites: 37 or 137GH and 258.

**273 Introduction to Taxation (3).** Survey of various types of taxes affecting both individual and business entities, with emphasis on federal income tax. Prerequisite: 37 or 137GH.

**301 Problems in Accounting (1-3).** Independent investigations, reports on approved topics. Prerequisite: supervising professor's consent.

**304 Managerial Accounting Concepts (3).** Introduces accounting concepts, terminology, measurements, and reports, emphasizes management uses. Prerequisite: graduate standing, senior standing in College of Engineering, or instructor's consent.

**305 Financial Accounting Concepts (3).** Current issues in the financial reporting of business corporations to external parties. Not



open to accountancy majors. Prerequisite: 37 or 304.

**310 Managerial Accounting (3).** Financial and cost accounting concepts. Processes for collecting, recording, and summarizing financial and cost data. Use of accounting data for position reporting, income determination, planning and control. Prerequisite: M.B.A. or M.S.P.A. candidate, or director's consent.

**316 Accounting Principles I (3).** Fundamental accounting principles and techniques; emphasizes financial accounting. Prerequisite: M.S. candidate or graduate standing, with director's consent.

**317 Accounting Principles II (3).** Continuation of 316, with emphasis on managerial accounting principles and techniques. Prerequisite: 316.

**325 Governmental Accounting and Budgeting (3).** Principles of fund accounting, financial reporting, and budgeting control in nonprofit organizations; Program-Planning-Budgeting Systems; governmental and institutional auditing; special problems. Prerequisite: 237 or director's consent.

**336 Advanced Financial Accounting (3).** Consolidated statements, partnerships, price level changes, and other financial accounting topics. Problems and case studies. Prerequisite: 246.

**337 Managerial Accounts and Statistics (3).** Accounting and other measurement and communication techniques applied to management problems of analysis, planning, and control. Prerequisite: 237.

**358 EDP Systems Analysis and Design (3).** Problems of installing and managing EDP systems; impact of EDP on decision-making functions and simulation models; evaluates recent developments: case studies. Prerequisite: 258.

**368 EDP Systems Management and Control (3).** Theory and practice of planning, administering, and controlling the information systems function; special emphasis on systems evaluation and computer audit packages. Prerequisite: 268.

**373 Intermediate Taxation (3).** Introduction to tax research methodology; in-depth study of corporate income taxation. Prerequisite: 273.

**384 Auditing (3).** Nature, history, and social role of auditing; fundamentals of contemporary auditing theory and practice; emphasis on audit reports and collection and evaluation of audit evidence. Prerequisite: 15 hours accountancy.

**390 CPA Review (4).** Study of representative problems from CPA examinations. Course will not satisfy hour requirements of the undergraduate or graduate accountancy degrees. Prerequisites: 21 hours accountancy, excluding data processing courses, and 6 hours business law.

**401 Problems in Accounting (1-3).** Independent investigations, reports on approved topics. Prerequisite: supervising instructor's consent.

**403 Controlling (3).** Cost accounting systems and the role of the controller in providing meaningful information to management. Open to M.S. students and other graduate students, with director's consent. Prerequisite: 317.

**406 Advanced Accounting Practice (3).** Principles and procedures relating to accounting changes, funds flow, tax allocation, partnerships, branch accounting, consolidations, asset revaluations, and fiduciaries. Open to M.S. students and other graduate students, with director's consent. Prerequisite: 317.

**407 Tax Theory and Practice (3).** Survey of various taxes with emphasis on federal income tax of individuals and business entities. Open to M.S. students and other graduate students with director's consent. Prerequisite: 317.

**408 Current Topics in Data Processing (3).** Administration and control of EDP systems; data management systems; development of information systems; computer project management. In-depth analysis with current emphasis on systems literature. Prerequisite: 258.

**409 Auditing Theory and Practice (3).** Accepted standards and procedures applicable to an audit examination. Open to M.S. and other graduate students, with director's consent. Prerequisites: 403 & 404.

**423 Advanced Taxation I (3).** An in-depth study of selected income tax problems relating primarily to business entities. Prerequisite: 6 hours of tax.

**425 Accounting for Governments and Other NonProfit Entities (3).** Role of accounting information systems in planning, managing, and controlling nonbusiness organizations; reporting to external parties; concepts of governmental auditing. Prerequisite: 325 or instructor's consent.

**428 Advanced Business Programming (3).** Business computer programming using the full scale ANSI COBOL language, business simulation programming, and operating systems manipulations. Prerequisite: 258.

**436 Financial Accounting Theory I (3).** Concepts and theory of current financial accounting practice. Prerequisite: 246.

**437 Advanced Cost Accounting (3).** Development and application of current concepts in cost accounting; role of cost accounting in the organization and relationships with financial accounting. Prerequisite: 337.

**444 Seminar in Auditing (3).** Role of auditing in society; auditor's responsibilities; auditing methodology, techniques, and procedures; organization and planning; collection and evaluation of evidence; reporting; and new audit directions and perspectives. Prerequisite: 384 or 409.

**446 Application of Financial Accounting Pronouncements (3).** Development, content and application of authoritative pronouncements in financial accounting. Problems and case studies. Prerequisite: 336.

**448 Seminar in Data Processing (3).** Selected topics regarding accountancy and the computer; integrated data processing and information systems; simulation using the accountancy model; computer

systems for decision making and control. Prerequisite: 268, 358, or 408.

**450 Accounting Policy (3).** Enterprise-level case studies to integrate accountancy measurements and disclosure decisions. Prerequisite: 12 hours of graduate professional accountancy requirements.

**457 Quantitative Methods in Accounting (3).** Applies mathematics and statistics to managerial and financial accounting problems. Prerequisites: 337, Mathematics 60 and Mathematics 61, and Statistics 234 or Statistics 250.

**460 Research Methods in Accounting (3).** Principles for planning, conducting and reporting research projects in accounting. Each student prepares a research proposal. Prerequisite: 24 hours graduate study.

**466 Financial Accounting Theory II (3).** Theories and concepts underlying alternative accounting approaches to income measurement and asset valuation. Prerequisite: 436.

**467 Advanced Managerial Accounting (3).** Conceptual framework and practice; methods which characterize the managerial accounting field. Problems and cases. Prerequisite: 337.

**468 Advanced Accounting Systems (3).** Examines advanced systems concepts and how accounting information is processed in an advanced system. Emphasizes the analysis, design, and control features. Prerequisite: 368.

**489 Cultural Significance of Accounts (3).** Orientation to the cultural situation which gives importance to modern accounting. Critical appraisal of trends in theory and functions of current accounting. Prerequisite: 12 hours accountancy.

**491 Research in Accounting (cr. arr.)** Each student is under direction and guidance of a staff member in writing a dissertation. Monthly seminar to discuss research projects.

## AEROSPACE STUDIES

**11 The Air Force Today I (1).** Deals with Air Force in the contemporary world. Introduces the doctrine, mission, and organization of U.S. Air Force. Familiarizes students with functions of U.S. strategic offensive and defensive forces. Leadership lab.

**12 The Air Force Today II (1).** Introduction and familiarization with the systems used in missile defense. Functions of U.S. general purpose forces, including Army and Navy forces, and Aerospace Support Forces. Leadership lab.

**21 The Development of Air Power I (1).** Deals with development of air power from balloons through World War II. Early flying operations and uses of aircraft in wartime and peacetime are covered. Early technological aircraft developments are studied. Leadership lab.

**22 The Development of Air Power II (1).** Includes development of air power after World War II. The peaceful employment of air power in relief missions and civic action programs, and use of air power in Vietnam. Leadership lab.

**131 Air Force Management and Leadership I (3).** An integrated management course emphasizing the individual as a manager in an Air Force environment. Individual motivational and behavioral processes, leadership, and group dynamics are covered. Emphasis on communicative skills as junior officer attributes. Lab.

**132 Air Force Management and Leadership II (3).** Basic managerial processes involving decision making, organizing, and controlling are covered. Military justice and administrative law are discussed within the context of the military organization. Student participation in speaking and writing is required. Lab.

**141 National Security Forces in Contemporary American Society I (3).** Emphasizes civil-military relations, including society's attitudes, the role of the professional officer, and the interaction of U.S. defense policy with the military. Stresses the development of individual and group communicative skills. Lab.

**142 National Security Forces in Contemporary American Society II (3).** Focuses on the Armed Forces as an integral part of society. Emphasizes society's constraints on national defense; requisites for maintaining security forces; and variables involved in formulating and implementing security policy and strategy. Lab.

## AGRICULTURAL ECONOMICS

**50 Agricultural Economics (5).** Introduces certain fundamental principles of economics; emphasis on application to agriculture. Adjustment to forces by farmers, businessmen in planning, producing and marketing products. Prerequisite: 16 hours completed, f.w.

**200 Problems (cr. arr.)** Supervised study in specialized phase of agricultural economics. Prerequisite: introductory course in agricultural economics.

**220 General Agricultural Marketing (3).** Analysis of farm products marketing systems from industry and firm viewpoint. Prerequisite: 50, f.w. cor.

**225 Statistical Analysis (3).** Elementary statistical inference. Prerequisite: Mathematics 10 or equivalent, f.w.

**230 Farm Programs (3).** Study and analysis of past and present government farm programs affecting the agricultural economy. Prerequisite: 50, f.

**241 Cooperative Business Organizations (3).** Cooperative business organizations; importance; principles; economic problems. Organizational procedures. Operational practices. Prerequisite: 220, w.

**250 Economics of Agricultural Production and Distribution (3).** Examines current national and international issues affecting agriculture. Applies economic principles to agricultural problems. Prerequisite: 50 or Economics 51 & Mathematics 10 or equivalent, f.w.

**251 Agricultural Prices (3).** Variations in prices of agricultural products; underlying factors. Prerequisite: 225 & 250, w.

**260 General Farm Management (3).** Economic and management principles applied to planning and operating farm businesses. Includes enterprise combinations, resource acquisition, water management, profit maximizing techniques and annual adjustments to changing conditions. Prerequisite: 50. Cannot also take 261, f.w.

**261 Farm Management (3).** Principles and decision tools applied to practical farm problems. Budgeting and linear programming emphasized. Resource acquisition and growth strategies evaluated. Economic aspects of new technologies analyzed. Prerequisite: 250 & Accountancy 36. Cannot also take 260, w.

**270 Resources and Economic Development (3).** An introductory survey of theory, policies, and institutional arrangements for domestic and regional economic development. Application made to problems in development of rural areas and use of region's resources. Prerequisite: 250 and Economics 229, f.

**271 International Agricultural Development (3).** Examines world food problem; analyzes its causes; economic and noneconomic policy alternatives for modernizing agriculture in less-developed countries. Prerequisite: 50 or Economics 51 and junior standing, w.

**280 Financing the Farm Business (3).** Financial management of farm business. Operational methods of credit institutions serving agriculture. Prerequisite: 50 & Accountancy 37, f.

**290 Marketing Farm Commodities: Theory and Practice (1).** Economic theory, practices in marketing farm commodities. Relation of theory and practice. General course prerequisite to courses 291, 292, 294, and 295--marketing of indicated commodities. Prerequisite: 220, w. first 1/3 semester.

**291 Marketing Farm Commodities: Livestock and Livestock Products (2).** Theory, practice in marketing livestock, livestock products. Prerequisite: 290, w. middle 1/3 and last 1/3 semester.

**294 Marketing Farm Commodities: Grain Crops (2).** Theory, practice in marketing grain and soybeans with consideration of both cash and future markets. Prerequisite: 290, w. middle 1/3 and last 1/3 semester.

**299 Senior Seminar (1).** Lectures and discussions on current topics. Employment opportunities, procedures discussed. Prerequisite: senior standing, f.

**301 Topics in Agricultural Economics (1-6).** Current and new topics not currently offered in applied and/or theoretical areas in agricultural economics.

**312 Planning the Farm Business (3).** Economics, management theories and principles applied to farm business organization. On-the-farm planning experience, emphasizing budgets, farm and farmstead layout, and other planning techniques. Prerequisite: 260, f.

**314 Farm Business Analysis (3).** Techniques of analyzing a farm business. Methods of resource acquisition, record analysis, tax management principles, and organizational structure of the farm business are principal topics covered. Prerequisite: 260 or 261, w.

**320 Agricultural Business Management (3).** Study of the managerial process including the organization and methods of effective management at various levels in agricultural business firms. Prerequisite: senior standing, 220 & 280 or equivalent, w.

**321 Economic History of Agriculture (3).** Emphasizes Europe and U.S. historical interpretation; usefulness in evaluating present and probable future developments in agriculture, w.

**333 Agricultural Law (3).** Statutes, cases, administrative regulations affecting agriculture. Court systems, contracts, deeds, easements, adverse possession, condemnation, fences, nuisances, irrigation rights, liability for employees, trespassers, dogs, bailments, partnerships, corporations, estate planning, income taxation. Prerequisite: junior standing or instructor's consent, f.w.

**338 Rural Real Estate Appraisal (3).** (same as Agronomy 338, Agricultural Engineering 338). Principles, techniques, practices of rural real estate appraisal. Field trips. Prerequisite: 260 or 261 & Agronomy 100, f.

**345 The Economics of Collective Action in Agriculture (3).** Organization/mechanics of collective bargaining. Organization theory, institutional economics, significance of farmer movements, cooperative systems approach to group action in agriculture. Prerequisite: 220 or 290 or instructor's consent, alt. w. odd yrs.

**355 Economics of Agricultural Production and Distribution (3).** Applies economic principles to agricultural production, including classical theory, limited resources, uncertainty, and capital theory. Prerequisite: senior or graduate standing, f.

**364 Correlation and Regression Analysis (3).** Regressions, correlation techniques for two or more variables. Emphasizes computational procedures, interpretation of results. Prerequisite: 225, f.

**386 Development and Management of Natural Resources (3).** Economic rationales for public natural resource policies, group decision making in the public interest, and public controls and investments in natural resources use. Prerequisite: 250 or Economics 251, f.

**390 Field Training (cr. arr.)** Combines study, observation, and employment in a public agency or private firm in marketing, farm management, or credit. Staff supervision and evaluation. Reports required. Prerequisites: 75 hours and instructor's consent, s.

**400 Problems (cr. arr.)** Supervised study, research in specialized phases of agricultural economics. Prerequisite: instructor's consent.

**410 Seminar (1).** Lectures, reports on economic problems in agriculture, f.w.

**420 Theory of Markets (3).** Development of theories of monopolistic, oligopolistic competition; application to agricultural markets. Market structure influence on price, nonprice competition in buying, selling of farm products and inputs. Prerequisites: 16 hours economics. w.

**423 Business Logistics (3).** (same as Marketing 423). Emphasis on food firms. Analysis and design of integrated logistics systems with in depth-study of components—demand forecasting; production planning; inventory control and traffic planning; warehousing; materials handling and management information systems; their trade-off alternatives.

**424 Advanced Production Economics (3).** Production function analyses. Linear programming; advanced theory of the firm. Applications to analysis of agricultural production problems. Prerequisites: 225 & 250 & Mathematics 205 or instructor's consent. w.

**430 Advanced Price Analysis (3).** Analytical methods for agricultural product prices. Prerequisite: 251 & Statistics 385. f.

**435 Advanced Farm Management (3).** Recent changes in agriculture and their impacts on farm management. Techniques in farm management research, teaching and extension; new theories; selected current literature analyzed. Prerequisite: 312 or 314. alt. f. even yrs.

**450 Research (cr. arr.)** Independent investigation of advanced nature. Report required.

**458 Economics of Marketing (3).** Advanced principles of agricultural economics from standpoint of market system; theory of the firm in imperfect competition; applications such as bargaining theory marketing in economic development. Prerequisite: Economics 351 or equivalent or instructor's consent. f.

**465 Current Economic Aspects of Agriculture (3).** Current economic agricultural problems; proposed solutions. Prerequisites: 16 hours economics. w.

**468 Resource Economics and Development (3).** Methods and criteria of choice in public investment decisions, emphasizes natural resource development. Temporal allocation of resources and its relation to economic development. Prerequisites: 12 hours economics and introductory calculus course. alt. w. even yrs.

**472 International Agricultural Development Policy (3).** An analytical review of economic policies directed toward stimulating agricultural development in the world's low income countries. Prerequisites: Economics 351 and Economics 353 or instructor's consent.

**475 Econometrics I (3).** (same as Economics 475). Emphasis is given special estimation problems which occur in integrating the theory with various types of economic data.

**476 Econometrics II (3).** (same as Economics 476).

**480 Research Methodology (3).** Research methods; sources of information; manner of collecting, analyzing, expressing results. Research project outline required. f.

**485 Advanced Topics in Economics (3).** Analyzes economic logic problems. Current agricultural economic problems. Prerequisite: graduate standing. w.

**490 Research (cr. arr.)** Independent investigation of advanced nature, leading to dissertation.

construction of projects. Prerequisite: 60 or equivalent.

**215 Electricity on the Farm (3).** Home and farm electricity; emphasizes use in productive farm enterprises. Prerequisite: junior standing.

**240 Farm Machinery (3).** Principles of construction and operation of field and farmstead machinery. Selection and management of equipment. Prerequisite: junior standing.

**250 Physical Principles for Food Processing (3).** (same as Food Science and Nutrition 250). Engineering principles and machine operation principles applicable to food processing. Prerequisite: Mathematics 10 and Physics 11.

**300 Problems (1-5).** Problems assigned or approved by instructor.

**301 Topics in Agricultural Mechanization (3).** Current and new technical developments in agricultural mechanization. Prerequisite: 6 hours in agricultural engineering or instructor's consent.

**306 Crop Drying and Conditioning (3).** Systems and equipment for crop drying. Control of grain quality by aeration in storage. Prerequisite: junior standing.

**310 In-Service Course in Agricultural Mechanization (1-8).** A. Farm Power and Machinery B. Farm Buildings and Conveniences C. Soil and Water Management D. Rural Electrification and Processing E. Agricultural Construction and Maintenance Basic principles relating to agricultural mechanization. Applies principles and subject matter in successful classroom presentation at the high school level. Prerequisite: 10 credits from courses 1, 20, 60, 103, 201, 210, 215 and 240; a B.S. degree in Agriculture or instructor's consent.

**320 Farm Drainage and Irrigation (3).** Soil, water, plant relationships. Design and layout of farm drainage and irrigation systems. Prerequisite: 201.

**330 Human Safety in Agriculture (3).** Physical and economic effects of agricultural accidents. Product design for various man-machine-environmental relationships. Voluntary and involuntary standards. Manufacturer and owner liability. Prerequisite: junior standing and one behavioral science course.

**338 Rural Real Estate Appraisal (3).** (same as Agricultural Economics 338, Agronomy 338).

**363 Mechanization Systems Management (2).** Managing farm mechanization systems. Includes field efficiency, field capacity, selection and replacement of system components, field operation costs and custom rates. Prerequisite: junior standing. If no farm experience, should have completed 240.

**386 Mechanized Feed Handling (3).** Detailed analysis and development of mechanical systems to feed and care for livestock. Building arrangement. Waste removal. Prerequisite: senior standing.

**452 Advanced Machinery Management Topics (3).** Digital computer application of techniques for machine replacement and scheduling of operations; analysis of farm equipment manufacturers' distribution and servicing systems; current trends in field machinery. Prerequisite: 363 or equivalent.

buildings for agriculture and light industry, including functional planning. Prerequisite: Engineering 195.

**305 Agricultural Engineering Measurements (3).** Use of instruments and techniques for agricultural engineering measurements. Prerequisite: junior standing in engineering or instructor's consent.

**315 Farm Electrification Engineering (3).** Electric power distribution on the farm. Wiring and lighting of farm buildings; motors and controls; farm electrical equipment. Prerequisite: Engineering 124.

**316 Crop Processing (3).** Methods and equipment for processing farm crops and products. Emphasis on grain drying and storage. Prerequisite: junior standing in engineering.

**321 Irrigation and Drainage Engineering (3).** Soil, water, plant relationships. Surface and sprinkler irrigation. Open ditch and tile drainage. Prerequisite: 221.

**340 Advanced Farm Power and Machinery (3).** Analytical study of construction and operating characteristics of engines, tractors, selected farm machines. Use of instruments, experimental apparatus. Prerequisite: Mathematics 304 and computer programming.

**350 Honors Thesis Research (2-4).** Open only to honors students in agricultural engineering. Independent investigation in agricultural engineering to be presented as a thesis.

**390 Agricultural Engineering Design (3).** Design of agricultural devices or systems. Prerequisites: Engineering 195, Civil Engineering 251 or Mechanical & Aerospace Engineering 251, & 9 hours course work in agricultural engineering.

**400 Problems (cr. arr.)** Supervised individual study.

**401 Advanced Topics in Agricultural Engineering (1-3).** Study of advanced developments in agricultural engineering.

**403 Advanced Farm Buildings (3).** Advanced study of farm buildings and building design. Prerequisite: 303 and graduate standing.

**410 Seminar (1).** Recent investigations in agricultural engineering and related fields. Discussion of current literature; preparation and presentation of papers.

**412 Research Methods (1).** Review of literature; planning research projects; publication procedures. Prerequisite: graduate standing.

**416 Agricultural Processing Engineering (3).** Applies thermodynamics, fluid mechanics and heat transfer to problems in processing farm crops.

**421 Water Management Theory (3).** Advanced studies in erosion control, irrigation, and drainage. Water resources engineering. Prerequisite: 321.

**435 Similitude in Engineering (3).** Principles of dimensional analysis. Use of structural and fluid flow models in design. Prerequisite: Engineering 195 and Civil Engineering 251 or Mechanical & Aerospace Engineering 251.

**440 Mechanical Farm Equipment (3).** Advanced study of special topics. Prerequisite: 340 or equivalent.

**490 Research (cr. arr.)** Independent investigation to be presented as a thesis.

## AGRICULTURAL ENGINEERING-AGRICULTURE

**1 Farm Power (3).** Engines and tractors. Mechanisms, cycles, fuels and combustion, injection systems, electrical systems, performance, annual costs.

**20 Welding (2).** Principles and practices in electric and oxyacetylene welding.

**60 Shop Tools and Processes (2).** Basic processes and tools used in repair, maintenance, and construction of farm equipment. Emphasis on power tools and machines. Prerequisite: 20 and Mathematics 10, or equivalent.

**103 Planning Farm Buildings (3).** Functional requirements of farm buildings. Farmstead and building planning. Material, sanitation, ventilation, convenience. Prerequisite: Mathematics 10, cor.

**117 Experimental Course (cr. arr.)** Designed for sophomore-level students. Content and number of credit hours to be listed in Schedule of Courses.

**164 Agricultural Mechanization Seminar (1).** Selected topics of personal and professional interest. Discusses employment opportunities and procedures. Prerequisite: senior standing or instructor's consent. f.

**165 Farm Tractor Hydraulics (3).** Basic hydraulic theory. Hydraulic components, systems and transmission devices. Hydraulic system testing. Prerequisite: sophomore standing. f.

**198 Pesticide Application Equipment (3).** Principles of pesticide application; sprayer hydraulics and spray atomization; calibration, mixing calculations and compatibility of tank mixes; personal and environmental protection; pesticide labels and regulations.

**201 Farm Water Management (3).** Place of water management practices in maintaining soil productivity. Farm surveying. Design and layout of terrace systems. Prerequisite: Mathematics 10 and junior standing.

**202 Agricultural Practices and Pollution Control (3).** Applies physical, chemical and biological principles to control soil, air, water pollution arising from production and processing of agricultural products. Prerequisites: course in general inorganic chemistry and junior standing.

**210 Advanced Shopwork (2).** Primarily for students majoring in agricultural education. Applies shop principles to the design and

## AGRICULTURAL ENGINEERING-ENGINEERING

**17 Experimental Course (cr. arr.)** Designed for freshman-level students. Content and number of credit hours listed in Schedule of Courses.

**117 Experimental Course (cr. arr.)** Designed for sophomore-level students. Content and number of credit hours listed in Schedule of Courses.

**195 Professional Practice in Agricultural Engineering (1).** Professional opportunities and responsibilities in agricultural engineering. Prerequisite: junior standing.

**196 Ecological Aspects of Agricultural Engineering (1).** Study of effects of agricultural engineering decisions on the environment and how resource constraints may change agricultural engineering practices. Prerequisite: Chemistry 5.

**203 Environmental Control of Farm Buildings (3).** Building design for environmental control. Heat and moisture relationships, ventilation, insulation. Prerequisite: Engineering 99.

**221 Soil Conservation Engineering (3).** Factors affecting runoff and erosion from agricultural lands. Design and layout of soil conservation practices. Prerequisite: Civil Engineering 113 and Civil Engineering 251 or Mechanical & Aerospace Engineering 251.

**241 Analysis of Farm Machines (3).** Tillage, planting, harvesting and crop handling machinery. Construction, selection and economic requirements of farm machines. Prerequisite: Physics 123 and computer programming.

**267 Agricultural Hydraulic System Design (1).** Review of hydraulic theory. Use of Joint Industry Conference (JIC) symbols to design hydraulic systems for agricultural machines. Offered the last five weeks of the fall semester. Prerequisites: Engineering 85, Engineering 99, Mechanical Engineering 251.

**300 Problems (1-5).** Problems assigned or approved by instructor.

**301 Topics in Agricultural Engineering (3).** Current and new technical developments in agricultural engineering. Prerequisite: instructor's consent.

**302 Design of Livestock Waste Management Systems (3).** Development and application of design criteria to the design of agricultural waste management facilities. Prerequisite: Chemistry 5, Civil Engineering 251 or instructor's consent.

**303 Farm Buildings Design (3).** Analysis, design, and synthesis of

## INTERDEPARTMENTAL - AGRICULTURE

**6 Basic Environmental Studies (3).** (same as Biological Sciences 6).

**12 Animal Science (5).** (same as Poultry Science 12, Dairy Science 12). Principles of animal production including importance of animal agriculture and animal products, genetics, anatomy, physiology, nutrition, and animal diseases and public health. f, w.

**101 Special Topics in Agriculture (1-3).** Selected topics not offered in other courses. Prerequisite: instructor's consent. f, w, s.

**111 Computing & Programming Concepts I (3).** Hands-on-computing experience, knowledge of computing concepts, computing science vocabulary and programming language skill in BASIC. Prerequisite: Mathematics 10 or equivalent. f, w.

**150 Agricultural Travel Course (cr. arr.)** General travel course designed to broaden perspective of agricultural students. Prerequisites: one course in each of the following areas: agricultural economics, animal science, plant science, and instructor's consent. Cost of course is borne by the student. s.

**181 Pesticide Chemicals (3).** (same as Entomology 181).

**199 Agriculture Careers and Placement Seminar (1).** Identifies careers in agriculture and related industries. Instruction in how to obtain careers and development of communication skills. Exposure to employment opportunities. Graded S/U. Prerequisite: instructor's consent. w.

## AGRONOMY

**30 Plant Science (5).** (same as Horticulture 30). Principles of production and management of crop plants based on their nature, function, adaption, and utilization. Recommended: a college course in a biological science. f, w.

**100 Soil Systems (4-5).** Nature and functions of soils in soil-biosphere-atmosphere systems; emphasis upon those interactions between water, air, organisms, and soil minerals important in consideration of land use, management. Prerequisite: Chemistry 1 or 5 or 11. f, w.

**111 Seed Analysis (2).** Seed identification and analyses for purity and viability. Prerequisite: 30. f, s.

**130 Undergraduate Seminar (1).** Discussion of assigned or selected topics in agronomy. Prerequisite: 30, 100. f, w.

**201 Topics in Agronomy (1-4).**

**202 International Agronomy (2).** Agronomic and interrelated factors and conditions associated with world food production problems and the transition from traditional to modern agricultures. w.

**204 Grain Crops (3).**

**209 Weed-Crop Ecology (3).** Principles of weed invasion, persistence, allelopathy and competition with crops. Relationships between crop and soil management practices and weed problems. Prerequisites: 30 or Biological Sciences 12, and Biochemistry 110 or equivalent. f, w

**213 Soil Testing and Evaluation (2).** Lecture/lab in methods of evaluating nutritional status of soils and interpreting results of soil tests and plant analysis. Prerequisites: 30, 100.

**220 Soil as a Natural Resource in Land Use Management (4).** Prerequisite: 100 or instructor's consent. w.

**225 Basic Plant Genetics (3).** Basic concepts of plant genetics relevant to agriculture. Emphasizes breeding, production and protection against pathogens. Prerequisite: 30 or equivalent.

**230 Crops and Soils Management (0-3).** Integrates crop and soil sciences into principles of agronomy. Basic plant-soil-climate relationships used in solving management problems of current and future production systems. Prerequisite: 30, 100. w.

**300 Problems (cr. arr.)** Not accepted as substitute for any regularly scheduled course. Problems arranged. f, w, s.

**301 Topics in Agronomy (1-4).**

**302 Fertilizers (2).** Constituents, manufacture, proper use of various kinds of fertilizers. Prerequisite: 100. f.

**303 Forage Crops (3).** Principle forage crops, pasture production, preservation and utilization. Prerequisite: 30. w.

**305 Advances in Crop Science (2).** Recent developments in field crops research, application to crop production. Prerequisite: 30. alt. s. odd yrs.

**306 Weed Control (3).** Identification of weeds; cultural, chemical methods of control; influence on production management. Prerequisite: 30. f.

**307 Physical Properties of Soils (5).** Physical constitution of soils in relation to soil structure, consistency, water relationships, aeration, temperature. Prerequisite: 100 and college physics. f.

**308 Soil Conservation (3).** Conservation of soils with respect to fertility, erosion and deterioration. Prerequisite: 100. Recommended: Agricultural Engineering 201. f.

**309 Herbicides in Agronomic Habitats (3).** Treats interacting biological, chemical and physical factors affecting the function and cycling of herbicides in plants and agronomic habitats. Prerequisites: 30, 100; Biochemistry 110 or Chemistry 205. w.

**310 Cotton and Other Fiber Crops (2).** Largely cotton production; induces relationship of morphology and physiology of cotton plant to production practices. Prerequisite: 30. w.

**311 Responses of Plants to Herbicides (2).** Laboratory study of crop and weed plants as they respond to herbicidal chemicals.

**312 Soil Microbiology (3).** Micro-organic life of soil in relation to soil fertility. Prerequisite: 100 and general bacteriology. w.

**313 Soil Fertility and Plant Nutrition (3).** Considers selected soil properties related to mineral nutrition and plants; practical aspects of evaluating, maintaining and improving soil fertility. Prerequisites: 30 & 100. w.

**314 Soil Fertility and Plant Nutrition Laboratory (2).** Lab procedures related to evaluating selected soil properties for improving soil fertility and plant nutrition. Prerequisite: concurrent or previous enrollment in 313. w.

**315 Crop Physiology (3).** Basic course in crop growth and development; emphasis on the role of crop physiology and morphology in management decisions. Prerequisite: 30. w.

**318 Mineral Components of Soils (4).** Crystalline materials of soil systems. Kinds and relevant properties, stability in soil environments and identification in complex soil material. Prerequisite: 10 hours soils or Geology 230.

**319 Soil Chemistry (3).** Chemical processes which determine the nature and properties of soils. Prerequisite: 100, Chemistry 12, and Chemistry 205 or Biochemistry 110. f.

**320 Soil Genesis, Mapping and Classification (4).** Identification of soils and soil systems in the natural landscape and factors determining their nature. Prerequisite: 100. f.

**325 Field Crop Breeding (3).** Principles underlying economic breeding of crop plants. Method of breeding major field crops. Prerequisite: 30, 225. f.

**329 Soil Chemistry Laboratory (2).** Techniques used to evaluate the chemical and mineralogical properties of soils. Pre- or corequisites: 314 & 319.

**330 Plant Breeding Theory (3).** Designed to provide a logical application of genetic concepts to mating and selection theory in general plant improvement. Prerequisite: 225 or equivalent.

**338 Rural Real Estate Appraisal (3).** (same as Agricultural Engineering 338, Agricultural Economics 338).

**343 Evolution of Genetic Concepts (2).** (same as Biological Sciences 343). Discusses major hypotheses and evidences leading to development of current fundamental concepts. Prerequisite: 170 or equivalent. alt. w. odd yrs.

**350 Special Readings (1-3).** Individual study of assigned topics.

**351 Soil Management Problems (2-3).** Recent developments in soils research; application to soil management. Credit variable with extra readings. Prerequisite: 10 hours soil or equivalent. alt. s. even yrs.

**384 Cytogenetics (3).** (same as Biological Sciences 384). Chromosome cytogenetics, mitosis, meiosis, aberrations, polyploidy, aneuploidy and regulation of chromosome pairing. Prerequisite: 12 hours in

biology including some genetics and cytology, or instructor's consent. w.

**385 Cytogenetics Laboratory (1).** (same as Biological Sciences 385). Practical aspects of subjects dealt with in 384. Prerequisite: 384 or instructor's consent; may take 384 and 385 concurrently. w.

**400 Problems (cr. arr.)** Advanced studies not expected to terminate in thesis.

**401 Topics in Agronomy (1-4).** Isotopes, radiochemistry. Emphasis on use of soil, plant nutrition, and other agricultural applications. Prerequisite: 313 or Biological Sciences 313. w.

**402 Isotopes in Soil Studies (5).** Isotopes, radiochemistry. Emphasis on use of soil, plant nutrition, and other agricultural applications. Prerequisite: 313 or Biological Sciences 313. w.

**407 Soil Physics (3).** Physical characteristics of soil (fracture mechanics, volume changes, soil aeration and temperature) and principles underlying flow and distribution of water in soils. Prerequisites: 307, physics, integral and differential calculus. alt. w. even yrs.

**410 Seminar (1).** Development in depth of advanced aspects of crop and soil sciences through reviews of results of research in progress and of current scientific publications. f, w.

**414 Advanced Soil Fertility (3).** Concepts of field crop nutrition and maintenance of soil fertility. Prerequisite: 313 or equivalent and Biological Sciences 313 or equivalent. alt. f. odd yrs.

**415 Advanced Crop Physiology (3).** Advanced course in crop growth and development. Emphasis on physiology and morphology of plant communities and how they are related to improvement and management of agronomic crops. Prerequisite: 315 and Biological Sciences 313 or equivalent. f.

**416 Transport and Metabolism of Plant Nutrients (3).** (same as Plant Pathology 416).

**417 Mathematical Models of Crop Systems (3).** Survey of representative mathematical models in cropping systems. Emphasis placed on use and testing rather than development. Prerequisites: 315 or Biological Sciences 313, Mathematics 80 and Computer Science 104. alt. w. even yrs.

**419 Physical Chemistry of Soils (3).** Theoretical basis for the applying physical, inorganic, and electro-chemical concepts to soil systems. Prerequisites: 319 or Geology 342, & Chemistry 230. alt. w. even yrs.

**425 Development of Plant Breeding Concepts (3).** Concepts, theories, practices underlying economic breeding of crop plants; based on readings of original literature. Prerequisite: 170, 325. alt. w. odd yrs.

**440 Applied Quantitative and Statistical Genetics (3).** Application of genetic mating systems to agronomic crops to derive estimates of genetic parameters; interpretation of parameters in improving crops. Prerequisite: 325, Statistics 395, and Poultry Science 423, or equivalents. alt. w. even yrs.

**445 Cytogenetics in Crop Breeding (3).** Application of principles and techniques of cytogenetics in crop breeding programs. Chromosomal aberrations, euploidy, aneuploidy, mutations, apomixis, interspecific hybridization and cytoplasmic inheritance. Prerequisite: 384. alt. f. odd yrs.

**450 Research (cr. arr.)** Research not expected to terminate in dissertation.

**490 Research (cr. arr.)** Original investigations in crop and soil sciences in support of theses for master's and doctoral candidates.

## ANATOMY

**202 Elementary Anatomy (5).** Fundamentals of human embryology, gross and microscopic anatomy. In the laboratory, observation and discussion of anatomical materials. For students of nursing and other colleges and schools of the University. Prerequisite: 5 hours biological science or equivalent. f, w.

**205M Medical Gross Anatomy (8).** Gross anatomy of human body including dissection. f.

**206M Medical Developmental Anatomy (2).** A study of normal and abnormal human development from conception through birth. f.

**207M Medical Histology (4).** Microscopic structure of cells, tissues and organs. w.

**240M Neurosciences I (5).** (same as School of Medicine--Interdisciplinary Course 240M, Biochemistry 240M, Physiology 240M).

**300 Problems (cr. arr.)** Regions or systems which may include developmental, microscopic, and gross anatomy.

**301 Human Gross Anatomy (8).** General principles of systemic anatomy. Gross anatomy and dissection of back, upper and lower extremities, head and neck, thorax, abdomen and pelvis. Prerequisites: 201, comparative anatomy or equivalent and instructor's consent. f.

**303 Human Developmental Anatomy (2).** Human embryology and teratology from conception to birth. Prerequisites: vertebrate embryology and instructor's consent. f.

**304 Human Histology and Organology (4).** Detailed study of cytology, histology and microscopic anatomy. Prerequisite: 10 hours of biology & instructor's consent. w.

**305 Anatomy of the Human Nervous System (3).** A comprehensive consideration of the morphology of the nervous system, emphasizing correlation of structure and function. Prerequisites: 201, comparative anatomy or equivalent, & instructor's consent. w.

**306 Autonomic Nervous System (2).** A comprehensive consideration of the autonomic nervous system in man, with emphasis on morphology. Prerequisites: 201, comparative anatomy or equivalent, & instructor's consent. f.

**308 Hematopoietic Organs (2).** Morphological and functional relationships of the blood-forming organs. Prerequisite: basic histology &

instructor's consent. w.

**312 Biology of the Endocrine Organs of Man I (2).** Principles of endocrinology; integrates developmental, structural, and functional aspects of the endocrine system. Neuroendocrinology, metabolic control. Prerequisites: advanced standing in biological sciences, instructor's consent. f.

**313 Biology of the Endocrine Organs of Man II (2).** Endocrinology of the reproductive system, integration of developmental, structural, and functional aspects. Prerequisite: 312, instructor's consent. w.

**405 Mammalian Reproduction (3).** Reproduction in mammals, with emphasis on hormones involved in reproductive process: biosyntheses, biologic actions, role. Prerequisite: graduate standing in one of animal, biologic, medical, or veterinary sciences, instructor's consent, Biochemistry 304 or equivalent. w.

**410 Seminar (1).** Presentation and discussion of original investigations and current literature. f, w.

**450 Research (cr. arr.)** Work equal to research in 490, but not leading to dissertation.

**490 Research (cr. arr.)** Work leading to dissertation.

## ANESTHESIOLOGY

**A Anesthesiology Elective (10).** Junior and senior students. The goals are to provide students (a) an understanding of certain truths associated with the anesthetic state (e.g., the inability of a person to provide himself from the environment; concomitant and common depression of systems of the body other than the nervous system); (b) an opportunity to learn to think and react quickly and correctly in times of stress; (c) to develop knowledge and skills at maintaining artificial ventilation and circulation; (d) to develop technical skills (e.g., insertion of endotracheal catheters, intravenous infusions); (e) to understand some of the rationale in the choice of an anesthetic agent or technique; (f) to relate the morbidity and mortality of anesthesia to surgical patients; (g) to inform students of the functions of anesthesiologists in the care of non-surgical patients (e.g., respiratory therapy, pain problems); and (h) to attract students to the specialty of anesthesiology. Eight-week periods are preferred although four-week electives are available. Actual participation in anesthetic evaluation and administration for surgical procedures is combined with close individual supervision. Arrangement for electives is with the department chairman.

**P Postgraduate Instruction (0).** Formal training is established and accredited. The residency is of two or three years duration. Goals: an understanding of certain truths associated with the anesthetic state; an opportunity to learn to think and react quickly and correctly in times of stress; to develop knowledge and skills at maintaining artificial ventilation and circulation; to develop technical skills; to understand some of the rationale in the choice of an anesthetic agent or technique; to relate the morbidity and mortality of anesthesia to surgical patients; to inform students of the functions of anesthesiologists in the care of nonsurgical patients. Objectives are reached by close supervision by the staff during administration of anesthesia by students to patients undergoing surgery; by preoperative discussion of anesthetic management for every patient. Didactic lectures and morbidity and mortality conferences. Exposure to visiting professors and anesthesia-oriented research, with directed reading and adequate time for study.

## ANIMAL SCIENCE

**11 Animal Science 11 (0).** (same as Poultry Science 11, Dairy Science 11) Principles of animal production including importance of animal agriculture and animal products, genetics, anatomy, physiology, nutrition, and animal diseases and public health. f, w.

**12 Animal Science (5).** (same as Poultry Science 12, Dairy Science 12, Agriculture 12). f, w.

**20 Livestock and Meat Science (5).** (same as Food Science and Nutrition 20). The livestock and meat industry, basic principles of livestock production, live animal-carass comparisons, slaughter techniques, meat as a food, meat inspection, processing, storage, preservation, and identification. f, w.

**25 Introductory Dairy Science (3).** Fundamentals of dairy industry. Includes production, manufacturing, technology, public health, economic aspects. f, w.

**35 Livestock and Meat Science (5).** (same as Food Science and Nutrition 35). The livestock and meat industry; basic principles of livestock production; live animal carcass comparisons; slaughter techniques; meat as a food, meat inspection, processing, storage, preservation and identifications. f, w.

**55 Introductory Poultry Science (3).** Basic information on the industry: reproduction, feeding and management of poultry. Introductory course for poultry science majors and others desiring information on poultry production and related fields. Prerequisite 11 or instructor's consent. w. cor.

**101 Livestock Judging (3).** Comparative judging and evaluation; various classes of farm animals; particular reference to utility. Reference reading; illustrated lectures. Prerequisite: 20. f.

**105 Livestock Judging (3).** Comparative judging and evaluation; various classes of farm animals; particular reference to utility. Reference reading; illustrated lectures. Prerequisite: 35. f.

**115 Dairy Cattle Judging (2).** Dairy breeds, comparative judging, selection. f.

**125 Horse Science (3).** Nutrition, feeding, management, reproduction, breeds and their uses; psychology and methods of training horses. Prerequisite: 11 or instructor's consent. w.

**145 Selecting and Grading of Poultry (2).** Includes breeds and

varieties of poultry, production judging, flock selection and testing, and grading of eggs and live and dressed poultry. Prerequisites: 55. f.w.

**154 Physiology of Domestic Animals (4).** Basic concepts of physiology and anatomy as related to domestic animals. Prerequisites: 11 or Biological Sciences 1, and Chemistry 1 or 11. f.

**199 Horse Science (3).** Nutrition, feeding, management, reproduction, breeds and their uses, psychology and methods of training horses. Prerequisite: 12 or instructor's consent. w.

**200 Problems (1-2).** Library and laboratory study of assigned problems in animal breeding, nutrition, physiology, or production and management. Planning, conduct, and reporting to be in consultation with instructor. Prerequisite: instructor's consent.

**202 Principles of Animal Nutrition (3).** Fundamentals of animal nutrition; application to livestock production. Prerequisite: Biochemistry 110 or Chemistry 205 or 210 and Mathematics 10. f.w.

**204 Advanced Meats (3).** (same as Food Science and Nutrition 204).

**212 Applied Nutrition (3).** Feed composition and utilization, ration formulation, feed evaluation and identification, practical problems. Prerequisite: 202.

**213 Genetics of Livestock Improvement (3).** Applies genetic principles to improvement of domestic animals. Considers methods available to breeder; effectiveness. Prerequisite: 11. f.w.

**214 Meat Classification, Grading, Judging (2).** (same as Food Science and Nutrition 214).

**235 Poultry Production (3).** Poultry farm methods, practices; factors affecting costs and returns with poultry. Prerequisites: 55, ag. Econ. 50, or instructor's consent. w.

**275 Advanced Livestock Selection and Evaluation (2).** Evaluation and selection of breeding and market animals of four farm species (swine, beef cattle, sheep, horses); emphasis on production records and carcass data. Prerequisite: 105. w.

**285 Advanced Dairy Cattle Judging (2).** Continuation of 115. Includes field trips. Prerequisite: 115. w.

**300 Problems (cr. arr.)** Current problems in animal breeding, nutrition, livestock production and management, meats. Assigned topics. In some cases student may undertake a project by outlining objectives, planning work, keeping records and summarizing results in written report.

**302 Monogastric Nutrition (3).** Principles of nutrition, feed formulation and recent research in poultry feeding. Prerequisites: 202, biochemistry 193 recommended. w.

**304 Physiology of Reproduction (3).** Principles of animal reproduction with emphasis on endocrine control of reproductive processes. Prerequisites: 11 and Biological Sciences 1 and 2. f.w.

**305 Beef Production and Management (3).** Systems of beef production: breeding, feeding, management of commercial and purebred beef cattle. Prerequisites: 202, 212. f. w.

**315 Advanced Dairy Production (3).** Applied dairy science: emphasis on nutrition and management; herd health, labor-saving equipment, buildings, quality products, organization of dairy enterprise, business and economic aspects. Prerequisites: 25 and 212 or equivalent. f.

**323 Applied Animal Genetics (3).** Applies genetic principles to the improvement of farm animals. Laboratory periods designed to provide experience in the development and use of statistics important in breeding programs. Prerequisite: 313. w.

**335 Advanced Poultry Production (3).** Principles and practices in poultry production. Prerequisite: 55. w.

**345 Sheep Production and Management (3).** Systems of sheep and wool production: breeding, feeding, management of commercial and purebred sheep. Prerequisites: 202, 212. w.

**351 Special Readings (cr. arr.)** Scientific publications in chosen field studied to acquaint student with technical literature, research methods. Prerequisite: instructor's consent. f.w.

**355 Swine Production (3).** Systems of pork production: breeding, feeding, management of commercial and purebred swine. Prerequisites: 202, 212. w.

**383 Bovine Breeding (3).** Genetic principles, breeding systems, practices for improving bovine species. Prerequisites: 213, or equivalent. w.

**384 Artificial Breeding (3).** Reproductive processes; selection, evaluation, storage of semen; insemination techniques; artificial breeding organizations. Prerequisites: junior standing and 304. f.

**390 Internship in Animal Science & Technology (1-12).** Off-campus training to develop technical skills and understanding of an area of animal science. Written reports required. Prerequisites: junior standing, two 300-level Animal Science courses and instructor's consent.

**391 Field Training (3).** (same as Dairy Science 391, Poultry Science 391). On-site instruction in technical or scientific aspects of animal production for selected, qualified advanced student. Prerequisites: junior standing, at least two advanced courses in animal sciences or equivalent, and instructor's consent.

**394 Semen and Ova Processing (3).** Research techniques involved in spermatozoa, ova, and embryo collection, processing and storage. Prerequisite: 384. w.

**400 Problems (1-2).** Advanced independent studies in fields not directly related to thesis or non-thesis degree research program. Prerequisites: graduate standing and instructor's consent.

**401 Livestock Production and Management Research Methods (3).** Techniques of experimentation, with application to livestock production and management. Exercises in methods of planning, conducting, analyzing, evaluating and reporting research. Prerequisite: graduate standing, Statistics 207 or equivalent or instructor's consent. f.

**402 Animal Nutrition (3).** (same as Nutrition 402). More important works contributing to knowledge of animal nutrition. Prerequisites:

202 and one course in biochemistry. f.

**410 Seminar (1).** Critical consideration of research and other selected subjects in animal breeding, animal nutrition, and livestock production and management. Students indicate at enrollment the area of study. f.w.

**411 Livestock Feeding Investigations (2).** Assigned readings of significant papers. Special reports. Prerequisite: 402. alt. s. even yrs.

**413 Reproductive Biology Seminar (1).** (same as Biochemistry 413).

**423 Genetics of Populations (4).** (same as Poultry Science 423, Biological Sciences 423).

**430 The Development, Growth and Organization of Colleges of Agriculture (1).** Additional guest speakers/material, assigned readings, reports. Prerequisite: must be Ph.D. candidates.

**432 Ruminant Nutrition (3).** (same as Nutrition 432). Physiology, chemistry, microbiology, pathology of ruminants. Emphasizes digestion, absorption, metabolism, utilization of nutrients. Lecture, laboratory, assigned readings. Prerequisite: 402 or equivalent. alt. w. odd yrs.

**440 Topics in Animal Science (cr. arr.)** Prerequisites: graduate standing and instructor's consent.

**450 Research (cr. arr.)** Investigations in animal breeding, animal nutrition, livestock production and management. Written report required.

**490 Research (cr. arr.)** Investigations in animal breeding, animal nutrition, livestock production and management. Thesis required.

## ANTHROPOLOGY

**1 General Anthropology (3).** General survey course in fields of anthropological concern: archaeology, cultural anthropology, physical anthropology; emphasizes underlying concepts, principles. Examples from nonliterate peoples of world. f.w. cor.

**3 Anthropological Materials (2-3).** Analyzes and discusses materials of Anthropology data collection: movies, tape and phonograph recordings, artifacts, models, ethnographies, fossils. Prerequisite: 1 (which may be taken concurrently) or instructor's consent.

**20 Introduction to Language Science (3).** (Same as Linguistics 20).

**40 Significant Discoveries of Archaeology (3).** Detailed consideration of approximately 20 archaeological discoveries and conclusions, from the field and the laboratory, which have been of surpassing importance for an understanding of human origins, behavior, culture and past experiences on earth. f.

**50 Deviance: a Cross-Cultural Perspective (3).** Cross-cultural studies of problem behavior with emphasis on violence, suicide, sexual misconduct, drug use and mental disorder.

**60 Monkeys, Apes and Humans (3).** For those with little or no background in anthropology. Surveys the ecology and behavior of major nonhuman primate groups, and how these relate to the evolution of human behavior.

**FIELD Anthropology Field Course (0).**

**110 Civilization of India (3).** (same as History 110, South Asia Studies 110). The substance of Indian civilization as seen from traditional Indian and Western perspectives; Indian viewpoints are emphasized.

**131 Tribal Religions (2).** Same as Religious Studies 131.

**142 Introduction to Field Research Archaeology (1-6).** Techniques of field research and laboratory analysis through field experience. Prerequisites: 3 hours anthropology or declared major field of study in anthropology; instructor's consent. Sophomore standing.

**143 Museum Methods (3).** Introduces museum techniques of handling and preservation of collections; exhibit design and evaluation; role of the anthropological museum. Prerequisite: Instructor's consent.

**150 Human Biological Evolution (5).** Evidence for the course of hominid evolution; the study of fossil and contemporary skeletal material. Prerequisite: sophomore standing or instructor's consent.

**152 World Archaeology (3-4).** Introduces human prehistory. Surveys early cultural development throughout the world, methods and theories of archaeology. Variable credit reflects 1 hour optional lab. Prerequisite: sophomore standing or instructor's consent.

**153 Cultural Anthropology (3).** Analysis of human cultures with emphasis on both constant and variable factors at different levels of social complexity; contact between cultures, and cultural influences on individual behavior. Prerequisite: sophomore standing or instructor's consent.

**154 Anthropological Linguistics (3).** (same as Linguistics 154). Language in relation to other aspects of human behavior. Introduction to description and analysis of the basic units of language. Emphasis on non-Indo-European and preliterate languages. Prerequisite: sophomore or instructor's consent.

**180 Seminar in Anthropology (3).** Readings, discussions, and problems in the integration of the subfields of anthropology through theory and examples. Prerequisites: Anthropology major, at least second semester junior, or instructor's consent.

**185 Undergraduate Research (2-8).** Prerequisite: instructor's consent.

**198 Honors in Anthropology (3).** Individual study and research leading to Honors in Anthropology. In consultation with instructor, student works on Honors Thesis. Anthropology Majors only. Prerequisite: junior/senior standing; Honors level GPA, instructor's consent.

**199 Honors in Anthropology (3).** Continuation of 198. Prerequisite: Junior/senior standing; Honors level GPA, instructor's consent.

**201 Topics in Anthropology (1-3).** Problems, topics, issues or review of research in any area of anthropology and/or experimental development of new content areas. May be repeated to a maximum of 9 hours. Prerequisite: instructor's consent.

**230 North American Indians Today (3).** North American Indians of today and recent past. Emphasis on problems in relation to Bureau of Indian Affairs, education, health, welfare, state and federal laws, Historical-cultural background provided by lectures, movies, readings

and discussions. Prerequisite: sophomore standing.

**235 Cultures of Native America (3).** Survey of culture areas of the American Indian at the time of the first contact with western civilization (North, Middle, and South America). Prerequisite: 1 or instructor's consent.

**240 Ancient American Civilization (3).** Origin of native Americans and the beginnings in the Americas; American Indian civilization prior to 1500 A.D.. Prerequisite: sophomore standing or instructor's.

**250 Cultural Ecology and Human Adaptation (3).** Systematic survey of the relationship and interrelation between the environment, human behavior and cultural patterns in the process of adaptation and survival. Prerequisite: junior/senior standing.

**253 Cultures of the World (3).** Surveys culture types; systematic description and ordering of living world cultures from hunting and gathering bands to nation-states. Prerequisite: 1 or 153 or junior/senior standing.

**260 The Third World: An Anthropological Perspective (3).** (same as Peace Studies 261). Consideration of problems in developing nations--neo-colonialism, peasant revolutions, overpopulation and under-industrialization--in the context of cultural change. Prerequisite: junior/senior standing.

**265 Male and Female (3).** Comparative anthropological findings of the male and female in politics, subsistence, art, etc. in primitive, peasant and modern cultures. Cultural and biological theories about sexually defined roles. Behavioral evolution of monkeys, apes, humans. Prerequisite: Sophomore standing.

**269 Anthropological Populations (3).** Ecological setting, population structure, and biocultural interactions of small, usually isolated human populations studied as possible models for human adaptation before recent explosive growth and migrations of our species. Prerequisite: Biological Sciences 1 or instructor's consent.

**270 Culture and Communication (3).** (same as Speech and Dramatic Art 270). Study of cultural systems as communicative devices. Examines topics such as space and gesture from an evolutionary and cross-cultural perspective. Emphasizes increased sensitivity to the cultural messages conveyed by different societies. Prerequisite: 1 or sophomore standing.

**306 Sociolinguistics (3).** (same as Linguistics 306). Studies covariation of linguistic structure and society; surveys current sociolinguistic literature; topics: multilingualism, Black English, social factors in language change, social dialectology--its methods and theory, etc. Prerequisites: one course in linguistics and instructor's consent.

**308 Historical Linguistics (3).** (same as Linguistics 308). Methods of tracing the history of languages by glottochronology, and by comparative and internal reconstructions; cultural and linguistic implications of such reconstructions and of areal linguistics. Prerequisite: 154 or instructor's consent.

**323 Medical Anthropology (3).** Cross-cultural study of belief systems concerning health and illness, practices of diagnosis and treatment, and roles of patients and practitioners. Several "non-Western" health care systems are studied in detail. Prerequisite: nine hours upperclass behavioral sciences.

**324 Preindustrial Technology (3).** Technological pursuits of nonliterate peoples: stone working, basketry, pottery, metallurgy, etc. Description, analysis of technical, economic, social aspects. Prerequisite: junior/senior standing or instructor's consent.

**325 Political Anthropology (3).** (same as Peace Studies 326). Cross-cultural analysis of the structure of power and authority; relationship of political processes to other aspects of culture; special reference to non-western societies. Prerequisite: junior/senior standing or instructor's consent.

**327 Anthropology of Religion (3).** The comparative study of religion as a cultural system and its relation to social structure. Prerequisite: junior/senior or instructor's consent.

**328 Psychological Anthropology (3).** Examines cross-cultural approaches to the study of perception, cognition, and personality; methods for gathering and validating data; examples from non-Western societies. Prerequisite: Psychology 1 or instructor's consent.

**329 Cultures of Asia (3).** Survey of peoples, cultures of Asia; emphasis on native societies of area. Prerequisite: 1 or instructor's consent.

**330 Cultures of Africa (3).** Survey of Negroid peoples, cultures of Africa south of the Sahara. Prerequisite: 1 or instructor's consent.

**331 Cultures of Oceania (3).** Survey of peoples, cultures of Pacific island world, including Australia. Sources, development, characteristics of native cultures of area. Prerequisite: 1 or instructor's consent.

**332 Comparative Social Organization (3).** Cross-cultural comparison, analysis of social structures. Role of kinship, age, sex, locality, economics, religion and other factors in determining relationships between individuals and groups in non-literate societies. Prerequisite: 153 or instructor's consent.

**334 Cultures of Mexico and Guatemala (3).** A survey of contemporary populations in Mesoamerica, with emphasis on village life, culture change and stability, and current problems of anthropological interest. Prerequisite: 1 or instructor's consent.

**335 North American Indian Culture (3).** Comparative study of American Indian tribes north of Mexico, with emphasis on eastern United States. Prerequisite: 1, 153, or 235.

**336 Zooarchaeology (3).** Faunal identification and analysis of mammals, birds, reptiles, etc. recovered archaeologically. Interpretation of cultural and climatic significance. Prerequisite: 152 or equivalent.

**338 Historical American Archaeology (2-3).** Lecture and laboratory course concerned primarily with Euro-American archaeological resources. Emphasis is on 19th-century midwestern settlement systems and types, architecture, technology, classification, intra-site patterning, and principal date classes. Prerequisite: junior/senior standing or instructor's



consent.

**339 Field Research in Historical American Archaeology (3).** Stresses specialized field techniques in location, identification and excavation of features common to historical sites; correlates historical data with approach to and products of excavation. Prerequisite: 338 or instructor's consent.

**340 North American Archaeology (3).** Ancient man and development of American Indian culture. Prerequisite: 152, or 240.

**341 Archaeology of South America (3).** Development of culture in South America from the Pleistocene to European contact. Prerequisite: 152, or junior/senior standing.

**342 Field Methods in Archaeology (1-8).** Techniques of archaeological excavation; field surveying, recording, care and interpretation of materials. Prerequisites: 142 or equivalent, & instructor's consent.

**344 Prehistory of Mexico (3).** Survey of the development of culture in Mexico prior to European contact. Prerequisite: 152 or junior/senior standing.

**345 History of Anthropology (3).** Growth of anthropological theories, methods, and perspectives; major figures and contributions in each subdiscipline. Prerequisite: junior standing. alt. w.

**346 Language and Culture (3).** (same as Linguistics 346). Interrelations between language, thought, culture, and society; role of language in cognition; methods and concepts of linguistics in cultural analysis. Prerequisite: 154 or equivalent

**347 Iron Age Prehistory (3).** Intensive analysis of prehistoric European and African sociocultural systems based on an iron technology. Includes the study of the art of this period. Prerequisite: junior/ senior standing or instructor's consent.

**348 Far Eastern Prehistory and Archaeology (3).** Survey of the prehistory and early cultures of Asia excluding the Near East. Emphasis on Northern Asia, China, Japan, South and Southeast Asia and Oceania. Prerequisite: junior/senior standing or instructor's consent.

**349 Topics in Anthropology (3).** Problems, topics, issues, or review of research; experimental development of new contact areas. Specific content varies depending on needs of faculty or students and will be announced in advance. Prerequisite: instructor's consent.

**350 Special Readings in Anthropology (cr. arr.)** Directed readings in ethnology, linguistics, archaeology, or physical anthropology not leading to thesis. Prerequisites: two courses in anthropology and instructor's consent.

**353 Prehistory of the Maya (3).** Survey of the pre-Hispanic development of Indian cultures in Guatemala and adjacent areas, emphasizing the rise and decline of Maya civilization. Prerequisite: 1 or 152 or junior/senior status.

**355 Human Skeletal Identification (3).** Trains students such as archaeologists and law enforcement officers to apply physical, anthropological, archaeological and modern forensic medical techniques to the personal identification of human remains. Prerequisite: Junior standing.

**357 Pre-Pleistocene Primate Evolution (3).** Primate evolution from the Paleocene to end of Pliocene: discusses contributions from comparative anatomy, postnatal growth, biochemistry, cytogenetics and ethology. Prerequisite: 150 or instructor's consent.

**359 Cultures of South Asia (3).** Examination of traditional and contemporary cultures of India, Pakistan, Sri-Lanka (Ceylon), and Bangladesh. Prerequisite: 153 or instructor's consent.

**361 Cultures of Europe (3).** Examines ethnic, linguistic, and folk cultural background of contemporary Europe, the articulation of local units with national society and culture. Prerequisite: 1 or instructor's consent.

**362 Cultural Change (3).** The processes of culture: innovation, diffusion, integration, patterning, acculturation and others, examined in literate and non-literate contexts. Prerequisite: 1, 153, or instructor's consent.

**363 Theories in Social Anthropology (3).** Critical examination of the selected theories of human society. Prerequisite: 153 or instructor's consent.

**364 Human Origins (3).** History and theory in the study of human plantology. Prerequisite: 150 or instructor's consent.

**365 Economic Anthropology (3).** Social and economic organization of a variety of non-western cultures; economic theory in anthropology; ecological, economic, and social factors in culture change. Prerequisites: 153 or instructor's consent.

**366 Human Biological Variation (3).** Human biological variation both among and within living populations. Evolutionary, genetic, ecological, demographic and especially cultural factors which contribute to biological variation. Prerequisite: 150 or Biology 1.

**367 Ethnographic Methods (3).** Relation of problems to techniques; surveys techniques of gathering data; discusses their limitations and potentials. Prerequisite: 9 hours anthropology or instructor's consent.

**368 Old World Prehistory (3).** Beginnings of culture in the old world through the early Iron Age. Prerequisite: 152, or instructor's consent.

**369 Primate Social Behavior (3).** Communicative behavior and group social dynamics of non-human primates. Prerequisite: 150 or instructor's consent.

**370 Primate Growth (3).** Normal biological changes during the postnatal growth period of man and non-human primates. Prerequisite: 150 or instructor's consent.

**371 Introduction to General Linguistics (3).** (same as Linguistics 371, Romance Languages 371).

**372 Techniques in Linguistic Analysis (3).** (same as Linguistics 372, Romance Languages 372).

**373 Linguistic Phonetics (3).** (same as Linguistics 373, Romance Languages 373).

**374 Issues in Linguistic Analysis (3).** (same as Linguistics 374, Romance Languages 374).

**393 Field Methods in Linguistics (4).** (same as Linguistics 393). Intensive training in collection and analysis of data taken from a native speaker of non-Indo-European language. Prerequisite: 6 hours linguistics and instructor's consent.

**400 Problems (cr. arr.)** Directed research not leading to thesis or dissertation. Prerequisite: departmental approval.

**420 Independent Reading in Preparation for Comprehensive Exam for PhD (1-8).** Independent readings for Ph.D. comprehensives. Open only to Ph.D. candidates who have completed all but final semester of course work. Prerequisite: consent of major advisor.

**436 Seminar in Anthropological Methods (3).** Prerequisites: 9 hours anthropology or instructor's consent. May repeat to 9 hours maximum.

**437 Seminar in Ethnohistory (3).** Prerequisite: instructor's consent.

**442 Field Problems in Archaeology (2-8).** Prerequisite: 342.

**443 Seminar in Theory and Methods in Archaeology (3).** Application of theory and conceptual frameworks to archaeological studies drawn from both Old and New Worlds. Prerequisites: 152 or 153. May repeat to 6 hours maximum.

**444 Seminar in Archaeological Research (3).** Readings and critical evaluation of selected problems in archaeological research. Prerequisite: 12 hours anthropology. May repeat to 9 hours maximum.

**446 Seminar in Anthropological Linguistics (3).** Ethnolinguistics, linguistic prehistory, Pidgin and Creole languages, linguistheories and cultural analysis. French structural anthropology. May repeat for 9 hours maximum when content varies. Prerequisite: 346 or instructor's consent.

**449 Topics in Anthropology (3).** Problems, topics, issues, or review of research; experimental development of new content areas. Specific content varies depending on needs of faculty or students and is announced in advance. Prerequisite: instructor's consent.

**450 Research (cr. arr.)** Original research not leading to the preparation of a dissertation. Prerequisite: instructor's consent.

**451 Problems in Physical Anthropology (2-8).** Concentrated work upon the definition and solution of problems in physical anthropology and human biology, with origination of or participation in research projects. Prerequisite: 366 or instructor's consent.

**452 Seminar in Physical Anthropology (3-6).** Readings and discussion concerning current problems in human and infrahuman primate evolution, with emphasis on taxonomy, morphology, and behavior. Prerequisite: 366 or instructor's consent.

**453 Seminar in Classic Questions in Physical Anthropology (3).** Considers classic literature and problems in physical anthropology. Prerequisites: 150, 151, 366.

**461 Seminar in Psychological Anthropology (3).** Focuses on developments in psychological anthropology, cross-cultural psychology. Special attention on cognition, perception, socialization, personality assessment, psycho-cultural change, psycho-linguistics, psychometrics, within cross-cultural contexts. Prerequisite: instructor's consent. May repeat to 6 hours maximum.

**462 Seminar in Cultural Dynamics (3).** Prerequisite: 326 or 362 or instructor's consent. May repeat to 6 hours maximum.

**463 Seminar in Comparative Social Organization (3).** Prerequisite: 332 or instructor's consent. May repeat to 6 hours maximum.

**465 Seminar in Ethnological Theory (3).** Prerequisite: 6 hours anthropology or instructor's consent. May repeat to 9 hours maximum.

**466 Seminar in Ecological Adaptation (3).** Relationships and interactions between man and his environments, with emphasis on the physical and cultural adaptations to environment. May repeat to 9 hours maximum. Prerequisites: 8 hours anthropology & instructor's consent.

**468 Seminar in Old World Archaeology (3).** Intensive studies in application of anthropological concepts to problems in Old World archaeology and prehistory. Prerequisites: previous course in cultural anthropology and in Old World archaeology. May repeat to 12 hours maximum.

**469 Seminar in Formal Anthropological Research Design (3).** Methods of fitting statistical and formal research designs to quantitative and qualitative data discussed and illustrated, with research by participants. Prerequisite: introductory course in statistics. May repeat to 9 hours maximum.

**490 Research (cr. arr.)** Advanced work leading to thesis or dissertation. Prerequisite: Consent of major advisor.

**493 Phonology (3).** (same as Linguistics 493, Romance Languages 493).

**494 Syntax (3).** (same as Linguistics 494). Surveys various theories of syntax; closely examines the theory of generative transformational grammar and reviews the relevant literature. Prerequisite: 374 or equivalent.

## ART

### ART-GENERAL

**2 Introduction to Art (3).** Basic practice in drawing, painting, design. Exploratory course for beginners. Prerequisite to all other studio courses except 55 and 60. f.w.

**3 Appreciation of Art (2).** Illustrated discussion with examples from varied historic and contemporary art fields on nature of art, functions, methods of creative expression. f.w.

### ARTCRAFTS

**55 Artcraft Fundamentals (3).** Practical work in handling various craft materials. Encourages creative expression in artcraft activities. f.w.

## CERAMICS

**230 Beginning Ceramics (3).** Artistic fabrication of clay through basic forming, ornamentation, glazing and firing; includes study of ceramic design, technology, history and contemporary movements. Payment of expendable materials expense is required. Prerequisite: 2, 20. f.w.

**330 Intermediate Ceramics (3).** Continuation of 230 with emphasis on throwing and glaze formulation. Payment of expendable materials expense is required. Prerequisite: 230 and 220 or 285 or 250. f.w.

**331 Advanced Ceramics (3).** Continuation of 330. Includes advanced problems in firing, clay and glaze technology, forming and ornamentation. Payment of expendable materials expense is required. Prerequisite: 330 and (if repeated chemistry 1. May be repeated to 12 hours maximum. f.w.

**332 Ceramics Sculpture (3).** Sculptural forms constructed of slabs, coils and wheel-thrown elements. Payment of expendable materials expense is required. Prerequisite: 331. May be repeated to nine hours maximum. f.w.

**430 Graduate Ceramics (3).** Advanced study of ceramic technology and design concepts with emphasis on directed development of individual work. Payment of expendable materials expense is required. Prerequisite: 331. May be repeated to 12 hours maximum. f.w.

**431 Graduate Ceramic Sculpture (3).** Directed development of individual work. Payment of expendable materials expense is required. Prerequisite: 331. May be repeated to 12 hours maximum. f.w.

## COMPOSITION

**270 Experimental Media I (3).** Ordering and structuring materials into compositional forms, using various media, traditional as well as new. Subject matter will vary each semester. Prerequisites: 160 and 220 or instructor's consent. f.w.

**370 Experimental Media II (3).** Continuation of 270. Prerequisite: 270. f.w.

**371 Experimental Media III (3).** Continuation of 370. Prerequisite: 370. May repeat to nine hours maximum. f.w.

**470 Experimental Media IV (3).** Advanced study of compositional organization at the graduate level. Prerequisites: 371 & graduate standing. May repeat to nine hours maximum. f.w.

## DESIGN

**20 Basic Design I (3).** Basic study of line, shape and texture: their use and control according to the basic variables and the principles of design. Two dimensional exercises employing a variety of tools and materials. Prerequisite: 2. f.w.

**21 Basic Design II (3).** Continuation of 20 with concentration on the elements of value and color and control of implied space. Prerequisite: 20. f.w.

**120 Color Theory (3).** An investigation of various color systems and their application to art. Prerequisite: 21. f or w.

**220 Beginning Spatial Design (3).** Preliminary studies of the elements of three-dimensional form as they are embodied in a variety of structural materials. Prerequisite: 20. f.w.s.

**221 Space, Form and Structure (3).** Advanced study of three-dimensional form; basic structural systems and machine production emphasized. Prerequisite: 220. f.

**315 Color Theory (3).** A study of theoretical and historical foundations of color associated with the fine arts and design. Includes experience in practical experimentation and creative interpretation of various theories. Prerequisite: 21.

**320 Space, Light and Color (3).** Advanced study of three-dimensional form with emphasis upon spatial effects of light and color. Prerequisite: 220. w.

**321 Advanced Spatial Design (3).** Advanced study of three-dimensional design; practical application of spatial design. May repeat to 15 hours maximum. Prerequisite: 221 and 320. f.w.

**421 Graduate Spatial Design (3).** Comprehensive study of three-dimensional design; emphasis on creative expression based on original theoretical research. Prerequisite: 322 and graduate standing. May repeat to 15 hours maximum. f.w.

## DRAWING

**60 Beginning Drawing I (3).** Basic practice in fundamentals of drawing. Various approaches to drawing problems in black and white. Studies from the human figure and still life. f.w.

**160 Beginning Drawing II (3).** Continuation of 60. Emphasizes drawing of the human figure in various graphic media. Prerequisites: 2, 60. f.w.s.

**165 Anatomical Drawing (3).** Anatomical structure of human figure as it relates to art. Drawing from live model; emphasis on gross anatomy as defined by skeletal and muscular structure. Prerequisite: sophomore standing, one semester of drawing. May repeat to six hours maximum. f.w.

**260 Intermediate Drawing (3).** Continuation of 160. Prerequisite: 160. f.w.s.

**360 Advanced Drawing (3).** Continuation of 260 with increased emphasis on expressive drawing. Prerequisite: 260. May repeat to 15 hours maximum. f.w.s.

**460 Graduate Drawing (3).** Continuation of 360 with emphasis on individual creative expression. Prerequisites: 360 and graduate art major. May repeat to 15 hours maximum. f.w.s.

## FIBERS

**140 Beginning Fibers (3).** Basic weaves, drafting, introduction to simple and four-harness loom weaving. Prerequisite: 2. f.w.

**240 Intermediate Fibers (3).** Patterns and pattern drafting for

four-harness looms. Off-loom weaving. Expendable materials fee required. Prerequisite: 140. f.w.

**340 Advanced Fibers (3).** Projects in off-loom, four-harness and/or multiharness weaving. Prerequisite: 240. May repeat to 15 hours maximum. Expendable materials fee required. f.w.

**440 Graduate Fibers (3).** Individually assigned projects in off-loom, four-harness and/or multiharness weaving. Prerequisites: 340 and graduate standing. May repeat to 15 hours maximum. Expendable materials fee required. f.w.

## GRAPHIC DESIGN

**222 Graphic Design I (3).** Investigation of letterforms, their historical development and visual properties. Studio problems incorporating graphic techniques of lettering and italic calligraphy applied to contemporary design principles. Payment of expendable materials expense is required. Prerequisite: 21 & 60 f.w.

**223 Graphic Design II (3).** Study of design process applied to specific graphic design forms such as logo and poster design using typographic and photographic techniques. Emphasizes development of visual concepts. Payment of expendable materials expense is required. Prerequisite: 222. f.w.

**323 Graphic Design III (3).** Application of Contemporary Design concepts and techniques to a variety of problems resulting in comprehensive and camera-ready designs incorporating word and image components. Diffusion transfer and prototype techniques. Payment of expendable materials expense is required. Prerequisite: 233. f.w.

**324 Graphic Design IV (3).** Continuation of Graphic Design III with emphasis on integration of verbal and visual ideas. Design problems suited to a professional portfolio. Payment of expendable materials expense is required. Prerequisite: 323. f.w.

**422 Graphic Design V (3).** Continuation of Graphic Design IV, with emphasis on professional design methods and techniques. Payment of expendable materials expense is required. Prerequisite: 324 and graduate standing. f.w.

## METALS

**250 Beginning Metals (3).** Comprehensive introduction to basic techniques in jewelry and silversmithing with emphasis on design. Techniques include sawing, soldering, piercing, bezel setting, forging, reticulation and etching. Payment of expendable materials expense is required. Prerequisite: 20, 220. f.w.

**350 Basic Casting (3).** Lost wax method of centrifugal casting, including vacuum, steam and cuttlefish casting. Payment of expendable materials expense is required. Prerequisite: 250 and instructor's consent. f.w.

**351 Enameling (3).** Techniques of applying enamels to nonferrous metals. Payment of expendable materials expense is required. Prerequisite: 250, 350 and instructor's consent. f.

**352 Raising (3).** Design and construction of hollow and flatware forms. Techniques include forming by planishing, sinking, upsetting and raising, and methods of finishing and ornamentation. Payment of expendable materials expense is required. Prerequisite: 350, 250 and instructor's consent. w.

**353 Advanced Techniques in Metals (3).** Emphasis on complex design problems in jewelry and silversmithing, including chasing and repousse, wood graining and advanced stone-setting. Payment of expendable materials expense is required. Prerequisite: 350, 351, 352, and instructor's consent. May repeat to 15 hours maximum. f.w.

**450 Graduate Seminar in Metals (3).** Supervised research in individually directed projects in advanced jewelry design and construction; includes lapidary work. Payment of expendable materials expense is required. Prerequisite: 353, graduate art major and instructor's consent. May repeat to 15 hours maximum. f.w.

## PAINTING

**177 Beginning Painting (3).** Basic exploration of oil and acrylic painting techniques and methods. Still life, landscape and figure. Prerequisites: 2, 20 and one semester of drawing. f.w.s.

**277 Intermediate Painting (3).** Continuation of 177 with the addition of portrait painting. Prerequisite: 177. f.w.s.

**377 Advanced Painting (3).** Advanced problems in oil and acrylic painting. Prerequisite: 277. May be repeated to 15 hours maximum. f.w.s.

**477 Graduate Painting (3).** Advanced study continued. Emphasis on individual creative expression. Prerequisite: 377 and graduate art major. May repeat to 15 hours maximum. f.w.s.

## PHOTOGRAPHY

**225 Beginning Photography (3).** Basic photography as an art form; camera and darkroom techniques; surveys photographic history and esthetics. Camera with adjustable aperture and shutter required. Payment of expendable materials expense is required. Prerequisite: 8 hours studio art. f.w.

**325 Intermediate Photography (3).** Continuation of 225 with emphasis on advanced photo techniques and photographic image making. Payment of expendable materials expense is required. Prerequisite: 225. May repeat to 15 hours maximum. f.w.

**425 Graduate Photography (3).** Advanced technical study with emphasis on development of the individual student's creative ideas. Payment of expendable materials expense is required. Prerequisite: 325 and graduate standing. May repeat to 15 hours maximum. f.w.

## PRINTMAKING

**290 Relief Printmaking (3).** Relief printing techniques in color and black and white; includes woodcut, mixed media. Prerequisite: 2, 21 and one semester of drawing. May be repeated to six hours maximum.

Expendable materials fee required. f.w.

**291 Intaglio Printmaking (3).** Intaglio printing techniques, including etching, engraving and aquatint. Prerequisites: 2, 21 and two semesters of drawing. May repeat to six hours maximum. Expendable materials fee required. f.w.

**292 Lithography (3).** Lithographic printing techniques from stone and metal plates. Prerequisite: 2, 21 and two semesters of drawing. Expendable materials fee required. f.w.

**390 Advanced Printmaking (3).** Advanced study in relief, intaglio or lithographic printmaking with emphasis on individual creative expression. Prerequisite: 290 or 291 or 292. May repeat to 15 hours maximum. Expendable materials fee required. f.w.

**490 Graduate Printmaking (3).** Graduate level study in relief, intaglio or lithographic printmaking with emphasis on individual creative expression. Prerequisites: 390 and graduate standing. May repeat to 15 hours maximum. Expendable materials fee required. f.w.

## PROBLEMS

**300 Problems in Art (1-3).** Directed advanced study and practice of art in a combination of areas related to, but not included in, scheduled courses. Prerequisites: senior standing or adequate preparation in art and instructor's consent. f.w.s.

**301 Topics (4).** Special studies in studio art; covers subjects not included in regularly offered courses. Prerequisites: junior standing and instructor's consent. f.w.s.

**402 Graduate Collaboration (1-4).** Collaborative projects involving two or more students in Department of Art. f.w.

**403 Historic Research in Drawing, Painting and Design (1-4).** Investigation of historic precedent in drawing, painting, design. f.w.

**410 Graduate Studio Seminar (3).** Special readings and research including written and/or oral presentations. Prerequisite: graduate standing and consent of department.

**424 Problems in Design (1-12).** Graduate level work in graphic design. Prerequisite: 422, and consent of department.

**429 Problems in Photography (1-12).** Supervised research in creative photography. Prerequisite: 425 and graduate standing. f.w.

**434 Problems in Ceramics (1-12).** Graduate level work in ceramics. Prerequisite: 430 or 431, and consent of department.

**444 Problems in Fibers (1-12).** Graduate level work in fibers. Prerequisite: 440 and consent of department.

**454 Problems in Metals (1-12).** Prerequisites: 15 hours of 450 and instructor's consent. May be repeated to 12 hours maximum. f.w.

**456 Historic Research in Artcrafts (1-4).** Prerequisite: Consent of department required. f.w.

**464 Problems in Drawing (1-12).** Prerequisite: 460 and consent of department required. f.w.

**474 Problems in Experimental Media (1-12).** Independent study at the graduate level. May be repeated to a maximum of 12 hours. Prerequisite: 470 & graduate standing. f.w.

**479 Problems in Painting (1-12).** Prerequisite: 477 and consent of department required. f.w.

**489 Problems in Sculpture (1-12).** Prerequisite: 485 and consent of department required. f.w.

**494 Problems in Printmaking (1-12).** Prerequisite: 490 and consent of department required. f.w.

**499 Problems in Serigraphy (1-12).** Prerequisites: 496 and instructor's consent. f.w.

## SCULPTURE

**285 Beginning Sculpture (3).** Principles of sculptural organization, figure studies, modeling techniques, simple plaster casting. Payment of expendable materials expense is required. Prerequisite: 5, 20, 165, or 160. f.w.

**385 Intermediate Sculpture (3).** Continuation of 285. Introduction to carving techniques. Payment of expendable materials expense is required. Prerequisite : 285. f.w.

**386 Wood and Stone Carving (3).** Advanced carving technique. Payment of expendable materials expense is required. Prerequisite: 385. May repeat to 12 hours maximum. f.w.

**387 Sculpture in Plastics (3).** Explores polyester, epoxy and acrylic plastics as sculptural media. Payment of expendable materials expense is required. Prerequisite: 385. May repeat to 6 hours maximum. f.w.

**388 Sculptural Welding and Metal Casting (3).** Payment of expendable materials expense is required. Prerequisite: 385. May repeat to 6 hours maximum. f.w.

**485 Advanced Sculptural Composition (3).** Payment of expendable materials expense is required. Prerequisite: 386 or 387 or 388 and graduate standing. May repeat to 15 hours maximum. f.w.

## SERIGRAPHY

**296 Serigraphy I (3).** Introduces methods, materials, and techniques of printmaking with the silk screen. Payment of expendable materials expense is required. Prerequisite: 20 & one semester of drawing. f.w.

**396 Serigraphy II (3).** Advanced study of serigraphy; pictorial composition through stencil arrangements emphasized. Payment of expendable materials expense is required. Prerequisite: 296. May repeat to 15 hours maximum. f.w.

**496 Graduate Serigraphy (3).** Advanced problems in serigraphy with emphasis on creative expression through a combination of methods. Payment of expendable materials expense is required. Prerequisite: 396 & graduate art major. May repeat to 15 hours maximum. f.w.

## WATERCOLOR

**175 Beginning Water Color (3).** Theory, practice of painting in water color from still life, landscape, figure. Prerequisites: 2 and one semester of drawing. f.w.

**275 Intermediate Water Color (3).** Continuation of 175. Prerequisite 175. f.w.

**375 Advanced Water Color (3).** Advanced problems in water color. Prerequisite: 275. May repeat to 15 hours maximum. f.w.

**475 Graduate Water Color (3).** Advanced study in water color. Emphasis on individual creative expression. Prerequisites: 375 and graduate standing. May repeat to 15 hours maximum. f.w.

# ART HISTORY AND ARCHAEOLOGY

**1 An Introduction to Visual Arts (3).** Introduces visual arts and arts in local museums and galleries. Students develop a vocabulary and discuss visual responses in short papers and examinations. No credit for both Art 3 and Art History and Archaeology 1. f.w.

**10 Introduction to Western Art I (3).** Architecture, sculpture and painting of the ancient and medieval world. f.

**11 Introduction to Western Art II (3).** Architecture, sculpture and painting from the Renaissance to modern times. w.

104 (0).

**130 Oriental Art and Civilization I (3).** Architecture, sculpture, painting of late ancient and Islamic Near East and India with particular emphasis on religious and cultural development. Prerequisite: Honors freshman, sophomore standing or instructor's consent. f.

**131 Oriental Art and Civilization II (3).** Architecture, sculpture, painting of Buddhist India, Southeast Asia, China, Japan, Central Asia. Special emphasis on relationships with philosophy, religion, symbolism. Prerequisite: Honors freshman, sophomore standing, or instructor's consent. w.

**141 American Art and Architecture (3).** Architecture, sculpture, painting of America from 17th century to present day. Prerequisite: Honors freshman, sophomore standing, or instructor's consent. w.

**142 American Folklife (3).** Surveys traditional cultural expression in American civilization and the role custom plays in everyday life in selected regions, ethnic communities and occupations; emphasizes craft, architecture, art, cultural landscape, and Old World and native American backgrounds. Prerequisite: sophomore standing. w.

**180 Introduction to Art History/Archaeology (1).** Introduces methods and historiography of art history/archaeology; required of departmental majors in junior year. Graded S/U only. Prerequisite: candidacy for B.A. in art history/archaeology.

**190 Honors Proseminar I (3).** Introduction in research, individual reports, papers. Prerequisite: junior standing. Restricted to Honors candidates and 3-year M.A. program. f.

**191 Honors Proseminar II (3).** Continuation of 190. w.

**192 Honors Reading and Research I (3).** Individual research projects in preparation of senior thesis. Prerequisite: senior standing. Restricted to Honors candidates and 3-year M.A. program. f.

**193 Honors Reading and Research II (3).** Preparation of senior thesis. Prerequisite: 192. w.

**201 Topics in Art History and Archaeology (1-99).** Selected studies in various facets of art history and archaeology. Prerequisite: departmental consent.

**217 Introduction to Near Eastern Art & Archaeology (3).** General survey of the archaeological evidence for the artistic development in the early civilizations of the Near East. Prerequisite: 10, General Honors 101 or instructor's consent.

**218 Introduction to Biblical Archaeology (3).** A general survey of the major archaeological discoveries in the Near East which contribute to our understanding of the artistic and religious development of the peoples represented in the Biblical tradition. Prerequisite: 10 or General Honors 101 or History 101 or instructor's consent.

**219 Art and Archaeology of Ancient Egypt (3).** General survey of development of material culture in Egypt from the predynastic period to the Roman conquest. Prerequisite: 10 or General Honors 101 or History 101 or instructor's consent.

**220 Classical Art and Archaeology I: Greece (3).** General survey of development of material culture in Greece from earliest time to Hellenistic period. Prerequisite: 10 or General Honors 101 or History 101 or instructor's consent. f.

**221 Classical Art and Archaeology II: Rome (3).** General survey of development of material culture in Roman world from earliest times through early Empire. Prerequisite: 10 or General Honors 101 or History 101 or instructor's consent. w.

**222 Ancient Technology (3).** Engineering, architecture, military technology and astronomy in the ancient world. Prerequisite: sophomore standing.

**240 Early Medieval Art (3).** Architecture, painting and sculpture of Europe from 4th century to beginning of Romanesque period. Prerequisite: 10, General Honors 102, or instructor's consent. f.

**241 Late Medieval Art (3).** Evolution of art and architecture in Europe from Charlemagne to 15th century as a result of the intellectual situation. Prerequisite: 10, General Honors 102, or instructors consent. w.

**250 Italian Renaissance Art (3).** Architecture, painting and sculpture of Italy from 14th through 16th century. Prerequisite: 10, General Honors 103, or instructor's consent.

**251 Northern Renaissance Art (3).** Evolution of art and architecture in Northern Europe from about 1400 to end of 16th century as a result of intellectual and historical situation. Prerequisite: 11 or equivalent, General Honors 102 or instructor's consent.

**260 Baroque Art (3).** European architecture, painting and sculpture of 17th century. Prerequisite: 11, General Honors 103, or instructor's consent.

- 261 Eighteenth Century European Art (3).** Eighteenth-century European painting, sculpture and architecture. Prerequisite: 11, General Honors 103 or instructor's consent.
- 270 Nineteenth Century European Art (3).** Nineteenth-century European painting, sculpture and architecture. Prerequisite: 11, General Honors 104 or instructor's consent.
- 271 Twentieth Century European Art (3).** International directions in painting, sculpture and architecture from 1885 to the present, with special emphasis on development of abstract art in relation to other cultural factors. Prerequisite: 11, General Honors 104 or instructor's consent.
- 272 Twentieth Century American Art (3).** Painting, sculpture and architecture with special emphasis on responses to political and social concerns. Prerequisite: 11, 141, General Honors 104 or instructor's consent.
- 300 Problems (cr. arr.)** Special studies in art history/archaeology; covers subjects not included in regularly offered courses. Prerequisite: adequate preparation in either art history, archaeology, anthropology, classical languages, or history; and instructor's consent.
- 301 Topics in Art History and Archaeology (cr. arr.)** Special studies in art history/archaeology; covers subjects not included in regularly offered courses. Prerequisites: adequate preparation in either: art history, archaeology, anthropology, classical languages, or history; and instructor's consent.
- 302 Art and Literature (3).** The visual arts examined from the point of view of poets, essayists and other writers. Prerequisite: 10 or 11.
- 304 Art and Archaeology of Syria-Palestine (3).** Development of material culture in the eastern Mediterranean during the Stone and Bronze Ages with relevant reference to Biblical and extra-Biblical textual material. Prerequisite: 218 or equivalent or instructor's consent.
- 305 Studies in Egyptian Art and Archaeology (3).** Special studies in ancient Egypt. Prerequisite: 219 or equivalent or instructor's consent.
- 306 European Art and Archaeology I (3).** Art, culture of Europe from earliest period to Bronze Age. Prerequisite: 220 or equivalent.
- 307 European Art and Archaeology II (3).** Art, culture of Europe during Bronze Age and Iron Age. Prerequisite: 221 or equivalent.
- 308 Ancient Painting I: Greece (3).** Survey of art of painting in Aegean and Classical world, 2000 B.C. to Hellenistic period. Prerequisite: 220 or General Honors 101 or equivalent.
- 309 Ancient Painting II: Italy (3).** Survey of art of painting in Roman world. Prerequisite: 221 or General Honors 101 or equivalent.
- 310 Ancient Sculpture I: Greece (3).** Survey of sculptor's art in Aegean and Classical world from earliest times to Hellenistic period. Prerequisite: 220 or General Honors 101 or equivalent.
- 311 Ancient Sculpture II: Italy (3).** Survey of sculptor's art in Roman world. Prerequisite: 220 or General Honors 101 or equivalent.
- 312 Ancient Architecture I: Greece (3).** Survey of art of building in Aegean and Classical world from earliest times to Hellenistic period. Prerequisite: 220 or General Honors 101 or equivalent.
- 313 Ancient Architecture II: Italy (3).** Survey of art of building in Roman world. Prerequisite: 221 or General Honors 101 or equivalent.
- 314 Archaeological Methods (2-6).** Methods of excavating various types of sites; recording, preserving their materials. Prerequisites: adequate preparation in archaeology or anthropology and instructor's consent.
- 315 Near Eastern Art and Archaeology I: Before 3000 B.C. (3).** General survey of development of material culture in Near East from earliest times to beginning of Bronze Age. Prerequisite: 220, 221, General Honors 101 or equivalent.
- 316 The Greeks Abroad (3).** An analysis of the archaeological evidence for Greek commercial and colonial activities overseas, with special emphasis on the chronological significance of these events. Prerequisite: 220 or instructor's consent.
- 317 Aegean Archaeology (3).** Greek prehistoric civilizations from paleolithic period to 1000 B.C. Prerequisite: 220 or General Honors 101 or equivalent.
- 323 Greek and Roman Numismatics I (3).** (same as Classical Studies 323). Coinage of Greek city-states and/or Roman Republic and Empire. Prerequisite: Greek 103 or Latin 103.
- 324 Greek and Roman Numismatics II (3).** (same as Classical Studies 324). Coinage of Greek city-states and/or Roman Republic and Empire. Prerequisite: Greek 103 or Latin 103.
- 325 Greek Epigraphy (3).** Inscriptions of ancient Greece and/or Rome. Prerequisite: Greek 103 or Latin 103.
- 326 Latin Epigraphy (3).** Inscriptions of ancient Greece and/or Rome. Prerequisite: Greek 103 or Latin 103.
- 330 Roman Provincial and Early Christian Art (3).** Analyzes development of art and architecture of provinces of the Roman Empire into Early Christian period of Europe and Near East. Prerequisite: 221, 240, General Honors 102, or instructor's consent.
- 336 Art of the Dark Ages (3).** Analyzes barbaric, Merovingian, Carolingian and Viking art and archaeology. Prerequisite: 240 or equivalent.
- 341 Byzantine Art and Archaeology (3).** Byzantine, Slavic and Russian art and architecture. Prerequisite: 240 or equivalent.
- 342 Romanesque Art and Architecture (3).** Discussion of selected topics in architecture, sculpture and painting and their artistic and cultural relationship from ca 1000 to ca 1150. Prerequisite: 240, 241 or equivalent.
- 343 Gothic Art and Architecture (3).** Discussion of selected topics in architecture, sculpture and painting and their artistic and cultural relationship from ca 1150 to ca 1400. Prerequisite: 241 or equivalent.
- 350 Michelangelo and the High Renaissance (3).** Sculpture, architecture, paintings, drawings of Michelangelo in the context of his times. Prerequisite: 250 or equivalent.
- 351 Renaissance and Baroque Architecture (3).** Problems in European architectural history from 14th through 17th century. Prerequisite: 250, 260 or equivalent.
- 352 Renaissance Figural Arts II: Northern Europe (3).** Discussion of selected topics in painting and sculpture and their socio-cultural relationship from the late gothic period to the sixteenth century in Europe north of the Alps. Prerequisite: 241, 251 or equivalent.
- 360 Rembrandt and Baroque Art (3).** Painting, prints and drawings of Rembrandt in the context of his times. Prerequisite: 260 or equivalent.
- 361 Rococo to Romanticism (3).** Rococo through romanticism: styles and issues in eighteenth century art. Prerequisite: 261 or equivalent.
- 362 Realism-Through Post-Impressionism (3).** Styles and issues in nineteenth-century art. Prerequisite: 270 or equivalent.
- 364 Material Folk Culture (3).** An exploration of traditional European-American and American material culture (art, craft, architecture) from a multidisciplinary perspective. Special attention is given to the relationship of the natural to the man-made environment. Prerequisite: 142 or equivalent.
- 365 American Architecture (3).** Architecture from colonial period to present in relation to European architecture. Prerequisite: 141 or equivalent.
- 370 Contemporary Art (3).** Painting and sculpture since World War II. Prerequisite: 141 or 271 or General Honors 104.
- 371 Modern Architecture (3).** Problems in history of architecture from late 18th century to present. Prerequisite: 141, 270, 271 or equivalent.
- 375 Historic Preservation (3).** (same as History 375).
- 376 Topics in Museum Studies (3).** Lectures and reports on selected topics including connoisseurship of archaeological and art objects, the history of collecting, and curatorial topics. Prerequisite: graduate standing or instructor's consent.
- 401 Introduction to Graduate Study (3).** Methods of research, bibliography, use and criticism of source material. Required of graduate students in art history and archaeology who have not had 190. Prerequisite: graduate standing.
- 402 Historiography of Art and Archaeology (3).** Literature of art and archaeology in terms of works of leading European art historians, archaeologists. Required of graduate students in art history and archaeology. Prerequisite: graduate standing, w.
- 403 Theory and Practice of College Humanities Teaching (3-6).** Required for students in M.A. program for teaching humanities; others, instructor's consent. Theory, techniques, and substantive concerns in interdisciplinary college teaching. Comparative analyses of literature, art, philosophy. Prerequisite: degree in humanities field.
- 404 Art Theory and Criticism (3).** Theoretical and critical literature of art from earliest times to the present. Prerequisite: graduate standing.
- 406 Archaeology of the Ancient Near East (3).** A detailed examination of the archaeological evidence for the early civilizations of the Fertile Crescent. Prerequisite: instructor's consent.
- 409 Seminar in Aegean Art and Archaeology (cr. arr.)** Special subjects assigned for individual research; discussion of reports by seminar members. May be repeated. Prerequisites: 317 or equivalent and instructor's consent.
- 410 Seminar in Greek Art and Archaeology (cr. arr.)** Special subjects of study assigned for individual research; discussion of reports by seminar members. Prerequisite: 308, 310, 312 or equivalent.
- 411 Seminar in Roman Art and Archaeology (cr. arr.)** Special subjects of study assigned for individual research; discussion of reports by seminar members. Prerequisite: 309, 311, 313, or equivalent.
- 412 Greek Sanctuaries (3).** Great sanctuaries of Greece as epitome of Greek art and civilization. Prerequisite: 220@or General Honors 101 or equivalent.
- 414 Monuments and Topography of Athens (3).** Descriptive and historic analysis of major monuments of the city of Athens in the ancient period. Prerequisite: 220 or equivalent.
- 415 Monuments and Topography of Rome (3).** Descriptive and historical analysis of major monuments of the city of Rome in ancient period. Prerequisite: 221 or equivalent.
- 420 Seminar in Medieval Art and Archaeology (cr. arr.)** Specific subjects of study will be assigned to students for presentation in relation to broader questions of the cultural/historical phenomena of the time, from ca 700 to ca 1150. Prerequisite: 336, 341 or equivalent.
- 425 Seminar in Late Medieval Art (cr. arr.)** Specific subjects in the period between ca 1150 and ca 1400 will be assigned to students for presentation in relation to broader questions of the cultural/historical phenomena of the time. Prerequisite: 342, 343 or equivalent.
- 430 Seminar in Renaissance Art I: Italy (cr. arr.)** Special subjects of study assigned for individual research; discussion of reports by seminar members. Prerequisite: 350 or equivalent.
- 440 Seminar in Baroque Art (cr. arr.)** Special subjects of study assigned for individual research; discussion of reports by seminar members. Prerequisite: 359, 360 or equivalent.
- 441 Venetian Painting (3).** Advanced lectures in the history of venetian painting from ca 1400 to ca 1800. Prerequisite: 250, 260, 350, 360 or equivalent.
- 445 Studies in European Prints and Drawings (cr. arr.)** History and connoisseurship of prints or drawings with individual assignments to students for reports. The collections of the Museum of Art and Archaeology will be used for study. Prerequisite: 350, 352, 360 or equivalent.
- 451 Seminar in Modern Art (cr. arr.)** Special subjects assigned for individual research; discussion of reports by seminar members. Prerequisite: 370, 371 or equivalent.
- 452 Seminar in Modern Architecture (cr. arr.)** Special subjects of study assigned for individual research; discussion of reports by seminar members. Prerequisite: 371 or equivalent.
- 453 British Art of the Eighteenth Century (3).** Graduate lecture course. Special attention will be given to the social and historical contexts, to theory, book illustration, garden historical contexts, to theory, book illustration, garden architecture and caricature. Prerequisite: graduate standing.
- 454 Nineteenth Century Painting (3).** Graduate lecture course. Special attention will be given to Victorian painting, landscape, the development of abstraction and the concept of realism. Prerequisite: graduate standing.
- 460 Seminar in American Art (cr. arr.)** Special subjects of study assigned for individual research; discussion of reports by seminar members. Prerequisite: 365 or equivalent.
- 465 Studies in American Decorative Arts (cr. arr.)** The minor arts of the United States: furniture and silver of 18th century emphasized. Prerequisite: 141, 365 or equivalent.
- 470 Introduction to Museum Studies (3).** Lectures and reports on the organization of museums, covering governing boards, professional staffs, accreditation standards, operations. For students in museum training only.
- 471 Curatorial Care of Collections II (3).** Lecture and laboratory course on preservation of objects. Prerequisite: advanced graduate standing or permission.
- 472 Museum Training I (1-6).** Internship in the Museum of Art and Archaeology, or another approved museum. For students in museum training only. Prerequisite: advanced graduate standing.
- 480 Readings (cr. arr.)** Reading, critical evaluation of literature of special fields of art history and/or archaeology. Prerequisite: 401 or equivalent.
- 490 Research and Thesis (cr. arr.)** Individual research leading to preparation of thesis or dissertation. Prerequisite: 401 or equivalent.

## ATMOSPHERIC SCIENCE

- 50 Introductory Meteorology (3).** (same as Geography 50). Physical processes of atmosphere in relation to day-to-day changes in weather. f. cor.
- 200 Independent Study in Atmospheric Science (1-3).** Independent study of a topic dealing with meteorological theory or application of meteorological science to the solution of a relevant problem. Prerequisites: upper-class standing, 50 or equivalent, and instructor's consent.
- 301 Topics in Atmospheric Science (cr. arr.)** Development of theory and applications for selected topics in atmospheric science. Prerequisites: junior standing and instructor's consent.
- 302 Weather Briefing (1).** Student participation in daily discussions of current weather patterns. Prognostic maps prepared from various atmospheric models. Prerequisite: 50 or graduate standing.
- 303 Meteorology of the Biosphere (3).** (same as Geography 303). Energy balance of biological systems including plant canopies, forests and animals. Effects of weather events on plant and animal production discussed. Prerequisite: 50, graduate standing or instructor's consent. w.
- 304 Meteorological Analysis I (3).** Basic techniques for surface and upper air analysis, using selected examples of weather patterns. Prerequisite: 50, 350, or instructor's consent. f. odd yrs.
- 305 Meteorological Analysis II (3).** Graphical analysis and interpretation of physical, kinematic and dynamic properties of the atmosphere. Analysis techniques applicable to atmospheric research. Prerequisite: graduate standing, w. even yrs.
- 314 Cloud and Precipitation Physics (3).** Physics of atmospheric nucleation-condensation, cloud droplet and ice crystal growth, precipitation processes, and associated electrical phenomena. Prerequisites: 1 year college physics and Mathematics 175. alt. f. odd yrs.
- 316 Micrometeorology (3).** Transport processes in surface boundary layer. Important applications in pollution discussed. Prerequisite: Mathematics 304.
- 350 Fundamentals of Meteorology (3).** Comprehensive review of fundamental concepts and major developments of modern meteorology; introduces basic physical and dynamic processes of the atmosphere. Prerequisites: Mathematics 175 & Physics 123.
- 366 Climates of the World (3).** (same as Geography 366).
- 377 Climate Dynamics (3).** Physical and dynamic problems of climate and climatic variation, climatological phenomena and various time ranges of forecasting, variation and predictability of the climate. Prerequisite: 350 or 366.
- 392 Atmospheric Thermodynamics and Statics (5).** Thermodynamics of dry and moist air, atmospheric hydrostatics, convection, and development of the fundamental equations of geophysical fluid dynamics. Prerequisite: 350 or instructor's consent. f. even yrs.
- 393 Atmospheric Kinematics and Dynamics (5).** Dynamics and kinematics of atmospheric flow. Manipulation of fundamental equations, numerical modeling of atmosphere. Prerequisite: 392, w. odd yrs.
- 400 Problems (cr. arr.)** Independent study by graduate students in atmospheric science. Prerequisites: graduate standing and instructor's consent.
- 401 Topics in Atmospheric Science (cr. arr.)** Development of the theory with its application for selected topics in atmospheric science. Prerequisites: graduate standing and instructor's consent.
- 402 Radiation in the Atmosphere (3).** Physics of solar and infrared radiative transfer in the atmosphere, including energy conversion effects, atmospheric optics, and photochemical processes. Prerequisites: 1 year college physics and Mathematics 175. alt. w. even yrs.

- 410 Seminar (cr. arr.)** Prerequisite: graduate standing. f, w.
- 412 Advanced Dynamic Meteorology (3).** Application of perturbation dynamics, advanced dynamics, and numerical methods to study of atmospheric circulations. Prerequisite: 393. alt. f. odd yrs.
- 416 Atmospheric General Circulation (3).** Comprehensive review of dynamical theories of general circulation with intensive discussion of current problems. Prerequisite: 393 or instructor's consent. alt. f. odd yrs.
- 420 Meteorological Statistics (3).** Applies theory of probability and frequency distribution to meteorological variables. Prerequisite: 350 or Statistics 320 or instructor's consent. alt. f. odd yrs.
- 466 Advanced Dynamic Climatology (3).** Study of global climate; application of large scale atmospheric dynamics; conservation of various forms of energy, climatic evaluation, large scale climatic modification. Prerequisite: 393 and 416, or 366, or instructor's consent. alt. w. even yrs.
- 490 Research (cr. arr.)** Research for thesis preparation. f, w.

## BIOCHEMISTRY

- 10 Biochemistry, the Field and the Profession (1).** Introductory seminar for students interested in brief exposure to field of biochemistry. Topics: nature of projects in department, literature sources, professional codes, organization of chemical community, biographies of famous biochemists. Graded S/U.
- 99 Biochemical Information Retrieval (1).** Consists of lectures, library field trips, demonstrations of data base searching, and student on-line data base searching. Solution of information retrieval problems required. Designed for sophomore biochemistry majors. Prerequisite: Biochemistry 10. Corequisite: Chemistry 210. f.
- 110 Introductory Biological Chemistry (3).** Introduction to organic structures and functional groups as they relate to biologically important compounds. Structures and function of proteins, polysaccharides, lipids and enzymes. Prerequisite: 5 hours general chemistry. f, w.
- 193 General Biochemistry (3).** Survey of biochemistry: static/dynamic aspects of carbohydrates, lipids, proteins, nucleic acids. Discussion of metabolic pathways, energy production, and metabolic regulatory mechanisms. Prerequisites: Chemistry I; Biochemistry 110 or Chemistry 210-211 or Chemistry 205; sophomore standing. f, w.
- 195 General Biochemistry Laboratory (2).** To be taken concurrently with 193. Laboratory sessions (one 4-hour lab weekly): experiments on chemical/physical properties of biomolecules, enzyme assays and application of instrumentation applicable to biochemical studies. Prerequisite: same as 193. f, w.
- 206 Medical Biochemistry (8).** Lectures cover the broad field of biochemistry of man. Clinical correlative lectures. Research project laboratories. Prerequisites: 8 hours general chemistry, 5 hours organic chemistry. Some quantitative chemistry recommended. f.
- 240M Neurosciences I (5).** (same as School of Medicine- Interdisciplinary Course 240M, Anatomy 240M, Physiology 240M).
- 270 Biochemistry (3).** First semester of comprehensive biochemistry course: metabolic pathways, amino acids/proteins, carbohydrates, lipids, nucleic acids, kinetics, energy requirements, metabolic regulation in living cells. Prerequisites: one year inorganic chemistry, 5 credits organic chemistry with laboratory. Recommended: quantitative analysis. f.
- 272 Biochemistry (3).** Second semester of a comprehensive biochemistry course, including metabolism of carbohydrates, fatty acids, steroids, amino acid synthesis and metabolism, molecular genetics, hormones, photosynthesis and integrated metabolism. Prerequisite: 270. w.
- 274 Biochemistry Laboratory (4).** Techniques course involving analytical experiments with carbohydrates, lipids, proteins, nucleic acids; use of instrumentation in biochemistry; radioisotope tracers in metabolism; isolation, purification and kinetics of enzymes. Prerequisites: 270 and 272, or 272 concurrently. f, w.
- 299 Seminar (1).** Discuss journal papers dealing with current topics of research, techniques, status of field, importance of results. Students report on completed undergraduate research projects. Prerequisites: senior standing, a minimum of 10 hours chemistry including a biochemistry course with laboratory.
- 300 Problems (1-3).**
- 301 Topics in Biochemistry (cr. arr.)** Experimental courses; highly specialized topics taught infrequently or courses taught by visiting professors. Prerequisite: general biochemistry; others as specified by instructor each semester course is offered.
- 304 General Biochemistry Lectures (5).** Principles of biochemistry; studies bioconstituents and enzymes, coenzymes, metabolism, hormones and nutrition. Prerequisites: organic chemistry & quantitative chemistry & biology. f.
- 310 Trace Analysis (3).** (same as Chemistry 310). Methods of trace element analysis with emphasis on analysis of biological materials. Prerequisite: quantitative analysis. w.
- 312 Instrumental Methods of Analysis (4).** (same as Chemistry 312).
- 370 Biochemical Genetics (3).** General concepts and experimental approaches in molecular biology relevant to modern chemical problems. Prerequisites: 270 and 272, or Biological Sciences 202, or equivalents.
- 371 Enzymology and Metabolic Regulation (3).** General concepts and experimental methods for study of the mechanism of enzyme action. Prerequisites: 270 and 272, or 304, or equivalents.
- 372 Physical Biochemistry (3).** Physical concepts underlying a variety of physical chemical methods as they apply to biochemical research. Prerequisites: 270 and 272, or 304 and Chemistry 230, or equivalents.

## 400 Problems (1-6).

- 401 Plant Biochemistry (3).** Emphasizes biochemistry unique to plants; biochemical events plants share with other organisms discussed, compared. Photosynthesis, metabolism, composition, compartmentation, regulation of biochemical events included. Prerequisite: 272 or 320-322 or 304 or instructor's consent. alt. f. odd yrs.
- 403 Topics in Biochemistry (2-3).** Experimental courses; highly specialized topics taught infrequently or courses taught by visiting professors. Prerequisite: general biochemistry, other as specified by instructor each semester course is offered.
- 410 Seminar (1).** Review of current literature; individual presentation of research or classical science topics. f, w.
- 413 Reproductive Biology Seminar (1).** (same as Animal Science 413). Presentation and discussion of selected topics from all phases of reproductive biology. Open to qualified students of graduate standing in the field of reproductive biology. f, w.
- 422 Analytical Biochemistry--Chromatography (2).** Principles, experimental design, capabilities, limitations, and applications of the general field of chromatography of biologically important molecules. Eight (2-hour) lectures, eight (4-hour) labs. Four weeks. Prerequisite: graduate standing or instructor's consent. f.
- 423 Analytical Biochemistry--Multiple Automatic Microanalysis (1).** Basic principles of autoanalysis with laboratory experiments on ion-exchange, GLC, flame analysis, and spectrophotometry. Three (2-hour) lectures and five (4-hour) labs. Two weeks. Prerequisite: graduate standing or instructor's consent. f.
- 424 Analytical Biochemistry--Mass Spectrometry (2).** Instrumentation, fragmentation mechanisms, interpretation of spectra, combined gas chromatography--mass spectrometry. Eight (2-hour) lectures, eight (4-hour) labs. Prerequisites: two courses in organic chemistry, one course in physics, and instructor's consent. w.
- 450 Research (2-8).** Does not include preparation of dissertation.
- 461 Advanced Carbohydrate Metabolism and Biological Oxidations (2).** Review of current knowledge of intermediary metabolism of carbohydrates, and the respiratory chain. Prerequisite: 304 or equivalent. alt. w. odd yrs.
- 462 Advanced Metabolism: Proteins and Nucleic Acids (2).** Advanced course in fields of protein and nucleic acid metabolism. Prerequisite: 304 or equivalent. alt. f. odd yrs.
- 463 Advanced Lipid Metabolism (2).** Advanced course in lipid metabolism, including selected topics in digestion, absorption, blood lipids, tissue lipids, lipid oxidation, lipid biosynthesis, metabolic control of lipid metabolism. Prerequisite: 304 or equivalent. f.
- 464 Physical Biochemistry: Proteins, Enzymes, Nucleic Acids (2).** Theoretical aspects of biokinetics, bioenergetics; principles of physical chemical techniques applicable to structural problems in proteins, nucleic acids. Prerequisites: 320 or equivalent and physical chemistry and differential integral calculus. w.
- 465 Advanced Metabolism: Amino Acids (2).** (same as Nutrition 465). Advanced course in metabolism of amino acids, nitrogen and sulfur compounds with related control mechanisms and nutritional aspects. Prerequisite: 304 or equivalent. alt. w. even yrs.
- 466 Regulation of Energy Metabolism (2).** An integrated approach to the regulation of principal pathways involved in cellular fuel utilization. Prerequisite: 304 or 322 or equivalent. alt. w. odd yrs.
- 490 Research (cr. arr.)** Research in biochemistry for qualified students, with counsel of faculty. Includes preparation of dissertation.

## BIOLOGICAL SCIENCES (DIVISION OF)

### BIOLOGICAL SCIENCES

- 1 General Biology (5).** General principles of biology. Designed for nonscience majors. Biology from the cell through organisms, ecosystems and man. Reduced credit (2 hrs.) for students who have completed Biology 7 or equivalent.
- 6 Basic Environmental Studies (3).** (same as Agriculture 6). Considers the ecosystem, energy and biogeochemical cycles and population dynamics; relations of the environment to agriculture and technology, pollution, power and food production; politico-economic considerations; moral and ethical issues. For nonscience majors. f, w.
- 7 Biology: an Appreciation of Life (3).** General principles of biology for nonscience majors. Emphasis on the unity and diversity of life, including behavioral and environmental biology. No credit for students who have completed Biology 1 or equivalent. f, w.
- 8 Genetics and Human Affairs (3).** For nonscience majors. Topics include general principles of heredity; gene structure and function; reproduction in humans, other animals, plants, and microorganisms; medical genetics; sperm banking; embryo transplantation; genetic engineering; genes in populations. w.
- 11 Introductory Zoology (5).** Introduces important principles and concepts of zoology. Emphasizes cell biology; evolution; genetics; ecology; structure, function, development of the organism. f, w.
- 12 General Botany (5).** Introduces fundamental principles of biology illustrated by plants. f, w.
- 21 General Biology (5).** Thorough presentation of major principles and details of biology dealing with form, function and behavior of organisms. First course of a sequence for natural sciences majors. Reduced credit (2 hrs.) for students who have completed Biology 1. f, w.

- 22 General Biology (5).** Continuation of 21. Prerequisite: grade of C or better in 21, or a grade of B or better in 1 and instructor's consent. f, w.
- 105 Introductory Microbiology (3).** Introductory lectures in microbiology describing unique activities of microorganisms which influence history, health, and technology, with discussions of the role of microbes in the changing environment. Prerequisite: one semester biology or instructor's consent. For nonscience majors. f, w.
- 115 Plant Function and Structure (3).** Basic principles of organismal physiology as illustrated by higher plants. Physiological mechanisms correlated with structure. Emphasizes environmental and internal control of plant growth. Prerequisites: general botany & 5 hours inorganic chemistry. w.
- 127 Readings in Biological Literature (1-3).** Supervised reading in biological literature. May be repeated up to six hours total credit. Prerequisite: instructor's consent. f, w, s.
- 194 Honors Readings in Biological Literature (2-3).** Selected readings for Honors majors. Prerequisite: biological sciences Honors program majors. Overall GPA 3.3. f, w, s.
- 195 Honors Research in Biology (2-3).** Special field or laboratory problems of experimental nature for upper-level Honors students, in consultation with instructor. Prerequisites: overall GPA 3.3; either GH125, GH150 or 194; and instructor's consent. f, w, s.
- 196 Honors Research in Biology (2-3).** Continuation of research; preparation of Honors report. Successful completion of report leads to degree with Honors in biological sciences. Prerequisites: 195, overall GPA 3.3. f, w, s.
- 197 Honors Colloquium in Biology (1).** Open to Honors students. Treats selected subjects of common interest in biology. Lecture, group discussions. Prerequisite: overall GPA 3.3. f.
- 198 Honors Colloquium in Biology (1).** Open to Honors students. Lectures, group discussions. Prerequisite: overall GPA 3.3. w.
- 199 Honors Proseminar in Biology (2-3).** In consultation with instructor, student works on Honors thesis. Prerequisites: senior standing; overall GPA of 3.3; 194, 197, 198 or 3 hour course at 301 level or higher in life sciences; instructor's consent. f, w, s.
- 202 General Genetics (3).** Principles of inheritance in plants, animals; physical basis of heredity, segregation, linkage, gene interactions; genetics in practice. Prerequisite: 1 year of biology. (Open to graduate students outside biological sciences.) f, w.
- 203 Introduction to Cell Biology (3).** Study of structure and function at the cellular and subcellular level. Subjects include: the physical chemistry of cellular processes; protein structure/function; metabolic regulation; membrane dynamics. Prerequisites: 21, 22 and Chemistry 210-211 or equivalent.
- 204 General Entomology (3).** (same as Entomology 204).
- 205 Developmental Biology (3).** The processes whereby new molecular complexes, organelles, cells, organs and organisms develop from simpler structures through directed- and self-assembly leading to higher levels of organization with new properties. Prerequisites: one semester of genetics; 203 and Chemistry 210 or equivalent recommended.
- 206 Developmental Biology Laboratory (2).** Experimental studies to illustrate basic concepts of animal and plant development. Includes opportunity to design experiments testing student and instructor. Prerequisite: 205. w.
- 207 Plant Growth and Development (3).** Introduction to growth and development of common cultivated plants. Emphasizes basic tenets of development which lead to better understanding of common cultivated plants. Prerequisite: 1, 12, or 21; Agronomy 30 & 5 hours inorganic chemistry. w. alt. yrs.
- 210 Parasitology (4).** Parasitism is considered as a fundamental type of interspecies interaction. Principles of parasitism as they apply to animals are presented with emphasis on parasite morphology, biology and host-parasite relationships. Prerequisites: 8 hours of biology.
- 212 Basic Microbiology (4).** Principles of microbiology. Prerequisites: 11, 12, or 21; general inorganic chemistry and general organic chemistry. f, w.
- 213 Comparative Anatomy of Vertebrates (5).** Comparative study of organ-systems of a series of vertebrates. Prerequisite: 21 and 22.
- 214 Plant Taxonomy (4).** Principles of classification of plants; use of keys; identification of local flora. Prerequisite: 1 year biology. f, w.
- 222 Vertebrate Embryology (5).** Compares basic patterns of development in vertebrates. Prerequisite: 21 and 22.
- 225 Sociobiology (3).** Introduces general biological principles that govern social behavior and social organization in all animals, blending theories of ecology, evolution, ethology and genetics. Prerequisites: one course in biology and junior standing. alt. yrs.
- 230 Invertebrate Zoology (5).** Structure, ecology and phylogeny of the invertebrate phyla. Prerequisite: 11 or 22. f.
- 238 Basic Genetics I (3).** Mendel's law, chromosome structure; molecular mechanisms of DNA replication, mutation, recombination and gene expression; gene fine structure; bacterial and viral genetics. Prerequisites: 21, 22 or 11, 12 or equivalent; Chemistry 11. Chemistry 12 or equivalent. f.
- 239 Basic Genetics II (3).** Segregation and linkage in eukaryotes; somatic cell genetics, extranuclear inheritance, gene interactions, immunogenetics, control of gene expression, population genetics. Prerequisite: grade of C or better in 238. w.
- 241 Genetics Laboratory (2).** Experimental genetic studies of *Drosophila*, corn and microorganisms. Prerequisite: a grade of C or better in 202 or 238 or instructor's consent. w.
- 250 Community Biology (3).** Introduces general ecology to nonmajor. Integrated set of lectures on evolution/population genetics, population dynamics/social systems, ecosystem structure/process, biomass in worldwide context, man in the environment. Prerequisite: 1, 11 or 12 or equivalent. f.

- 260 Molecular Biology (4).** Introduces molecular biology of prokaryotes and eukaryotes; emphasizes molecular genetics. Prerequisites: 202 and 203 or a basic biochemistry course. f.
- 270 Vertebrate Physiology (5).** Introduces concepts of vertebrate organ function and homeostatic control emphasizing mammalian physiology. Some comparisons to function in other vertebrates and strategies for coping with environmental stresses introduced. Prerequisites: 10 hours biology, plus 10 hours general chemistry. f.
- 275 Introduction to the Nervous System (3).** Introduces neurophysiology of resting and action potentials, synaptic transmission, integration, structure/function of receptors/neurons. Surveys nervous system through animal kingdom. Prerequisite: 10 hours of biology. f.
- 300 Problems in Biological Sciences (cr. arr.)** Individual supervised work to supplement regularly organized courses in biology: introduction to research. Prerequisites: upper-class standing and instructor's consent. f, w, s.
- 301 Topics in Biological Sciences (cr. arr.)** Selected topics not in regularly offered courses. Prerequisite: instructor's consent. f, w, s.
- 302 Evolution (3).** Surveys various processes in organic evolution, underlying genetic mechanisms. Prerequisite: 12 hours biology or geology, or upper-class standing. w.
- 303 Systematic Bacteriology (2).** Taxonomy of the nonphotosynthetic bacteria. Principles of nomenclature, characterization and classification. Prerequisite: 212 or equivalent. w.
- 304 Systematic Entomology (3).** (same as Entomology 304). f.
- 305 General Phycology (3).** Introduces morphology and taxonomy of algae with emphasis on fresh water algae. Lecture, lab. Prerequisite: 21 and 22, or 11 and 12. f, alt. yrs.
- 306 Aquatic Botany (3).** Methods of field and laboratory identification of major groups of algae. Emphasizes environmental relationships including higher plants of the aquatic system. Prerequisite: 11 and 12, or equivalent, and a systematic botany course. f, alt. yrs.
- 307 Mycology (4).** (same as Plant Pathology 307). f, alt. yrs.
- 308 Plant Anatomy (4).** Comparative structure, growth of meristems; development, structure of important cell types, tissues, tissue systems; comparative anatomy of stem, root, leaf. Emphasizes anatomy of gymnosperms, angiosperms. Prerequisite: 12 or 22. w.
- 309 Mammalogy (3-4).** (same as Forestry, Fisheries & Wildlife 307). f.
- 311 Ichthyology (3).** (same as Forestry, Fisheries & Wildlife 311). w.
- 313 Plant Physiology (3-5).** Modern physiology of higher green plants using common cultivated plants as examples. May be taken with or without laboratory. Prerequisites: 12 or 22 and 5 hours chemistry. f.
- 314 Agrostology (5).** Identification of native grass flora. Five hours credit includes lectures, special assignments. Prerequisite: 12 or 22 or equivalent. f, alt. yrs.
- 315 Paleobotany (3).** General survey of plant fossils; their orientation in time and space. Lecture, discussion, lab. Prerequisite: 12 or 22 or Geology 1; junior or senior standing or graduate student with background in plants and geology. w, alt. yrs.
- 316 Principles of Insect Physiology (4).** (same as Entomology 316). f, alt. yrs.
- 317 Paleobotany (3).** Introduces pollen types of modern plants, ontogeny, comparative morphology; airborne types, extent of distribution, applications to study of phylogeny. Prerequisites: upper-class standing and instructor's consent. w, every 3rd yr.
- 321 Marine Biology (3).** Marine organisms and their environment. Prerequisite: junior standing; 22 or 230, and 5 hours chemistry and 5 hours physics. w.
- 322 Protozoology (3).** Morphology, taxonomy and physiology of protozoa, with emphasis on free-living forms. Lecture, lab. Prerequisites: 21 and 22 or 11 and 12. f, alt. yrs.
- 323 Helminthology (4).** Morphology, physiology, development and systematics of parasitic worms. Some collection and classification expected. Prerequisite: 8 hours of biology; 210 is recommended. w, alt. yrs.
- 324 Limnology (3-4).** (same as Forestry, Fisheries & Wildlife 324). f.
- 325 Herpetology (4).** The biology, ecology, taxonomy, and distribution of amphibians and reptiles. Some Saturday field trips. Prerequisite: 8 hours biology or equivalent training. f.
- 326 Analysis of Biological Macromolecules (3).** Theory/application of techniques used for characterization of proteins, nucleic acids; topics; sedimentation velocity, equilibrium; sucrose, density gradients; electrophoresis; spectrophotometry. Prerequisites: 203 or Biochemistry 270, Mathematics 80 and one year physics. w, alt. yrs.
- 328 Introductory Radiation Biology (3).** (same as Nuclear Engineering 328, Radiology 328, Veterinary Medicine and Surgery 328). f.
- 330 Sensory Physiology (3).** Introduces basic principles of coding, decoding and integration of different sensory stimuli by sensory systems. Prerequisite: 275 or equivalent or instructor's consent. w.
- 331 Comparative Animal Physiology (5).** Comparison of organ function and adaptation in vertebrates and invertebrates. Demonstrates adaptive strategies for life systems. Emphasizes current research in the field. Prerequisite: 270 or equivalent. w, alt. yrs.
- 332 Physiological Ecology (3-4).** Relationship of physiological responses of organisms to their ecology; emphasizes different manifestations of a living system's ability to modify its properties in accord with environmental changes. Prerequisites: 203 or equivalent; a course in physiology & in ecology or consent of instructor.
- 333 Histology of Vertebrates (5).** Microscopic anatomy of vertebrate tissues and organs. Prerequisites: junior standing & 5 hours biology; 213 and 270, or equivalent training in anatomy or organismal biology, are recommended.
- 335 Mammalian Reproductive Biology (3).** Adult reproductive anatomy, physiology and behavior; gametogenesis and fertilization; placentation; sexual differentiation; parturition; maternal behavior and lactation; puberty; reproductive aging; reproductive ecology. Prerequisites: junior standing and 15 hours of biology.
- 336 Introduction to Electron Microscopy (2).** Surveys basic principles and research methods of electron microscopy. Lab incorporates both practical experience in microtomy and electron microscopy, and demonstrations of advanced techniques. Prerequisites: a course in physiology or histology and instructor's consent. f, w.
- 340 Mammalian Cell Genetics (3).** Recent advances in mammalian somatic and hybrid cell research; viral carcinogenesis. Prerequisite: 202, or equivalent. f, alt. yrs.
- 342 Comparative Animal Ethology (3-4).** Comparative study of animal ethology. Principles of animal ethology illustrated in different animal phyla. Prerequisites: 22 and one additional upper-class course in biology or psychology. f.
- 343 Evolution of Genetic Concepts (2).** (same as Agronomy 343). w, alt. yrs.
- 345 Animal Communication (3-5).** Physical properties of sensory stimuli, receptor mechanisms, functional significance of communication behavior, and multidisciplinary and experimental approaches to current research in animal communication. Prerequisites: 203 & Physics 12 or equivalent. w, alt. yrs.
- 346 Genetics of Microorganisms (3).** Lectures, readings in formal genetics, sexuality, and mating systems of fungi, algae, protozoa, bacteria, and viruses. First course in two-part series on genetics for microbiologists. Prerequisite: 202 or equivalent and 212 or equivalent. f.
- 348 Human Genetics (3).** (same as Child Health 348). Chromosomal, single gene, and multifactorial inheritance in man. Segregation and pedigree analysis, lineage, mutations, prenatal diagnosis, karyology, population, counseling, risk evaluation. Prerequisites: 202 or equivalent; Chemistry 210 or equivalent. f.
- 354 Advanced Bacteriology (3-5).** Discusses modern microbiology. Solvable questions posed by the instructor answered by the student through independent experimentation. Techniques of molecular biology stressed. Prerequisites: 203 and 212 or equivalent.
- 360 Techniques in Cell Culture (4).** Cultivation in vitro of tissue and cells from mammalian and other sources. Prerequisites: 203 or Biochemistry 270 & instructor's consent. f, alt. yrs.
- 362 General Ecology (5).** Principles of populations, coevolution, density factors, competition; physical environment; concept of community, trophic structure, biotic succession; characterization of biomes, man in ecosystem. Biology majors having completed 250: 2 hours credit. Prerequisites: 10 hours and junior standing. f, w.
- 366 Avian Ecology (3).** Advanced examination of ecological patterns in birds. Explores the environmental factors affecting the evolution of avian behavior, morphology, community structure and distribution. Forestry, Fisheries and Wildlife 150 suggested. Prerequisite: 250 or 362. w, alt. yrs.
- 369 Genetics of Plant Disease Development (3).** (same as Plant Pathology 369).
- 371 Cellular Physiology (5).** The cell as a functional unit. Prerequisites: 10 hours biology and 5 hours physics and 5 hours organic chemistry; some background in biochemistry and/or molecular biology is strongly recommended. Lectures only may be taken by graduate students or with instructor's consent. f.
- 374 Cell Biology I (3-5).** Survey of chromosome structure and production of RNA and protein gene products through critical review of research papers. Laboratory is optional. Prerequisites: 203; either 238 or 260; Mathematics 80; Biochemistry 270 is strongly recommended (may be taken concurrently).
- 375 Cell Biology II (3).** Continuation of 374. Structure and function of membranes; cell ultrastructure; organelle function; cellular movement; microtubules; microfilaments; mitosis and meiosis. Prerequisite: 374 lecture. w.
- 380 Cytology (4).** Structure and function of the major organelles of a cell; mitosis and meiosis; chromosomal rearrangements; ploidy; sex-determination, Karyo-type evolution. Prerequisite: 12 hours biology including 202 or equivalent. f.
- 384 Cytogenetics (3).** (same as Agronomy 384). alt. yrs.
- 385 Cytogenetics Laboratory (1).** (same as Agronomy 385). w, alt. yrs.
- 400 Problems in Biological Sciences (cr. arr.)** Research not expected to terminate in thesis, or individual advanced study in special subjects. Prerequisites: graduate standing and instructor's consent. f, w, s.
- 401 Topics in Biological Sciences (cr. arr.)** Advanced topics not in regularly offered courses. Prerequisite: instructor's consent. f, w, s.
- 403 Physiological Responses to Environment (3).** (same as Forestry, Fisheries & Wildlife 403). alt. yrs.
- 404 Cell Metabolism (3).** Lectures on photosynthesis, respiration, amino acid metabolism, nucleic acid, and protein synthesis. Prerequisites: 313 or equivalent and 6 hours organic chemistry and graduate standing or instructor's consent. alt. w, alt. yrs.
- 406 Terrestrial Ecosystems (3).** Characteristics of organic production, consumption, and nutrient patterns in various ecosystems; biotic and physical factors dealing with equilibrium processes; environmental disorganization on diversity and stability. Prerequisite: 362 equivalent graduate standing or consent of instructor. w, alt. yrs.
- 407 Molecular Genetics Laboratory (4).** Emphasizes recently developed genetic and biochemical techniques; illustrates how they apply to contemporary problems in biological research. Prerequisites: 202, 203, 212, Biochemistry 270 & instructor's consent. f, alt. yrs.
- 408 Developmental Genetics (3).** Discussion and analysis of selected regulatory mechanisms in development, with major emphasis on the regulation of gene transcription. Prerequisites: 202 & Biochemistry 270, Biochemistry 272, or equivalent, graduate standing. w, alt. yrs.
- 409 Plant Morphogenesis (2).** Reading, discussion, reports based on world's literature dealing with analysis of factors involved in development of plants from time of inception to adult form. Prerequisite: 308 or equivalent. f, alt. yrs.
- 410 Seminar (1).** Current topics in the biological sciences. Open to all graduate students. f, w.
- 411 Seminar in Areas of Specialization (1).** Offered each semester in one or more specialized sections designated 411A, 411B, etc., followed by the topic title of the seminar. Prerequisite: graduate standing.
- 412 Seminar in Genetics (1).** Discussion of current investigations in genetics. Prerequisite: graduate standing.
- 413 Workshop in Area of Specialization (1).** Intensive course in the theory and methodology of biological investigation. Conducted by visiting scientists. Offered in one or more specialized sections. Prerequisites: graduate standing and instructor's consent. f, w.
- 414 Photosynthesis Lecture (2).** Discussion of structure, organization, control, and biochemical and biophysical processes of photosynthesis with emphasis on "light reaction." Prerequisites: a course in biochemistry and a course in plant physiology. arr
- 415 Photosynthesis Laboratory (2).** Problem-oriented laboratory. Modern biochemical techniques used to measure photosynthetic electron and proton transport, ATP synthesis, oxygen@evolution; absorption measurements of cytochromes and reaction centers as well as chlorophyll fluorescence kinetics and spectra. Prerequisite: 414 or concurrent enrollment in 414. arr.
- 420 Endocrinology (3).** (same as Dairy Science 420). f.
- 421 Plant Geography (3).** Species distribution over the earth; population centers, migrations, external factors in isolation, present-day dispersal. Prerequisite: 214; graduate standing or consent of instructor. w, alt. yrs.
- 423 Genetics of Populations (4).** (same as Animal Science 423, Poultry Science 423). f.
- 424 Molecular Biology of Bacteriophage (3).** Biophysical techniques of bacteriophage structure. Replication of phage and cellular protein, RNA, DNA. Molecular basis of control of RNA; protein synthesis in specific systems. Prerequisites: a course in biochemistry and genetics. alt.
- 426 Neural Basis of Animal Behavior (3).** Analysis of the cellular neurobiology of invertebrate and vertebrate behavior. Prerequisite: 275, 330, or 342. alt. yrs.
- 428 Advanced Community Ecology (3).** Detailed examination of new happenings in population and community ecology. Topics vary but will include species interactions, community structure, reproductive strategies. Prerequisite: 362 or instructor's consent. alt. yrs.
- 430 Speciation (2).** Factors involved in process of speciation; breeding population structure and effects; effects of pollinating agents. Prerequisites: 202 and 214. f.
- 434 Advanced Plant Taxonomy (2).** Phylogenetic relationships of monocotyledonous plant families. Critical evaluation of views of various workers. Prerequisite: 214. w, alt. yrs.
- 435 Advanced Plant Taxonomy (3).** Phylogenetic relationship of dicotyledonous plant families. Critical evaluation of views of various workers. Prerequisite: 214. w, alt. yrs.
- 436 Comparative Endocrinology (3).** Endocrine systems, their functions as they occur throughout the animal kingdom. Prerequisites: senior or graduate standing and 8 hours biology. f.
- 446 Fundamentals and Advanced Aspects of Oncogenic Mechanisms (3).** Basic and advanced knowledge in the nature of cancer. Chemical radiation and viral oncogenesis. Prerequisites: 202, 212 & 260; Chemistry 212; Biochemistry 270, 272; or equivalent & instructor's consent.
- 448 Tumor Immunology (2).** Current concepts in experimental and clinical host/tumor interactions, immunocompetence, immune surveillance and escape mechanisms, immunotherapy, experimental models and techniques. Prerequisites: a course in immunology and a course in cell biology, or instructor's consent. f, alt. yrs.
- 452 The Biology of Nucleic Acids (3).** Evaluation of current literature in molecular biology of nucleic acids: chromosome replication/cell division in microorganisms, molecular basis of mutation, radiation biology. Prerequisites: 202 & Biochemistry 304 or equivalent; & instructor's consent. f, alt. yrs.
- 490 Research in Biological Sciences (cr. arr.)** Research leading to thesis or dissertation. Prerequisites: graduate standing and instructor's consent. f, w, s.

## INTERDEPARTMENTAL - B&PA

### BUSINESS ADMINISTRATION

- 301 Organization Theory and Behavior (3).** Organization theory; study of relationships among individuals, groups, and units in organizations and the systems which facilitate organizational goal achievement.
- 320 Computer Applications for Planning and Decision Making (3).** Introduction to computer programming for administrative uses, including management information systems for facilitating organizational operations.
- 324 Managerial Statistics (3).** Statistics as an aid in decision making; emphasis on statistical inference, sampling techniques, and nonparametric statistics as applied to problems of business and public administration.
- 326 Information Systems for Planning and Decision Making (3).**

Management information systems for facilitating organizational operations; information for planning and control; managing the information function. Prerequisites: 320, 324 or instructor's consent.

**342 Production/Operations Management (3).** Surveys problems common to operations within a complex organization. Emphasizes planning, control, and decision making. Prerequisites: 320 & 324, or instructor's consent.

**344 Managerial Finance (3).** Analyzes financial information relative to acquisition, management of assets; costs of alternative financial contracts; effect of mix of outstanding securities on entity's cost of capital; interaction between funding/investment decisions. Prerequisites: Accountancy 310; 320 or instructor's consent.

**346 Managerial Marketing (3).** Analysis and control of an integrated marketing program with special emphasis on prices, products, promotion, and channels of distribution.

**376 Business Policy (3).** Investigates alternative goals of business enterprises relative to internal resources and external environment; development and implementation of policies and strategies to achieve objectives. Prerequisite: senior standing in B & PA or instructor's consent.

**401 Topics Business Administration (cr. arr.)** Selected topics in administration offered on experimental basis. Prerequisite: instructor's consent and graduate standing.

**420 Managerial Decision Science (3).** Application of mathematical/statistical models to decision making. Includes, but not limited to, use of mathematical programming, stochastic processes, Bayesian analysis. Manager's, rather than technicians, point of view stressed. Prerequisites: 320, 324, and Mathematics 205.

**442 Business and Society (3).** Interdependence of the business firm and its social, political, and legal environment; interrelationships with governments, interest groups, and the larger society; role of business in formulation of community, regional, national, and foreign policy.

**449 Business Environment and Policy (3).** Investigates alternative goals of business enterprises relative to internal resources and external environment; development and implementation of policies and strategies to achieve objectives. Cases, computer simulations, and/or field research may supplement published materials.

**471 Behavioral Science in Business I (3).** Intensive examination of behavioral sciences focusing on individual and small group behavior within the business organization. Selected topics include employee motivation, leadership, decision making, and group dynamics. Prerequisite: Ph.D. status or instructor's consent.

**472 Behavioral Science in Business II (3).** Examination of behavioral sciences focusing on structure and processes of business organizations and environments. Selected topics include structure, environmental influences, organization change, conflict resolution, and interorganizational relations. Prerequisite: Ph.D. status or instructor's consent.

**481 Research Design and Methodology (3).** Intensive study of fundamental issues, problems, and procedures in the conduct of research in business organizations. Orientation includes philosophical, theoretical, empirical, and operational considerations. Prerequisite: Ph.D. status or instructor's consent.

## CHEMICAL ENGINEERING

**117 Experimental Course (cr. arr.)** For sophomore-level students. Content and number of credit hours to be listed in Schedule of Courses.

**170 Chemical Process Measurements (3).** Lecture and laboratory instruction on physical and chemical measurements essential to chemical process industries. Prerequisites: Physics 123 and Chemistry 12.

**199 Engineering Thermodynamics II (3).** (same as Mechanical and Aerospace Engineering 199). Gas and vapor mixtures, cycles, availability, imperfect gases, thermodynamic relations, combustion, chemical equilibrium. Prerequisites: Engineering 99 and Mathematics 201.

**201 Topics in the Interrelation of Chemical Engineering and Society (3).** Problems of contemporary interest involving chemical engineering and society. Prerequisite: instructor's consent.

**225 Chemical Process Calculations (3).** Industrial stoichiometry, material and energy balances, thermophysics, thermochemistry; related topics. Prerequisites: Physics 123 and Chemistry 12, or concurrently.

**234 Principles of Chemical Engineering I (3).** Fluid flow, heat transfer. Prerequisite: 225 or Engineering 99.

**235 Principles of Chemical Engineering II (3).** Mass transfer. Prerequisite: 234.

**243 Chemical Engineering Laboratory I (2).** Laboratory study of some principal unit operations of chemical engineering. Prerequisite: 235 or concurrently.

**261 Chemical Engineering Thermodynamics I (3).** Study of thermodynamics, with particular reference to chemical engineering applications. Prerequisite: 225 or Engineering 99.

**262 Chemical Engineering Thermodynamics II (3).** Prerequisite: 261.

**300 Problems (2-4).** Directed study of chemical engineering problems. Prerequisite: instructor's consent.

**301 Topics in Chemical Engineering (3).** Current and new technical developments in chemical engineering. Prerequisite: instructor's consent.

**304 Digital Computer Applications in Engineering (3).** (same as Electrical Engineering 304, Mechanical and Aerospace Engineering 304, Nuclear Engineering 304). Use of digital computer for solution of engineering problems involving roots of equations, simultaneous equations, curve fitting, integration, differentiation and differential equations. Prerequisite: Mathematics 201.

**306 Engineering Analysis (3).** (same as Nuclear Engineering 306). Applies ordinary and partial differential equations to engineering problems; Fourier's series; determinants and matrices; Laplace transforms; analog computer techniques. Prerequisite: Mathematics 304.

**311 Chemical Engineering Basis for Pollution Control (3).** Introduces chemical processes and technology used in control of environmental pollution. Emphasizes control of pollution from chemical process industries. Prerequisite: 234 or equivalent.

**312 Air Pollution Control (3).** Modeling of urban air pollution and control techniques. Topics treated are plume dispersion theories, photochemistry, methods of monitoring, methods of industrial abatement and legal aspects. Prerequisite: 311 or instructor's consent.

**315 Introduction to Biochemical Engineering (3).** General introduction to biochemical engineering follows fundamentals of microbiology and biochemistry. Topics: fermentation, microbial population kinetics, bioproduct separation and purification, enzyme engineering techniques, biochemical reaction energetics. Prerequisite: Chemistry 212, Mathematics 201 or instructor's consent.

**335 Transport Phenomena (3).** Integrated study of momentum, heat and mass transport. Prerequisites: 235, 261, and Mathematics 304.

**345 Special Reading (2-5).** Individually supervised special reading leading to an engineering report. Prerequisite: senior standing in chemical engineering.

**350 Research for Honor Students (3-6).** Individual research for a senior thesis; research is supervised by the chemical engineering faculty. The thesis is to be defended before the departmental Honors committee. Prerequisite: senior standing in chemical engineering.

**363 Chemical Reaction Engineering and Technology (3).** Reactor design and optimization; rate equations; thermal effects in reactor. Prerequisite: 262 or instructor's consent.

**370 Modern Methods of Chemical Process Control (3).** Process description using state space theory; introduction to digital control techniques; stability analysis. Prerequisites: 262, 304.

**385 Chemical Engineering Design I (3).** Design and layout of chemical plants and equipment. Prerequisites: 235, 262, and 304.

**386 Chemical Engineering Design II (3).** Prerequisite: 385.

**387 Process Analysis and Simulation (3).** Mathematical analysis and modeling of chemical processes; optimization during process design and operation. Prerequisite: 304.

**400 Problems (1-5).** Supervised investigation in chemical engineering to be presented in the form of a report. Prerequisite: instructor's consent.

**401 Advanced Topics in Chemical Engineering (3).** Prerequisite: instructor's consent.

**408 State Variable Methods in Automatic Control (3).** (same as Mechanical and Aerospace Engineering 408, Electrical Engineering 408, Nuclear Engineering 408). State variables for continuous and discrete-time dynamic control systems; controllability and observability; optimal control of linear systems. Prerequisites: 370, Electrical Engineering 206, Mechanical & Aerospace Engineering 357 or instructor's consent.

**410 Seminar (1).** Reviews investigations and projects of importance in chemical engineering.

**420 Advanced Heat and Momentum Transfer (3).** Advanced study of these transport phenomena. Prerequisite: 235.

**422 Analysis of Equilibrium Stage Processes (3).** Advanced study of stage processes. Prerequisites: 262 and 304.

**423 Advanced Mass Transfer (3).** Advanced study of mass transfer. Prerequisite: 235.

**430 Mechanics of Viscoelastic Fluids (3).** Rheological behavior of viscoelastic materials described in terms of invariant equation of state, stressing characteristic features of fluids. Prerequisite: Mathematics 302 or equivalent, a course in Newtonian fluid mechanics or instructor's consent.

**451 Advanced Chemical Engineering Thermodynamics I (3).** Advanced thermodynamics; particular reference to its application to chemical engineering. Prerequisite: 262.

**452 Advanced Chemical Engineering Thermodynamics II (3).** Prerequisite: 451.

**455 Irreversible Thermodynamics (3).** Simultaneous fluxes of thermal and other energy, mass or work across continuous and discontinuous thermodynamic system boundaries lead to transport coefficients in the phenomenological relationships between fluxes and conjugate forces. Prerequisite: 451 or instructor's consent.

**461 Process Development and Plant Design (3).** Advanced study of chemical engineering design and manufacturing processes. Prerequisite: 386.

**463 Chemical Reaction Engineering Science (3).** Phenomenological behavior of catalysts. Theoretical interpretations for heterogeneous and homogeneous catalysts. Prerequisite: 363.

**470 Mathematical Studies of Chemical Engineering Operation (3).** Analytical methods applied to solution of chemical engineering problems. Prerequisite: Mathematics 304.

**471 Process Optimization Methods in Chemical Engineering (3).** Steady-state and unsteady-state optimization techniques applied to chemical processes. Prerequisite: 304.

**490 Research (cr. arr.)** Independent investigation in chemical engineering, to be presented as a thesis.

## CHEMISTRY

**1 Introductory Chemistry (5).** Important basic concepts of chemistry for the general student. Serves as a prerequisite only for 115. f.w.s.

**5 Chemistry for Engineers (5).** For students in College of Engineering in fields other than chemical engineering. Presents chemical principles in areas of greatest importance to engineers. Prior comple-

tion of college algebra or equivalent strongly recommended. f.w.

**10 Preparation for General Chemistry (2).** For students lacking adequate preparation for general chemistry. Emphasizes basic chemical calculations. Not open to students with credit in any other college chemistry course. No advanced standing permitted in lieu of this course. Chemistry 1 may be taken after Chemistry 10 only with reduced credit (3 hours). Does not fulfill general education requirements in physical sciences in college of Arts and Science.

**11 General Chemistry (5).** Thorough treatment of major principles of chemistry. First course of a sequence. Prior completion of college algebra strongly recommended. f.w.s.

**12 General Chemistry (5).** Continuation of 11. Prerequisite: grade of C or better in 11. f.w.s.

**90 Orientation in Chemistry (0).** w.

**115 Organic Chemistry (5).** Surveys field of organic chemistry including natural products. For students needing only 5 hours of organic chemistry. Does not meet requirements for 212. Only 3 hours credit if student has completed Biochemistry 110 or equivalent. Prerequisite: either 11 and 12 or 1 with a grade of C. f.

**150 Undergraduate Research (1-3).** May be repeated. Cannot be substituted for other chemistry courses required for B.S. or A.B. degree. Prerequisite: 2.75 GPA and/or instructor's consent. Only 3 hours credit for students of special summer institutes.

**198 Senior Honors Research (3).** Prerequisites: 3.33 average in chemistry courses & instructor's consent. f.

**199 Senior Honors Research (3).** Prerequisites: 3.33 average in chemistry courses & instructor's consent. w.

**210 Organic Chemistry (3).** First course of a sequence. Concentrates on fundamentals and applies them to a few functional groups. Only 1 hour credit if student has completed 205 or equivalent. Prerequisite: 11 & 12 or equivalent. f.w.s.

**211 Organic Chemistry Laboratory (2).** Must accompany, cannot precede 210. f.w.s.

**212 Organic Chemistry (3).** Continuation of 210. Covers carbonyl-containing compounds, amines, heterocycles, natural products (fats, carbohydrates, amino acids, proteins, nucleic acids) and others. Prerequisite: 210 or special permission. f.w.

**213 Organic Chemistry Laboratory (2).** Must accompany, cannot precede 212. f.w.

**221 Quantitative Instrumental Analysis (4).** Introductory course for non-majors. Stresses chemical analysis, including the basic principles of modern instrumental methods. Prerequisite: 12. w.

**223 Quantitative Chemical Analysis (4).** Extensive treatment of principles and practice of quantitative analysis and separations. For chemistry and other science majors. Prerequisite: 12. f.

**230 Physical Chemistry (3).** Satisfies physical chemistry prerequisite for Biochemistry 320-322. Prerequisites: Mathematics 175, a course in quantitative analysis, a course in organic chemistry; Physics 11 and Physics 12 or Physics 123, and Physics 124 or Physics 124 concurrently. w.

**231 Physical Chemistry (3).** Lecture only. Topics include the kinetic theory of gases, chemical kinetics, thermodynamics and chemical equilibrium. Prerequisite: 1 semester organic chemistry and 1 year college physics and Mathematics 201, or Mathematics 201 concurrently. f.

**233 Physical Chemistry (3).** Continuation of 231. Lecture only. Covers wave mechanics, bonding and molecular spectroscopy.

**234 Physical Chemistry Laboratory (3).** Normally concurrent with 233. w.

**250 Senior Research (3).** May take for credit three times. Prerequisites: 2.75 grade point average, 33 hours chemistry or senior standing and approval of department chairman. f.w.s.

**301 Topics in Chemistry (cr. arr.)** Organized study designed to broaden knowledge base of new graduate students. Subjects on analytical, inorganic, organic and physical chemistry covered. May be repeated. Prerequisite: departmental consent. f.w.

**310 Trace Analysis (3).** (same as Biochemistry 310).

**312 Instrumental Methods of Analysis (4).** (same as Biochemistry 312). Chemical instrumentation methods including electrochemistry, spectroscopy and advanced separation techniques. Prerequisites: 223 & 231 concurrently. f.

**314 Intermediate Organic Chemistry (3).** Basic principles of organic chemistry examined at an intermediate level. Prerequisites: 1 year of organic chemistry, graduate standing and instructor's consent. f.

**315 Organic Reaction Mechanisms (3).** Reviews organic reaction mechanisms; applies concepts to the interpretation and development of complex organic reaction mechanisms; methods for elucidation presented and discussed; methods for predicting course of reaction, e.g. orbital symmetry, presented. Prerequisite: 1 year organic chemistry.

**316 Synthetic Organic Chemistry (3).** Stresses synthetic-organic chemistry. Prerequisite: at least one year organic chemistry. w.

**321 Intermediate Analytical Chemistry (2).** Principles of separations, equilibrium and other advanced topics in analytical chemistry. Enrollment confined to graduate students in chemistry. Prerequisite: 312. w.

**325 Qualitative Organic Analysis (3).** Methods of separation, purification and characterization of organic compounds by modern research techniques; identification of individual compounds and the components of mixtures by chemical procedures and spectroscopic methods. Prerequisite: 10 hours organic chemistry. w.

**329 Environmental Chemistry (3).** Surveys the chemistry of air and water environments; discusses the chemistry of waste treatment. Prerequisite: 18 hours chemistry, including organic and analytical.

**330 Intermediate Physical Chemistry (2).** Treatment of electronic structure, spectroscopy, thermodynamics and chemical kinetics designed to provide a broad base of knowledge in these fundamental areas

to beginning graduate students in chemistry. Prerequisite: graduate or instructor's consent.

**331 Intermediate Physical Chemistry (2).** Continuation of 330. Prerequisite: graduate standing or instructor's consent. w.

**332 Chemical Thermodynamics (3).** Review of classical thermodynamics and statistical thermodynamics; applications to chemical and phase equilibrium in ideal and non-ideal systems. Prerequisite: 233. f.

**333 Introductory Quantum Chemistry (3).** Introduces quantum concepts, Schrodinger equations of simple systems and their solutions, many electron systems, approximate methods, and applications to molecular orbital. Prerequisite: 233 or equivalent. w.

**335 Nuclear Chemistry (3).** Studies nuclear reactions and properties of products of those reactions. Prerequisite: 233.

**341 Inorganic Chemistry (3).** Atomic and molecular structure, bonding, kinetics and mechanism, ligand field theory, coordination compounds, acids and bases. Prerequisite: one semester physical chemistry, 2nd semester co-requisite. w.

**342 Inorganic Preparations (3).** Vacuum techniques, magnetic susceptibility, rate studies, preparation and determination of formation constants of coordination complexes, geometrical and optical isomerism, redox potentials. Prerequisite: concurrent with 341.

**343 Intermediate Inorganic Chemistry (2).** Discussion of descriptive inorganic chemistry, inorganic chemical dynamics, solution thermodynamics and structural methods in inorganic chemistry designed to provide a broad base of knowledge to beginning graduate students. Prerequisite: graduate standing or instructor's consent.

**351 Topics in Environmental-Toxicological Chemistry (3).** In-depth study of the chemical aspects of current issues dealing with environmental pollutants and toxic chemical substances. Prerequisite: 329 or equivalent. w.

**361 Introduction to Radiochemistry (3).** Introduces application of radioactive-tracer techniques to chemical research. Prerequisite: course in quantitative analysis or instructor's consent. w.

**401 Topics (cr. arr.)** Organized study of selected topics. Subjects and earnable credit may vary from semester to semester. Repeatable upon consent of department. Prerequisite: instructor's consent.

**409 Chemistry of Natural Products (3).** Studies shikimates, acetogenins, terpenoids, steroids, alkaloids, drugs. Emphasis on biogenesis and relevant chemistry.

**410 Seminar (1).** f, w.

**411 Organometallics (3).** Condensations effected by organometallics; dissolving metal reductions; sandwich compounds and related organotransition metal derivatives.

**412 Physical Organic Chemistry I (3).** Bond theory, physical methods, absorption spectroscopy, conformational analysis, mechanism of reactions.

**417 Applications of the Reactions of Organic Chemistry (3).** Prerequisite: one year graduate organic chemistry.

**419 Physical Organic Chemistry II (3).**

**423 Separations and Chromatography (3).** Classical and electrochemical methods of separation: gas, paper, thin film, and column chromatography; ion exchange.

**425 Advanced Analytical Chemistry I (3).** Selected topics dealing with recent advances in analytical chemistry.

**427 Advanced Analytical Chemistry II (3).** Continuation of 425.

**432 Chemical Kinetics (3).** Factors affecting rates, orders and mechanisms of chemical reaction, with emphasis on current theories and experimental techniques.

**433 Atomic and Molecular Structures (3).** Introduces molecular symmetry and eigenvalue problems; quantum mechanical treatment of topics selected from molecular vibration and notation, electronic structure and spectra, crystal field theory, magnetic resonance, theory of solids. Prerequisite: 333 or equivalent. f.

**436 Photochemistry and Molecular Excitation (3).** Introduces experimental studies of interaction of light and ionizing radiations with matter. Emphasizes mechanism and rates of reaction of molecular fragments and electronically excited species and experimental methods for studying these reactions.

**440 Inorganic Mechanisms (3).** Experimental stoichiometry and rate law determination. Isotopic applications. Methods and results of fast reaction studies. Basic known inorganic mechanisms. Experimental methods of establishing mechanisms of reaction.

**442 Inorganic Thermodynamics (3).** Heats of hydration, ligand field theory, stabilization of oxidation stages by complexation, evaluation of stability constants, solution calorimetry. Prerequisite: 332.

**444 Inorganic Structural Methods (3).** Chemical bonding, application of group theory, spectroscopy; diffraction as applied to structure determination; structural implications of dipole moment and magnetic susceptibility measurements.

**450 Research (cr. arr.)** Does not lead to dissertation. f, w, s.

**461 Advanced Radiochemistry (3).** Reviews current advances in radiochemistry, hot atom chemistry, radiation chemistry, nuclear spectrometry. Prerequisite: 361 or equivalent. alt. f, even yrs.

**490 Research (cr. arr.)** Research leading to thesis.

## CHILD AND FAMILY DEVELOPMENT

**66 Principles of Human Development (3).** Concepts and principles basic to an understanding of human development.

**160 Early and Middle Childhood (3).** Emotional, cognitive, and physical development of the child before puberty. Observation is integral part of course.

**163 Interpersonal Relationships, Marriage and the Beginning Family (3).** Psychosocial factors of interpersonal relationships during courtship and early stages of marriage and family life.

**225 Introduction to the Study of Families (3).** Examination of how families function. Diversity of families; crucial life choices; resource utilization. Eco-system analysis of family issues such as wellness, self-reliance and strength. f, w.

**260 Adolescence and Young Adulthood (3).** Physical, intellectual and psychosocial maturation of adolescents and young adults within the context of lifelong developmental sequelae. Prerequisite: 3 hr. behavioral science. w.

**263 The Child From Six Through Adolescence (3).** Physical and psychosocial development of the child from six through adolescence.

**264 Child Development Laboratory (2-5).** Experience in working with young children (2-5 years), adult-child relationships, general guidance principles and techniques and methods of fostering curiosity and creativity. Prerequisites: 160 or equivalent; instructor's consent.

**265 Infant-Toddler Development and Programs (3).** Applied cognitive, language and social development of infants and toddlers. Emphasizes supporting development in a child care setting and staff relations. Prerequisite: 160 or equivalent.

**300 Problems in Child and Family Development (cr. arr.)** Independent work on special problems in child and family development. Prerequisite: instructor's consent.

**318 Topics (cr. arr.)** Selected current topics in field of interest.

**341 Multi-Cultural Study of Children and Families (3).** Study of multi-cultural (e.g., Afro-American, Hispanic, native American) groups within context of their unique cultural heritage. Attention given to interaction with institutions of dominant society. Prerequisite: 225 or instructor's consent.

**350 Readings (cr. arr.)** Readings in recent research; critical discussions.

**351 The Black Family: Past, Present & Future (3).** Emphasis is on the unique social, economic, religious, educational and political environments that have affected the structure and function of the black family. Prerequisite: junior standing or instructor's consent. w.

**352 Violence in the Family (3).** Focus is on causes and correlates of child abuse and neglect as well as violence between spouses, siblings and intergenerational family members. Prerequisites: 6 hours child and hours child and family development/psychology/sociology/social work.

**354 Curriculum Development for Early Childhood Programs (3).** Study of curriculum content and methods appropriate for children ages 3-8. Includes development of teacher competencies in fostering the child's physical, cognitive, language, the child's physical, cognitive, language, creative and self-social development. Prerequisite: 160 or equivalent. f, w.

**355 Recent Trends (1-2).** Review of current research and/or practice in child and family development. Prerequisite: instructor's consent.

**356 Child and Family Advocacy (3).** Study of the processes of social policies, legislation and regulations affecting children and families at the local, state and federal levels. The course emphasizes current issues and need for citizen involvement. Prerequisite: instructor's consent.

**358 Administration of Programs for Children & Families (3).** Includes design, operation and evaluation of programs. Field experience included. Prerequisite: 264 or instructor's consent.

**361 Working With Parents (2-3).** Understanding of parents and their perspectives, interpersonal communication and relationships, conference and group meeting techniques. Includes experience with parent groups.

**362 Fostering Intellectual Development in Early Childhood (3).** Analysis of activities and programs which foster intellectual growth of young children; review of current early childhood programs.

**363 Family Development (3).** Analysis of the developmental stages of the family life cycle from establishment through aging. Prerequisites: 225, psychology & sociology or instructor's consent. f, w.

**364 Advanced Child Development Laboratory (3-6).** Work with young children (2-5 years) includes developing early childhood program and manipulative, representational, language and discovery experiences for young children; study of program models. (Consult instructor to schedule lab hours.) prerequisites: 264 or equivalent & instructor's consent.

**366 Working With Parents Practicum (2-3).** Practicum experience in working with parents/families of young children. Focuses on developing interpersonal skills in daily contacts with parents, group meetings, and conferences in both home and school setting.

**367 Aging and the Near Environment (3).** Examines basic issues of middle and later adulthood from the perspective of the home and family environment and within the context of lifespan development. f, s.

**368 Family Interaction (3).** Analysis of intrafamilial interaction and its determinants; includes study of socialization, bonding, decision making, power and conflict. Prerequisite: 163, 363 or Sociology 214.

**369 The Development of Sex-Role Behavior (2).** Emphasis on development of sex-role behaviors. Considers alternative theories of identification and the influence of biological, familial, and cultural variables. Prerequisite: 6 hours child & family development or instructor's consent.

**372 Child Health Seminar: Infants & Children in Health Care Settings (3).**

**390 Field Training (cr. arr.)** Prerequisite: instructor's consent.

**400 Problems (cr. arr.)** Prerequisite: instructor's consent.

**401 Social and Emotional Development (3).** Seminar on emotional and social development in children, with focus on research and theory on the impact of various family, school and societal factors. Prerequisite: graduate standing. w.

**405 Integration and Application of Human Development Principles (3).** Emphasizes life span theory, research and curriculum

planning; applied experience in the application of human development principles in small groups. Prerequisites: 6 hours of 300-level courses and instructor's consent.

**410 Seminar (1-4).** Reports and discussion of recent work in area of concentration.

**415 Readings (cr. arr.)** Readings in recent research; critical evaluation. Prerequisites: graduate standing & instructor's consent.

**419 Field Training (cr. arr.)** Internships and/or field experiences under supervision. Prerequisites: graduate standing and instructor's consent.

**425 Remarriage & Stepfamilies: Development, Dynamics and Intervention (3).** The processes of remarriage and reconstituted family dynamics, special developmental needs and intervention models will be studied. The impact on children will be considered. Prerequisites: 6 hours of 300-level courses and instructor's consent.

**450 Research (cr. arr.)** Independent research not leading to a thesis. Report required.

**462 Cognitive Development (3).** Study of the development of reasoning, perception and language. Prerequisite: graduate standing. f.

**463 Theories of Human Development (3).** Major theories of life span human development. Attention given to structure, content and major research critiqued for theoretical strengths. Prerequisite: 6 hours of 300-level behavioral sciences courses or instructor's consent.

**468 Family Theories & Measurement I: Inductive Approach (3).** Studies the building of middle range family theories in the areas of family change and interaction. Includes metatheoretical concepts and diagramming. Prerequisite: 368 or instructor's consent. f, even years.

**469 Family Theories & Measurement II: Deductive Approach (3).** The application of selected general behavioral theories to the study of families. Considers the building of family theory. Intended for advanced graduate students. Prerequisite: 368 or 468 or instructor's consent. f, odd years.

**470 Stress and Crises in Families (3).** The study of the influence of stressor events on family functioning. Emphasis on those variables which tend to increase or decrease the probability of family crisis. Prerequisite: 368 or instructor's consent.

**490 Research (cr. arr.)** Independent research leading to thesis or dissertation.

## CHILD HEALTH

**A Pediatrics, Third Year (10).** During the clinical years, an 8-week full-time clerkship is required. Students are assigned patients on the ward and newborn nursery and in the diagnostic outpatient clinics for independent history-taking, examination, and clinical and laboratory evaluation, followed by discussion with a member of the staff. In addition to general pediatric clinics, subspecialty clinics are held in the fields of prematurity, diabetes, endocrinology, nutrition, gastroenterology, hematology, allergy, cardiology, neurology, and rheumatology. Clinical experience is supplemented by participation in daily conferences, lectures, and seminars.

**B Pediatrics, Elective (10).** All fourth-year students are encouraged to spend elective time in pediatrics. During this period there will be extensive exposure to everyday pediatric problems in the outpatient clinics, and a shorter period of intensive inpatient training, with increasing responsibility in both areas. Preceptorship with a practicing pediatrician, laboratory and clinical research, or a combination of these may also be arranged. These programs should not be confused with research fellowships which are available during the student's clinical years. Arrangements for such fellowships may be made through the department chairman.

**P Postgraduate Instruction (0).** Advanced postgraduate instruction in pediatrics (both short-term programs, up to 4 years in duration) and residencies are available to qualified physicians by arrangement.

**348 Human Genetics (3).** (same as Biological Sciences 348).

**372 Child Health Seminar: Infants & Children in Health Care Settings (3).** Will cover organization, operation, services of modern health care settings, the health problems, diseases of infants, children with complex and extended cared needs. Prerequisite: instructor's consent.

## CIVIL ENGINEERING

**20 Surveying (3).** Primarily for forestry students. Uses surveying equipment; boundary and traverse surveying; coordinate and topographic surveying; elementary route surveys. Prerequisite: Mathematics 9 and Mathematics 10 or equivalent.

**113 Engineering Measurements (3).** Introduces methods of engineering surveys. Theory of errors. U.S. Public Land Surveys. Surveys computations by conventional and computer computations. Prerequisites: Mathematics 80 & Engineering 30.

**185 Introduction to Dynamics (3).** (same as Mechanical and Aerospace Engineering 185).

**212 Transportation Systems Engineering (3).** Studies engineering characteristics of various modes of transportation of passengers and goods. Prerequisite: 113.

**221 Structural Analysis I (4).** Analysis of statically determinate beams, frames and trusses; shear and moment diagrams; influence line diagrams; beam deflections. Analysis of statically indeterminate structures; moment distribution; energy methods. Prerequisite: Engineering 195.

**222 Reinforced Concrete Design (3).** Basic principles of reinforced

concrete design. Design of beams for flexure and shear; design of short and slender columns. Prerequisite: 221.

**223 Structural Steel Design (3).** Basic principles of structural steel design. Design of beams, axially loaded members, columns, and bolted and welded connections. Prerequisite: 221.

**232 Civil Engineering Materials (3).** Introduces composition, structure, properties, behavior, and selection of civil engineering materials. Prerequisite: Engineering 195 or instructor's consent.

**241 Fluid Mechanics Laboratory (1).** Applications and demonstration of basic principles of fluid mechanics by experiment. Prerequisite: 251.

**251 Fluid Mechanics (3).** (same as Mechanical and Aerospace Engineering 251). Concepts of statics and dynamics of fluids; emphasis on principles of continuity, momentum, energy. Includes brief introductions to compressible and potential flow and viscous effects. Prerequisites: 185 and Engineering 99 concurrently.

**266 Building Construction (3).** Survey of materials used in building construction. Introduction to blueprint reading, quantity take-offs, and cost estimation. Special attention to building details, especially the integration of different building components.

**276 Aerospace Structures I (3).** (same as Mechanical and Aerospace Engineering 276). Analysis and design of aerospace structural components and structures. Prerequisites: Engineering 195 and Mathematics 304.

**291 The Technology Environment Interface (3).** Evaluation of interactions inherent in technology application to the natural world.

**300 Problems (2-4).** Directed investigation of civil engineering. Prerequisite: instructor's consent.

**301 Topics in Civil Engineering (3).** Study of current and new technical developments in civil engineering. Prerequisite: instructor's consent.

**304 Digital Computer Applications in Engineering (3).** Use of digital computer for solution of engineering problems involving roots of equations, simultaneous equations, curve fitting, integration, differentiation, and differential equations. Prerequisite: Mathematics 201.

**313 Advanced Surveying (3).** Celestial observations for determination of position; state coordinate systems, precise surveys, introduction to geodetic surveys, principles of photogrammetry. Theory of optical surveying instruments. Prerequisites: 113 and Mathematics 80.

**323 Structural Design II (3).** Design of building structures and bridges in steel and reinforced concrete using case studies.

**325 Energy Methods in Mechanics (3).** (same as Mechanical and Aerospace Engineering 325). Utilization of energy concepts on the solution of advanced problems in mechanics. Prerequisite: 185.

**331 Prestressed Concrete (3).** Theory and practice of prestressed concrete design: pretensioning, posttensioning, anchorage of steel, materials, design specifications.

**340 Applied Fluid Mechanics (2).** Steady and unsteady flow in closed conduits, flow in multiple pipe systems, compound reservoir problems, gravity dam design, gradually varied flow. Prerequisite: 251.

**341 Hydrology (3).** Fundamental concepts of hydrology in engineering; quantitative estimation of stream-flow magnitude and frequency. Prerequisite: Mathematics 201.

**342 Hydraulics of Open Channels (3).** Gradually varied flow and theory of the hydraulic jump. Slowly varied flow involving storage; rating curves. Prerequisite: 251.

**343 Analytical Hydrology (3).** Modern methods of hydrologic analysis and synthesis of hydrologic records. Prerequisite: 341 or instructor's consent.

**344 Analysis of Water-Resource Systems (3).** Applies hydrology, hydraulic and sanitary engineering, and economics to water-resource design problems considering man and his environment. Uses methods of systems analysis. Prerequisite: 340, 341, or instructor's consent.

**352 Advanced Mechanics of Materials (3).** (same as Mechanical and Aerospace Engineering 352). Analysis of more complicated problems in stresses, strains. Prerequisite: Engineering 195.

**353 Experimental Stress Analysis (3).** (same as Mechanical and Aerospace Engineering 353). Photo elastic, electric strain gage, brittle lacquer methods of experimental stress analysis for static loads. Strain gage work includes strain rosettes. Prerequisite: Engineering 195.

**355 Soil Mechanics (3).** Detailed study of physical and mechanical properties of soil governing its behavior as an engineering material. Prerequisite: Engineering 195.

**363 Urban Development and Planning (3).** Introduction to planning processes; procedures and forces that shape urbanization. Prerequisite: senior standing.

**365 Engineering Administration (3).** Cash flow analysis, financial analysis, managerial accounting and cost control, budgeting, organizational structure and behavior. Prerequisite: junior standing.

**367 Construction Contracts and Specifications (3).** Structure of the construction industry; varieties of construction contracts; principles of contract law; preparation and administration of construction contracts; construction plans and specifications; estimating procedures. Prerequisite: junior standing.

**368 Construction Planning and Scheduling (3).** Planning and scheduling of construction operations by the critical path method. Network diagramming, scheduling computations, and time-cost trade-offs. Manpower and equipment leveling. Computer and noncomputer techniques. Prerequisite: senior standing.

**369 Construction Methods and Equipment (3).** Selection and use of construction equipment; planning construction operations. Equipment economics. Prerequisite: senior standing.

**370 Analysis of Civil Engineering Decisions (3).** Formulates and analyzes probabilistic models of civil engineering systems and their environment. Elementary theory of decision making under uncertainty.

Application to selected civil engineering problems. Prerequisite: senior standing.

**372 Foundation Engineering (3).** Design of basic foundation structures, footings, retaining walls, pile foundations, dams. Prerequisite: 355.

**373 Optimization of Civil Engineering Systems (3).** Automated design techniques such as linear, nonlinear, and dynamic programming; gradient and random searching. Civil engineering applications emphasized throughout. Prerequisite: senior standing.

**374 Civil Engineering Systems Design (3).** Design of civil engineering systems. Prerequisite: senior standing.

**375 Matrix Methods of Structural Analysis (3).** An introduction to the fundamentals of stiffness and flexibility methods for analysis of truss and frame structures. Application of the STRUDL and NASTRAN programs to three dimensional structures. Prerequisite: 221. f.w.

**381 Traffic Engineering (3).** Characteristics and studies associated with highway traffic. Analysis of signalized intersections. Prerequisite: 212 or instructor's consent.

**384 Pavement Materials and Design (3).** Properties of materials used in roads, airports and other pavement construction. Design methods for rigid and flexible pavements. Prerequisite: 212 or 212 concurrently.

**385 Vibration Analysis (3).** (same as Mechanical and Aerospace Engineering 385). Vibration theory with application to mechanical systems. Prerequisites: 185 and Mathematics 304.

**391 Introduction to Water Quality (3).** Methods for determining and characterizing water quality, effects of pollution on streams and lakes, and an introduction to engineered systems for the distribution, collection and treatment of water and wastewater. Prerequisite: junior standing.

**392 Water and Wastewater Treatment Processes (3).** Planning, layout and design of municipal and industrial water and wastewater treatment systems. Prerequisite: 391.

**393 Sanitary Engineering Microbiology (3).** Theory and application of fundamental principles of microbiology, ecology, and aquatic biology of the microorganisms of importance to sanitary engineers. Prerequisite: senior standing or instructor's consent.

**394 Sanitary Engineering Chemistry (3).** Applications of chemical theory and concepts of operations commonly employed in water and waste-water treatment to pollution from persistent chemicals and to specific control parameters. Prerequisite: senior standing or instructor's consent.

**395 Water Quality Analysis (3).** Chemical, physical and biological methods for analysis of streams, lakes, wastewaters and water supplies and their use in water quality management. Prerequisite: 391 or instructor's consent.

**396 Planning and Geometric Design of Highways (3).** Techniques of highway planning in rural and urban areas. Design of the visible elements of highways. Prerequisite: 212.

**400 Problems (1-6).** Supervised investigation in civil engineering to be presented in the form of a report.

**401 Advanced Topics in Civil Engineering I (1-3).** New and current technical developments in civil engineering. Prerequisite: 304 or equivalent.

**407 Numerical Methods in Engineering (3).** Classification and numerical solution of engineering problems—ordinary and partial differential equations, algebraic equations. Includes initial, boundary, eigen- and characteristic-value problems. Prerequisite: Mathematics 304.

**410 Seminar (1).** Review of research in progress. Research techniques.

**411 Continuum Mechanics (3).** (same as Mechanical and Aerospace Engineering 411). Introductory course in the mechanics of continuous media. Basic concepts of stress, strain, constitutive relationships; conservation laws are treated using Cartesian tensor notation. Examples from both solid and fluid mechanics investigated. Prerequisites: 251, Mathematics 304, Engineering 195.

**412 Theory of Elasticity (3).** (same as Mechanical and Aerospace Engineering 412). Stress and strain at a point. General equations of elasticity. Plane stress, plain strain problems; torsion of prismatic bars. Energy methods.

**413 Theory of Plates and Shells (3).** (same as Mechanical and Aerospace Engineering 413). Bending of plates with various loading and boundary conditions. Deformations, stresses in thin shells.

**414 Theory of Elastic Stability (3).** (same as Mechanical and Aerospace Engineering 414). Buckling of columns, beams, rings, curved bars, thin plates, shells.

**416 Theory of Plasticity (3).** (same as Mechanical and Aerospace Engineering 416). Plastic yield conditions and stress-strain relations. Behavior of elastic-perfectly plastic members. Plain strain in plastic members. Prerequisite: 412 or instructor's consent.

**418 Advanced Dynamics (3).** (same as Mechanical and Aerospace Engineering 418). Fundamental principles of advanced rigid body dynamics with applications. Special mathematical techniques including Lagrangian and Hamiltonian methods. Prerequisite: 185 and Mathematics 304.

**419 Nonlinear Mechanical Analysis (3).** (same as Mechanical and Aerospace Engineering 419). Analysis of behavior of nonlinear mechanical systems. Nonlinear phenomena of importance in mechanical design. Prerequisites: Mechanical and Aerospace Engineering 285 or equivalent and Mathematics 304.

**420 Materials and Measurement (3).** About 25% of the course is devoted to the physical measurement of strain, force, displacement and motion. Remainder of course is devoted to advanced study of the behavior of engineering materials with emphasis on concrete and steel. Prerequisite: 232 or equivalent.

**421 Matrix Analysis of Structures (3).** Force and displacement methods of analysis using matrices and the computer; applications to continuous beams, plane frame and trusses, grids and space frames and trusses.

**422 Advanced Structural Analysis (3).** Current trends in structural analysis. Elastic analysis of curved beams, arches and suspensions. Finite element and nonlinear methods of analysis.

**423 Structural Analysis (3).** Classical and modern methods for elastic analysis. Influence line, Miller-Breslau principle. Introduction to force and displacement methods using matrix analysis. Application to continuous beams, grids, plane and space frames and trusses.

**424 Design of Special Structures Systems (3).** Reviews current trends in design of structural systems and components. Critical evaluation of recent code modifications. Application to design of light gauge metal structures, lateral bracing systems, curved beams and panel systems. Prerequisite: 324 or 326.

**426 Space Mechanics (3).** (same as Mechanical and Aerospace Engineering 426). Rigid body dynamics analysis of satellites, space vehicles. Trajectories, time of flight optimization. Prerequisites: Mechanical and Aerospace Engineering 285 or equivalent, and Mathematics 304.

**428 Vibrations of Distributed Parameter Systems (3).** (same as Mechanical and Aerospace Engineering 428). Vibration analysis of strings, cables, bars, rods, shafts, beams, membranes, plates, circular rings, frames; free and forced oscillation; miscellaneous loading; various boundary conditions; effect of damping; energy methods; method of difference equations. Prerequisite: 385.

**430 Reinforced Concrete Theory and Design (3).** Advanced design of reinforced concrete structures; review of standard codes and specifications and their influence. Prerequisite: 375 or equivalent.

**432 Concrete Shell Design and Construction (3).** Membrane theory; application to shells of revolution, barrel shells, hyper shells. Simplified solutions for perturbation stresses. Practical design criteria and shell layout principles. Construction methods. Applications of prestressing and precasting. Prerequisite: 324 or 326.

**436 Advanced Soil Mechanics (3).** Theoretical soil mechanics as applied to solution of specific engineering problems. Prerequisite: 355 or equivalent.

**437 Design of Earth and Earth-Rock Dams (3).** Seepage analysis. Design considerations. Stability analysis. Failures in dams. Foundation explorations. Special design problems and details. Prerequisite: 355 or equivalent.

**438 Highway Transportation (3).** Economics of transportation on highways. Comparison of vehicle operation costs. Project studies of highway problems in general. Prerequisite: 396 or equivalent.

**441 Advanced Hydraulic Engineering (3).** Rapidly varied flow and design of transition structures. Hydraulic design of spillways, reservoirs and related structures. Prerequisite: 340.

**445 Water Quality Modeling (3).** Derivation and application of models for describing oxygen budget, nutrient exchange, and biological productivity in streams, lakes and estuaries. Prerequisite: 391.

**450 Construction Engineering (3).** Selection and layout of construction plant. Design and construction of formwork, falsework, cofferdams, conveyors and other temporary structures used by contractors. Prerequisite: 369 or equivalent.

**451 Construction Productivity (3).** Work improvement techniques in the construction industry reviewed and applied to local construction site. Construction safety influenced by supervisors and managers studied in detail. Declining productivity in the construction industry evaluated and solutions considered. Prerequisite: 367. f.

**452 Construction Project Management (3).** Cost analysis, estimating techniques. Time, cost, and quality control of construction projects. Recording/analyzing construction effort. Applications of crew balance, process charts, time-lapse motion pictures, operations research, and preplanning techniques to construction operations. Construction safety.

**453 Construction Administration (3).** Organization, management, engineering, business, and legal problems in the construction industry. Purchasing, bonding, insurance, financing, labor relations, and contract administration. Prerequisite: 367 or concurrently.

**457 Land Use Planning (3).** Case study of site planning using systems analysis; feasibility for development or redevelopment, restraints imposed by political, social and economic conditions on land use activity as related to urban and regional relationships. Prerequisite: 363.

**458 Dynamical Theory (3).** (same as Mechanical and Aerospace Engineering 458). Engineering principles and application in mathematical expression of energy, force, inertia system. Prerequisite: Mechanical and Aerospace Engineering 285 or equivalent and Mathematics 304.

**459 Dynamics of Structures (3).** (same as Mechanical and Aerospace Engineering 459). Study of the dynamic behavior of structures. Analysis of equivalent lumped parameter systems for the design of structures in a dynamic environment. Prerequisite: 421 or equivalent, proficiency in digital computer programming, or instructor's consent.

**460 Fundamentals of Fluid Mechanics (3).** Fundamentals of fluid motion, lecture and laboratory. Instrumentation, technique and analysis for experimental studies in fluid mechanics. Prerequisite: 251 or equivalent.

**461 Potential-Flow Theory (3).** Dimensional considerations, fundamental relationships of fluid mechanics, potential theory, and conformal mapping for incompressible fluid flow. Prerequisite: Mathematics 302 and Mathematics 305 or equivalent.

**462 Viscous-Flow Theory (3).** Theory of laminar and turbulent flow, boundary layers, and free-turbulence flow. Prerequisite: 461 or equivalent.

**464 Hydrodynamics (3).** Special topics in potential theory and conformal mapping. Prerequisite: 461.

**465 Wind Engineering (3).** Study of wind effects on the safety of



engineering structures, air pollution and building energy consumption, and the use of wind. Prerequisite: 251. w.

**472 Behavior of Reinforced Concrete Members (3).** Experimental and analytical investigations of the behavior and strength of reinforced concrete members. Literature survey of current research.

**475 Random Vibration (3).** (same as Mechanical and Aerospace Engineering 475). Analysis of random vibrations including topics in stationary, ergodic and nonstationary random processes, with application to single-degree of freedom, discrete and continuous mechanical systems. Prerequisite: 385.

**483 Transportation Planning and Models (3).** Regional and metropolitan transportation studies; land use, traffic generation, distribution and assignment models. Prerequisite: 370 or 373.

**484 Theory of Traffic Flow (3).** Scientific approach to study of traffic phenomena with emphasis on applications. Deterministic and stochastic models of traffic flow; optimization of intersection controls; computer simulation of traffic problems. Prerequisite: 370 or instructor's consent.

**485 Traffic Control Engineering (3).** Information retrieval and analysis of human and vehicular characteristics; roadway element; system control and optimization of highways, intersections, planning and design of new traffic facilities including ways, terminals. Prerequisite: 212 or equivalent.

**486 Finite Element Methods (3).** (same as Mechanical and Aerospace Engineering 486).

**490 Research (cr. arr.)** Independent investigation in the field of civil engineering to be presented in the form of a thesis.

**491 Unit Process Laboratory (3).** Studies chemical and physical relationships as applied to unit processes of water and wastewater. Prerequisites: 393 and 394.

**492 Physicochemical Treatment Processes (3).** Fundamental principles, analysis and modeling of physical and chemical processes for water and wastewater treatment. Prerequisite: 391.

**493 Biochemical Treatment Processes (3).** Biochemical principles, kinetic models and energy considerations in the design of biological wastewater treatment processes. Prerequisite: 391.

**496 Design of Water and Wastewater Treatment Facilities (3).** Development of design criteria and their application to the design of water and wastewater treatment facilities. Prerequisite: 391

**498 Engineering Aspects of Water Quality (3).** Theoretical aspects of biological, chemical, physical processes; applications in water, wastewater, industrial-waste treatment processes, natural water systems; chemical equilibria, flow models; reaction kinetics on process design, pollutants. Prerequisite: 391 or instructor's consent.

## CLASSICAL STUDIES

### CLASSICAL CIVILIZATION

**10 The Greek and Roman Achievement (3).** General introduction to Greco-Roman culture; a wide-angle view of ancient Western civilization for beginning students with little or no background in the area.

**50 Greek and Latin in English Usage (3).** Influence of Latin and Greek on English vocabulary.

**60 Classical Mythology (3).** Myths of Greece and Rome as an aid in interpretation of literature and art. cor.

**101 Classical Civilization (cr. arr.)** Roman Culture--The Empire: Augustan restoration and revivalism. The Aeneid. satire, post-Augustan prose; philosophy and education; religious syncretism and pagan monotheism; Roman Peace and World state, urbanization and Romanization; Christianity and pagan culture.

**115 Greek Culture (3).** Survey of Greek life and thought. Principal developments in literature, the arts, politics, religion and philosophy, and their influence on Western civilization. Prerequisites: Sophomore standing.

**116 Roman Culture (3).** Survey of Roman life and thought. Principal developments in literature, the arts, politics, religion, philosophy, and private life, and their influence on Western civilization. Prerequisites: Sophomore standing.

**201 Topics in Classical Studies (cr. arr.)** Organized study of selected topics. Subjects and earnable credit may vary from semester to semester. Repeatable with departmental consent. Prerequisites: Sophomore standing.

**224 Roman Classics in Translation (3).** Reading in translation and critical study of the most important literary works of the ancient Roman world. Prerequisite: sophomore standing.

**225 Greek Classics in Translation (3).** Reading in translation and critical study of the most important literary works of the ancient Greek world. Prerequisite: sophomore standing.

**226 Greek Drama (3).** Reading and interpretation of Greek tragedies and comedies in translation. Prerequisite: sophomore standing.

**227 Advanced Mythology (3).** Interpretation of selected classical myths and their influences on later literature and art. Prerequisite: C or above in previous classical civilization course.

**260 Greek and Roman Religion (3).** Survey of religious development among the Greeks and Romans. Prerequisites: Sophomore standing.

**301 Topics in Classical Studies (cr. arr.)** Subjects and earnable credit may vary from semester to semester. May be repeated with departmental consent. Prerequisites: junior standing and instructor's consent.

**352 The Classical Tradition (3).** Selected studies in continuity and influence of Greek and Roman culture on Middle Ages, Renaissance, and modern times. Prerequisites: Junior standing.

## CLASSICS

**193 Honors Proseminar (3-6).** Limited to Honors undergraduates. To be taken in senior year. Integrated exploration of classical civilization. May repeat to 6 hours maximum.

**201 Topics (cr. arr.)** Organized study of selected topics. Subjects and earnable credit may vary from semester to semester. Repeatable with departmental consent.

**311 History of the Greek and Latin Languages (3).** (same as Linguistics 313). Evolution of classical languages and their relationship to each other.

**323 Greek and Roman Numismatics I (3).** (same as Art History and Archaeology 323).

**324 Greek and Roman Numismatics II (3).** (same as Art History and Archaeology 324).

**350 Special Readings (1-3).** Readings in authors and texts not covered in other courses. Prerequisite: classics/classical civilization--departmental consent; Greek--two years classical Greek or equivalent; Latin--two years Classical Latin or equivalent. Prerequisite: 2 years classical Latin or equivalent; departmental consent.

**380 Advanced Study in the Teaching of the Classics (3).** Prerequisite: classroom teaching experience or chairman's consent.

**409 Introduction to Graduate Study in Classics (1).** Required of all first-year graduate students.

**425 Seminar in the Hellenistic Age (3-6).**

**435 Seminar in Ancient Rhetoric and Oratory (3).**

**445 Seminar in the Ancient Novel (3).**

**455 Seminar in Greco-Roman Religion (3).**

**465 Seminar in Greco-Roman Satire and Social Criticism (3).**

**490 Research and Thesis (1-8).** Individual research in preparation for writing thesis and/or dissertation.

## CLINICAL LABORATORY SCIENCES

**135 Teaching Practicum for Allied Health Sciences (3).** (same as Curriculum & Instruction T245, Occupational Therapy 135, Physical Therapy 135, Radiologic Technology 135, Respiratory Therapy 135).

**175MT Introduction to the Clinical Laboratory (1).** An introductory course to the clinical laboratory for those students about to begin clinical training in medical technology cytotechnology, or histotechnology. Prerequisite: departmental consent.

**186MT Basic Disease Processes (2).** Readings and discussions on basic disease processes of interest to the anatomic pathology laboratory and the histologic technician.

**280HT Elementary Histology (3).**

**281HT Basic Histotechnology (6).** Theories and technical application of procedures used in the preparation of tissue sections and slides of microscopic examination; including instrumentation, fixation, dehydration, clearing, infiltration, embedding, microtomy, H&E staining and coverslipping.

**282HT Special Staining Techniques (3).** Principles and procedures for special staining techniques for carbohydrates, connective tissues, blood, fat and lipids, pigments and minerals, bacterian and fungi, nerve, and other special cellstains.

**283HT Applied Histotechnology (3).**

**284HT Research and Instructional Techniques (3).** Involves library and laboratory research. Includes development of oral and written communication skills. Prerequisite: seniors admitted to Histotechnology curr.

**285HT Clinical Management (3).** Supervisory techniques and procedures helpful in operating a histopathology laboratory including laboratory safety, workload recording, and personnel management in a laboratory situation.

**286HT Basic Disease Processes (3).** Special readings and discussions of basic disease processes of interest to the anatomic pathology laboratory.

**300CT Problems in Cytotechnology (1-3).** Individual supervised work in an area of interest in cytology. Prerequisite: instructor's consent.

**300HT Problems in Histotechnology (1-3).**

**300MT Problems in Medical Technology (1-3).** Individual supervised work in an area of interest in medical technology. Prerequisite: instructor's consent.

**301CT Cytology of the Female Genital Tract (8).** A definitive study by means of light microscopy of normal and abnormal cellular changes occurring within the female genital tract along with histologic correlation. Prerequisite: senior standing and instructor's consent.

**301HT Advanced Histotechnology (3).** Advanced and specialized techniques used in the preparation and processing of muscle, nerve and rectal biopsies; special techniques in cytology; electron microscopy; enzyme and immunohistochemistry; plastic embedding and neuropathologic techniques.

**301MT Fundamentals of Medical Technology I (3).** Emphasizes disease processes and basic laboratory methods used in clinical laboratory areas: microbiology, hematology, immunology, virology, tissue typing, blood banking and chemistry. Prerequisite: senior standing in medical technology curriculum.

**302CT Cytology of the Respiratory Tract (4).** A definitive study by means of light microscopy of normal and abnormal cellular changes occurring within the respiratory tract along with histologic correlation. Prerequisite: senior standing and instructor's consent.

**302MT Fundamentals of Medical Technology II (3).** Continuation of 301MT.

**303CT Cytology of the Urinary Tract (4).** A definitive study by means of light microscopy of normal and abnormal cellular changes occurring within the urinary tract along with histologic correlation. Prerequisites: senior standing and instructor's consent.

**303MT Fundamentals of Medical Technology III (3).** Continuation of 301MT and 302MT.

**304CT Cytology of the Gastrointestinal Tract (5).** A definitive study by means of light microscopy of normal and abnormal cellular changes occurring within the gastrointestinal tract along with histologic correlation. Prerequisites: senior standing and instructor's consent.

**304MT Clinical Practicum (3).** Presentation and application of concepts and laboratory methods used in areas of immunochemistry, toxicology, mycology, urinalysis and cytogenetics. Prerequisites: 301MT, 302MT, 303MT.

**305CT Cytology of Body Fluids (4).** A definitive study of means of light microscopy of normal and abnormal cellular changes occurring within body fluids along with histologic correlation. Prerequisites: senior standing and instructor's consent.

**305MT Hemostasis (2).** Lectures and laboratory exercises in basic theory and techniques of hemostasis, including platelet function and disorders, plasma coagulation system, acquired and inherited hemostatic disorders. Prerequisites: 301MT, 302MT, 303MT.

**306CT Cytology of the Breast (2).** A definitive study by means of light microscopy of normal and abnormal cellular changes occurring within the breast with histologic correlation. Prerequisites: senior standing and instructor's consent.

**306MT Clinical Immunology (3).** Antigen-antibody reactions and their role in determining infectious, auto-allergic and inflammatory disease states.

**307CT Fine Needle Aspiration Cytology (2).** A definitive study by means of light microscopy of normal and abnormal cellular changes occurring within the fine needle aspirations from various body sites along with histologic correlation. Prerequisites: senior standing and instructor's consent.

**307MT Blood Banking (3).** Principles and techniques of transfusion practices related through lectures and experience in the blood bank laboratory. Prerequisites: 301MT, 302MT, 303MT.

**308CT Special Procedures in Cytology (2).** Study of hemtologic findings in body fluid cytology; chromosome cultures and karyotyping, emphasizing sex-related abnormalities; hormonal evaluation of smears from the female genital tract and their clinical significance. Prerequisites: senior standing and instructor's consent.

**308MT Clinical Hematology (6).** Lectures and laboratory regarding procedures for diagnosing hematologic disorders. Experience in collection of specimens from patients; staining, counting and identifying blood and bone marrow cells. Prerequisites: 301MT, 302MT, 303MT.

**309CT Clinical Management (1).** Procedures and processes helpful in operating a cytology laboratory, especially at the supervisory level. Prerequisites: senior standing and instructor's consent.

**309MT Clinical Microbiology (6).** Diagnostic procedures related to the isolation and identification of infectious microorganisms: bacteria and parasites. Emphasis on human pathogens and their sensitivity patterns with commonly used antibiotics. Prerequisites: 301MT, 302MT, 303MT.

**310CT Practical Cytotechnology (8).** Independent application of all techniques used to prepare and examine cytologic material. Prerequisites: senior standing and instructor's consent.

**310MT Clinical Chemistry (6).** Principles of quantitative analysis applied to the measurement of substances in biological fluids. Significance of these findings in the diagnosis and treatment of disease. Prerequisites: 301MT, 302MT, 303MT.

**311CT Technical Application with Research in Cytotechnology (2).** Research in an area of interest in cytology resulting in a written and oral presentation. Prerequisites: senior standing and instructor's consent.

**311MT Principles of Management and Education (1).** Lectures and discussion of management techniques and theories used in supervising laboratory personnel. Analysis of educational objectives and exam questions.

**312MT Research and Instructional Techniques (3).** Involves library and laboratory research. Includes development of oral and written communication skills. Prerequisite: senior standing in medical technology curriculum.

**M150 Special Readings (1-3).** Directed study of literature and research reports in clinical laboratory medicine. Prerequisite: departmental consent.

**M181 Practical Histotechnology (8).** Technical application of procedures for preparing slides for microscopic study, utilizing fixation, dehydration, infiltration, clearing embedding, routine staining, and coverslipping.

**M182 Advanced Histotechnology (3).** Advanced and special techniques for tissue preparation, including muscle biopsies, electron microscopy, bone marrows, neuropathology, cytology, and immunofluorescence techniques.

**M183 Applied Histotechnology (3).** Independent application of all techniques to prepare tissue sections and slides for examination studies.

**M184 Staining Technology (8).** Laboratory mathematics, principles, and procedures for special staining techniques for carbohydrates, connective tissues, blood fats and lipids, pigments and minerals, bacteria and fungi, nerves and other special cells.

**M185 Clinical Management (3).** Procedures and processes helpful in operating a histopathology laboratory; administration, recording, quality control, laboratory safety, and instrument maintenance and troubleshooting.

# CLOTHING AND TEXTILES

- 81 Clothing Construction (3).** Compares techniques and analyzes quality in garment construction.
- 83 Contemporary Fashion Fundamentals (3).** Studies the use of the elements and principles of design in selecting clothing for individuals. f.w.
- 86 Introduction to the Fashion Industry (3).** Surveys the fashion industry. Studies the development, production and marketing of merchandise from concept to consumer f.
- 182 Textiles (3).** Textile fibers and their processing as it relates to selection, care, and performance of end products. Prerequisite: second-semester freshman or above.
- 183 Fashion Illustration (2).** Development of techniques and media for portraying the fashion figure and dress. Prerequisites: 81.
- 186 Fashion Merchandising (3).** Surveys fashion merchandising and retailing principles. Specific applications through case studies, problems, and guest lecturers. Prerequisite: clothing & textile majors only or instructor's consent.
- 187 History of Dress and Fashion (3).** Origins and development of Western dress and fashion through significant historic periods from pre-historic to present times. f.
- 281 Fashion and Costume Design (3).** Evaluation of fundamentals of fashion and design. Design experience. Problems which develop judgment and originality. Prerequisites: 81 or equivalent, 83, and 183.
- 282 Apparel Production Processes (3).** A study of apparel production processes used by designers and by the industry. Prerequisites: 83, 182 or instructor's consent. f.w.
- 283 Analysis of Apparel Production Components (2).** Experimental laboratory study of the components of custom crafted apparel and ready-to-wear. Prerequisites: 81 or equivalent, 83, 182, 282 or parallel. f.w.
- 285 The Clothing/Textiles Consumer (2).** Consumer problems in buying textiles and clothing for home and family members. Legislation, quality standards, and construction of current textile and clothing items. Prerequisites: 182.
- 286 Applied Textiles (3).** A comparative study of the properties of fibers and fabrics, and how these influence the performance of apparel and household textiles. Laboratory experience. Prerequisite: 182.
- 300 Problems (cr. arr.)** Prerequisites: junior standing & instructor's consent.
- 318 Topics (cr. arr.)** Selected current topics in field of interest.
- 350 Readings (cr. arr.)** Prerequisites: senior standing & instructor's consent.
- 355 Recent Trends (1-2).** For upper-class and graduate students who wish additional knowledge and understanding in specific subject matter areas.
- 380 Tailoring (3).** Comparison of tailoring techniques used in industry and home production. Selection and tailoring of a wool suit or coat. Prerequisite: 81 or 283.
- 381 Costume History (3-4).** Interpretation of 19th and 20th century costumes and fashions as influential resources for contemporary dress. Prerequisite: 187.
- 382 Applied Costume Design (3).** Draping and modeling costumes of original design. Prerequisites: 381 & 387.
- 383 Advanced Fashion Illustration (3).** Techniques of representing costumed figures in various illustrative media and development of original designs for contemporary dress. Prerequisite: 183 & 281.
- 385 Textile Fibers (3).** Advanced study of textile fibers; emphasis on their structure, composition, physical and chemical properties. Prerequisites: 182 & 6 hours organic chemistry.
- 387 Flat Pattern Design (3).** Principles of designing by flat pattern methods and construction of original designs. Prerequisites: 281, or instructor's consent.
- 388 Clothing Behavior and Society (3).** Behavioral aspects of clothing as related to the individual and society. Prerequisites: 83, 86, and two courses from sociology, psychology or economics.
- 390 Field Training (cr. arr.)** Internship practical aspects of experience coordinated with the University curriculum. Available for various areas of emphasis. Prerequisites: 2.5 GPA, instructor's consent, and necessary prerequisites for area of emphasis. See department for internship guidelines.
- 400 Problems (cr. arr.)** Prerequisites: 300-level course in field of problem & instructor's consent.
- 410 Seminar (1-4).** Reports and discussion of recent work in area of concentration.
- 412 Research Methods in Clothing and Textiles (3).** Research planning, technique, sampling and measurement, data collection, analysis, and interpretation. Prerequisites: 3 hours statistics.
- 415 Readings (cr. arr.)** Readings in recent research material in textiles and/or clothing. Prerequisites: graduate standing, 20 hours clothing & textiles, & instructor's consent.
- 418 Topics (cr. arr.)** Selected current topics in field of interest.
- 450 Research (cr. arr.)** Independent research not leading to a thesis. Report required.
- 480 Textile Fabrics (3).** Advanced study of textile fabrics with emphasis on dyeing, finishing, and physical testing. Prerequisites: 182 & senior or graduate standing.
- 481 Advanced Costume History (3).** Study of American dress as a reflection of historical development. Influence of our European heritage and environmental resources and restraints upon American lifestyles from the 16th century to the present. Prerequisites: 381 or instructor's consent.

- 488 Cultural Interpretations of Dress and Adornment (3).** Diversity in functions and patterns of dress and adornment. Prerequisite: 388 or instructor's consent.
- 490 Research (cr. arr.)** Independent research leading to thesis or dissertation.

# COMMUNITY DEVELOPMENT

- 190 Individual Participation in Our Changing American Communities (3).** Citizen participation; consideration given to community development philosophy, practice, structures, and obstacles to the encouragement of effective citizen involvement in public decision making.
- 192 The Field of Community Development (3).** General survey of community development (domestic and international): origins, current status, basic values, and practices associated with citizen participation in community change.
- 193 Community Development Approaches to Youth Work (3).** Focuses on the implications and applications of community development concepts, principles, and practices for youth program development and maintenance.
- 194 Planning and the Community (3).** Acquaints undergraduates with the basic philosophy of planning, roles of citizens, private interests and planners, and with basic principles and processes of planning in urban and rural communities, as well as at the regional level.
- 300 Community Development Perspectives (3).** Historical, philosophical perspectives of community development form the base for this course. Examines concepts, values, principles of community development as an introduction to community development theory, practice.
- 301 Topics in Community Development (1-3).** Organized study of selected topics in community development. Particular topic and earnable credit may vary from semester to semester. Prerequisite: instructor's consent.
- 310 Community Development Theory (3).** Relevant social science theory reviewed as it applies to conscious, deliberate efforts to affect human, social, economic, political development. Relation of theory to action, specific methodologies, programming from professional services presented as aspects of practice theory.
- 315 Strategies for International Community Development (3).** Acquaints students with past and present development efforts and results throughout the world and considers the possibilities for the future. Introduces students to strategies for community development in the countries throughout the world.
- 320 Group and Interpersonal Competence (3).** Opportunity for extensive participation in group process: emphasis on interpersonal competence; use of group techniques in community development work. Selected readings in social psychology related to aspects of group principles, practices.
- 330 Professional Practice of Community Development (3).** Introduces professional practice methods through selection of field methods appropriate to specific situations and consistent with community development theory.
- 350 Special Readings (1-3).** Extensive reading in selected area or intensive reading in special field.
- 360 Principles and Practices of Planning (3).** Examines planning process as conceived and practiced at local level in United States today. Consideration given to scope and purpose, governmental framework, concepts of form and structure, research methods, development of alternatives, implementation.
- 362 The Implementation of the Local Planning Process (3).** Implementation of planning process analyzed within context of contemporary scene in United States. Consideration given to advantages and limitations of various devices, and to emergence of new approaches to planning implementation.
- 364 Area and Regional Planning (3).** Concepts, techniques, procedures of community, regional planning. Methods of collection, analysis, integration of pertinent economic, social, political, physical data. Estimation of future needs; allocation of space for planning future growth; development of areas.
- 370 Seminar in International Development (3).** Interdisciplinary seminar on international development. Development theories and problems including social, political and administrative aspects explored; sectoral areas such as population, rural development, education and health analyzed. Roles of various development agencies discussed.
- 372 Community Development in Lesser Developed Countries (3).** Analyzes economics/social/political/administrative implications of community development in lesser developed countries. Investigation of organization/implementation/operation of programs; particular attention to programming and practice.
- 376 Cultural Factors in Community Development (3).** Application of theories and methods of cultural change to the solution of practical problems in the modern world.
- 382 Principles & Practices of Fund Raising/Evaluation-Human Serv Org (3).** (same as Recreation and Park Administration 342). A basic understanding of program evaluation and its relationship to the fund raising process, emphasizing youth-oriented programs. Focuses on developing fund raising campaigns and grantsmanship.
- 383 The Management of Volunteer Systems (3).** Focuses on the role of volunteers in developmental organization and provides students an opportunity to develop the skills necessary to arrive at a management strategy designed to incorporate an effective voluntary component into existing programs.

- 384 Elderly Consumer-Participants in Human Service Delivery (3).** Elderly as consumers of services/participants in service delivery systems: services offered, special participation problems, social dynamics of service delivery systems and intervention points, community strategies to effect and improve service delivery.
- 390 Program Development and Administration for Human Services (3).** Essential features of program development and program administration in the public sector: what the administrative structure does, how it operates, and why.
- 400 Problems (cr. arr.)** Intensive study of an area of community development related to student's special interest.
- 410 Community Development Process (3).** Establishment, implementation, development, and institutionalization of community development process in traditional and transitional societies. Attention given to interrelated social, economic, political, institutional, and cultural factors pertaining to establishment and operation of the process.
- 412 The Theory of Planning (3).** Engagement of basic philosophical and theoretical frameworks and constructs of planning, including the evolution through both the social and physical sciences and their impacts on planning theory. Prerequisite: upper division status.
- 417 Government Social Policy and Institutional Resources (3).** Examines historical and contemporary developments of social policies and institutional arrangements implementing them.
- 420 Field Experience (3-12).** Field practice in selected community setting under faculty or other competent supervision.
- 425 Community Development Research Methods and Techniques (3).** Introduction to social science research methods and techniques, with consideration given to a variety of research approaches and techniques. Particular application of these approaches to community development research and evaluation is stressed.
- 430 Community Development Seminar (3).** Integration of theoretical knowledge and current practice problems in community development. Students and faculty in the seminar decide issues and topics to be the focus.
- 438 Community Development in Urban Areas (3).** Considers barriers to effective use of community development process in meeting needs in urban areas; critiques present structures and approaches, examines goals and organizational structures for applying process to urban needs.
- 440 Specialized Topics in Community Development (1-3).** Specialized topics of developments in related fields of special pertinence to community development.
- 442 Community Development Practice in Urban Areas (3).** Introduces the variables to be considered in creating the community development process in urban areas. Courses of action to take in response to these variables and problems which arise around them. Prerequisite: instructor's consent.
- 450 Research (1-6).** Student expected to demonstrate graduate ability in designing and carrying out a research project not leading to thesis.
- 490 Research (3).** Student demonstrates theoretical knowledge and skills in research leading to thesis.

# COMPUTER SCIENCE

- 75 Introduction to Computer Science (3).** Survey of computer science emphasizing basic concepts and techniques. Algorithms, flowcharts, representation of information, data structures, computer organization, programming languages, software systems, social issues. Students write programs in several languages. Prerequisite: High school algebra.
- 104 Computers and Programming I (3).** Introduces the student to keypunching, flowcharting and programming in FORTRAN. Emphasis is on the use of the FORTRAN language to solve a variety of business and scientific problems. Prerequisite: Mathematics 10.
- 201 Programming as a Research Tool (3).** Intensive study of programming techniques and applications for graduate students and superior seniors with no previous programming experience. Prerequisite: Statistics 207 or Statistics 234 or equivalent. Credit not given for both 104 and 201.
- 203 Computers and Programming II (3).** Thorough treatment of computer programming language PL/I and its application to both numerical and nonnumerical problems. Prerequisite: 104, or equivalent.
- 206 Basics of Assembly Language (3).** Assembly language programming for a general purpose computer. Intended for nonmajors in computer science. Introduces basic machine organization, assembly language programming techniques and interfacing with other computer languages. Prerequisite: 203.
- 207 Programming Languages (1).** Organized study of programming languages. Languages offered will vary from semester to semester. May be repeated for a maximum of 6 hours credit. Prerequisite: 203.
- 208 Job Control Language & System Utilities (3).** Advanced practical programming, with emphasis on use of job control language, auxiliary storage media, access methods, and system utilities. Prerequisite: 203.
- 210 Introduction to System Concepts (3).** Introduces fundamental concepts found throughout computer science including machine, program and file organization; data structures; compilers and link editors. Required course for undergraduates in computer science. Prerequisites: 203 and instructor's consent.
- 300 Problems (cr. arr.)**
- 301 Topics (cr. arr.)** Organized study of selected topics. Subjects and earnable credit may vary from semester to semester. Repeatable upon consent of department. Prerequisites: junior standing and instructor's consent.

**304 Minicomputers: Programming and Applications (3).** Structure, operation and programming of the PDP 11/20 studied in detail. Characteristics and applications of minicomputers discussed. Using assembly language, student writes and executes numerous programs by actually operating the PDP 11/20. Prerequisite: 210.

**305 Assembly Language Programming (3).** Assembly language programming for computer science majors. Introduces assembly language, macroprocessing and basic operating systems for a general purpose computer. Prerequisite: 210.

**320 Data Structures (3).** Studies certain important programming techniques/fundamental algorithms for representing and manipulating data. Linked list structures, arrays, stacks, queues, deques; trees, tree traversals; analysis of sorting/searching algorithms; miscellaneous combinatorial algorithms. Prerequisite: 210.

**323 Numerical Analysis (3).** (same as Mathematics 323).

**324 Numerical Linear Algebra (3).** (same as Mathematics 324).

**330 Computer Organization I: Design Fundamentals (3).** Boolean algebra, combinatorial logic, digital circuits, representation and transfer of data, digital arithmetic, storage and accessing, control functions, input/output facilities, systems organization. Prerequisite: 210.

**337 Applied Modern Algebra (3).** (same as Mathematics 337).

**341 Theory of Automata I (3).** Introduction to the study of computational processes by means of abstract machines and formal languages. Finite state machines, regular languages, pushdown stoe machines, context free languages, applications. Prerequisite: 210, Mathematics 201 or Mathematics 226.

**343 Compilers I (3).** Introduction the translation of computer languages by means of interpreters and compilers. Lexical analysis, syntax specification, parsing, syntax-directed translation. Prerequisites: 320 and 341.

**350 Special Readings (1-3).**

**351 Systems Programming I (3).** Analysis and design of computer systems including assemblers, input/output; executive, multiprogramming and multiprocessing systems with a close examination of at least one major system. Prerequisite: 305.

**370 Programming Methodology I (3).** Overview of software life cycle processes. Evolution dynamics of software systems. Practical and theoretical topics including system analysis and requirements specification, software design, software implementation (programming), software quality assurance and maintenance. Prerequisite: 320.

**400 Problems (1-3).**

**401 Topics (cr. arr.)** Organized study of selected topics. Subjects and earnable credit may vary from semester to semester. Repeatable upon consent of department. Prerequisite: instructor's consent.

**425 Heuristic Programming (3).** Concepts and theories underlying intelligent machines. Programming techniques used in artificial intelligence for game playing, automatic theorem proving, natural language "understanding," pattern recognition, deductive and inductive inference. Prerequisites: 320.

**430 Computer Organization II: Architecture (3).** Comparative study of computers with emphasis on alternative designs and trade-offs. Introduction to computer description languages. Prerequisite: 330.

**441 Theory of Automata II (3).** Study of the efficiency and the ultimate limitations of computational processes. Turing machines, recursive functions, undecidable questions, computational complexity, NP-hard and NP-complete problems. Prerequisite: 341.

**443 Compilers II (3).** Further study of the compilation process. Error handling, code optimization, data-flow analysis, code generation. Prerequisites: 305, 343.

**450 Research (cr. arr.)** Investigation and research into a topic, not leading to a thesis. Prerequisite: department chairman's consent.

**451 Systems Programming II (3).** Concepts and problems associated with design of large scale systems such as assemblers, compilers, loaders, interpretive systems, real-time, monitor, executive multiprogramming, multiprocessing, multiaccess systems; scheduling algorithms for jobs and input/output. Prerequisite: 351.

**460 Data Storage and Retrieval (3).** Theory and techniques for organization, storage and retrieval of data. Covers automatic indexing, text processing techniques and file organization techniques. Comparisons of typical commercial and special purpose systems. Prerequisites: 320.

**465 Data Base Management Systems (3).** Introduces computer data base systems: functions, uses, requirements, security, storage structures, sublanguages, actual systems. Details of three major approaches: relational, hierarchical, and network. Emphasizes design techniques for constructing systems meeting their specifications. Prerequisite: 203.

**470 Programming Methodology II (3).** Topics will include verification and validation techniques, software management, cost estimating and life-cycle control, concepts of distributed computing systems, and current trends affecting software methodology. Prerequisite: 370.

**480 Computer Networks (3).** Concepts and terminology of data communications, protocols for computer communication, routing techniques and congestion avoidance, encryption, error control, satellite communications. Prerequisite: 210

**490 Research (cr. arr.)** Graduate thesis research.

# COUNSELING AND PERSONNEL SERVICES

**G40 Advisory Seminar in Counseling and Personnel Services (1).** Orientation to the departmental undergraduate programs, degree program planning and introduction to the professional milieu. Required course for departmental majors. S/U only.

**G60 Introduction to Counseling and Personnel Services (2).** Required introductory course for undergraduates in counseling and personnel services. Overview and orientation, introduction to helping relationship theory, ethical and legal considerations, roles of professional helpers, and pertinent professional concerns.

**G151 Problems in Counseling and Personnel Services (1-3).** Independent problems.

**G152 Seminar in Counseling and Personnel Services (1-3).** Special seminars in selected topics.

**G160 Field Experience in Counseling and Personnel Services (1-3).** For C&PS undergraduates. Related clinical/administrative and monitorial duties in schools and approved agencies during semesters and summer. Work 30 hours for each credit hour. Professor supervised. Graded S/U.

**G255 Introduction to Rehabilitation Services (2).** Overview of rehabilitation system, resources and services existing for adults with disabilities. Focuses on how to help disabled people achieve independent living and vocational adjustment using services for their rehabilitation needs. Prerequisite: G60 or concurrent.

**G275 Internship in Counseling and Personnel Services (8).** Supervised internship in approved agency. Minimum 30 clock-hours for each semester hour of credit earned. Required of and open only to students majoring in one of the baccalaureate programs in counseling and personnel services. Prerequisite: departmental consent.

**G300 Problems (cr. arr.)**

**G320 Managing Counseling, Guidance, & Personnel Programs (3).** Provides knowledge and skill in agency and program development and administration for counselors, psychologists and personnel workers including planning implementation strategies, needs assessment, fiscal management, funding, public relations and evaluation.

**G325 Individual Vocational Assessment (3).** Information about individual vocational assessment theory, process, technology. Practical application emphasized through developing occupational sample for a community agency, using the Dictionary of Occupational Titles, giving vocational tests, conducting a job analysis. Prerequisite: Education R370.

**G330 Parent Counseling and Consultation (3).** For educational personnel, mental health consultants, child development specialists who work with parents in professional setting. Examines current family needs and child rearing practices. Basic skills in diagnosis, counseling, consultation, parent education developed.

**G335 Vocational Placement Methods (2).** Review and application of several techniques involved in vocational placement, i.e., diagnostic interviewing and placing, job seeking skills training, job development, placement and follow-up. Lab. Prerequisite: G325.

**G352 Psychological Aspects of Disability (3).** Introduces rehabilitation counselors and service workers to unique psychological problems and adjustments associated with a wide range of physical and mental disabilities. Emphasizes desirable service delivery intervention strategies to facilitate vocational, social and personal adjustment.

**G353 Rehabilitation Facilities (3).** Analyses of the design, personnel and services provided by rehabilitation facilities. A course project will be developed in a facility. Prerequisites: G60 and G160.

**G354 Work Adjustment I (3).** Study of behavioral management and other work adjustment techniques as they apply to the work adjustment needs of handicapped persons. Prerequisites: 9 hours psychology and senior standing.

**G355 Introduction to Alcohol Abuse and Rehabilitation Programs (3).** Designed primarily for students entering the helping professions. Covers historical perspective, definition and measurement of the problem, classifications and theories about the etiology of alcoholism. f.

**G356 Alcoholism: Assessment and Methods of Rehabilitation (3).** Designed primarily for students considering a career in the treatment of alcoholism. Focus is on assessment of alcohol problems, medical aspects of alcohol abuse and treatment modalities. Prerequisite: G355 or instructor's consent. w.

**G360 Topics (cr. arr.)**

**G392 Career Resources in Business and Industry (2).** Provides first-hand knowledge about personnel practices, occupational requirements, and career opportunities and resources in business and industry. Practical applications are emphasized through extensive on-site visits and use of business-industry-labor personnel.

**G395 Introduction to Helping Relationships (3).** Overview of counseling profession with specific emphasis on current and emerging trends. Introduction to major approaches to helping relationships in various professional settings; laboratory experience in helping skills.

**G396 Group Procedures in Counseling I (3).** Group theory and related research, observation and analysis of group dynamics with emphasis on counseling group member skills and behaviors. Prerequisite: junior standing.

**G397 Career Development I: Theory, Materials and Techniques (3).** Introduction to major theoretical orientations to career development. Characteristics, requirements of occupations and training opportunities. Nature and use of career materials, resources and techniques.

**G398 Career Development II: Methods and Programs (3).** Methods and programs for facilitating the career development of individuals over the life span. Organization and development of activities and programs for all ages is emphasized. Prerequisite: G397 or instructor's consent.

**G400 Problems (cr. arr.)**

**G404 Individual Inventory (3).** Interprets educational, psychological test data and data in personnel records; emphasizes use of data in counseling. Prerequisites: G395 or Practical Arts and Vocational-Technical Education F321; Education R370.

**G406 Mental Health Principles and Programs (3).** Psychology of mental health. Emphasizes normal personality. Examines current and emerging mental health programs and services.

**G407 Counseling Theory and Practice (3).** Introduction to the major theoretical orientations to counseling process and techniques; advanced laboratory experience in case conceptualization and counseling skills. Prerequisite: G395 or equivalent.

**G409 Group Procedures in Counseling II (3).** Continuation of G396. Emphasis on analysis of individual behavior in a counseling group. Prerequisites: G396 and instructor's consent.

**G410 Seminar (0.5-3).**

**G411 Vocational Rehabilitation I (2).** Vocational handicaps, methods of rehabilitating vocationally handicapped. State, national provisions for vocational rehabilitation services.

**G412 Vocational Rehabilitation II (2).** Continuation of G411.

**G415 Supervised Practice in Counseling and Personnel Services I (6).** Supervised practice of counseling in an approved counseling agency. Prerequisites: minimum grade of B in G397; G404; G406; g407 or equivalent; instructor's consent.

**G416 Supervised Practice in Counseling II (3-6).** Advanced supervised practice in counseling in an approved counseling agency. Prerequisites: G415 & G422 (concurrent registration in G422 acceptable).

**G417 Supervised Practice in Personnel Services II (3).** Advanced supervised practice in student personnel services in an approved agency. Prerequisites: G415 and G408 (or G408 concurrently).

**G419 Studies in Supervision in Counseling Psychology (3).** Instruction and practice in the supervision of counseling psychology conducted in appropriate laboratories and agencies. Prerequisite: G416 or G417.

**G422 Advanced Counseling Theories (2-3).** Historical, contemporary theories of counseling. Advanced study of techniques, research findings. Prerequisite: G415 or equivalent.

**G425 Career Development III: Advanced Theory and Research (3).** Examination of career development theories, the research supporting the theories and the practical application of these ideas in career counseling and career programs. Prerequisite: G397 or instructor's consent.

**G432 Assessment Methods for Counseling Psychologists I (3).** Students develop and practice skills in writing psychological reports with special emphasis on assessing "normal" psychological-social-vocational functioning. Prerequisites: G404 and Educational Psychology A403 or instructor's consent.

**G433 Assessment Methods for Counseling Psychologists II (3).** Assessment of personality functioning using projective and inferential testing procedures. Rudimentary skills in using the Rorschach method. Prerequisite: instructor's consent.

**G446 Biofeedback in Counseling Psychology (3).** Theory and practice of biofeedback and related methods in counseling psychology. Prerequisite: G415.

**G447 Family Counseling (3).** Appropriate for master's and doctoral students who will work with families in a professional setting. Examines family systems theories and major theories in terms of family needs. Basic skill development in family counseling processes. Prerequisite: G407 or instructor's consent.

**G448 Marriage Counseling (3).** Marriage counseling as a professional goal, process of marriage counseling, premarital and divorce counseling, sexual adjustment in marriage, marital enrichment, research in marriage counseling. Prerequisite: G407 or instructor's consent.

**G449 Supervised Practice in Marriage and Family Counseling (3-6).** Supervised practice in marriage and family counseling in an approved counseling setting. Prerequisites: G415; G447 or G448; and instructor's consent.

**G454 Work Adjustment II (3).** Application of counseling, training and other behavior change processes including feedback systems to work environments such as rehabilitation centers. Measurement and analysis of work behavior. Prerequisite: G354.

**G455 Studies in Alcoholism Research (3).** Examines current issues in the field of alcoholism including: an intensive study of current treatment approaches, research education, evaluation, training and community outreach strategies. Prerequisite: post-masters standing in C&PS or psychology or instructor's consent.

**G460 Topics (cr. arr.)**

**G462 Foundations of Student Affairs Administration (3).** (same as Higher and Adult Education K462). History, philosophy, theory and issues pertinent to student affairs work. Required of all students with an emphasis in college student affairs work.

**G463 Student Affairs Administration: Methods & Programs (3).** (same as Higher and Adult Education K463). Emphasis will be on program development and research methodology and application. Required of all students with emphasis in college student affairs work. Prerequisite: G462 or instructor's consent.

**G465 Legal and Ethical Issues in Counseling Psychology and Stu Per Srv (3).** Legal and ethical concepts and issues relevant to the practice of counseling psychology and student personnel services. Prerequisites: graduate standing and one 400-level course in counseling or personnel services.

**G470 In-Service Course in Counseling (cr. arr.)**

**G473 Supervised Practice, Method and Theory in Group Procedures I (3).** Supervised practice of group facilitation in an approved counseling setting. A study of the contemporary theories and advanced technique are integrated with the practice of group facilitation. Prerequisites: G409, G415 and instructor's consent.

**G474 Supervised Practice, Method and Theory in Group Procedures II (3).** A continuation of G473. Prerequisites: G473 & instructor's consent.

**G475 Internship in Counseling Psychology (3-6).** Supervised experience in research, instruction, counseling, or student personnel work on half- or full-time basis in approved internship station. May repeat to 12 hours credit. Prerequisites: masters in C&PS; department chairman's consent.

**G490 Research (cr. arr.)** Independent research leading to thesis.

## CURRICULUM AND INSTRUCTION

**T40 Advisory Seminar in Curriculum & Instruction (1).** Orientation to the department and to the profession. Degree program planning in early childhood, elementary and secondary education. Required of all department entrants. Graded S/U.

**T41 Classroom Communication (3).** Basic communication theories, principles and practices in the teaching/learning process; encoder and decoder skills with emphasis on assertive message sending and receiving; laboratory practice in cognitive and affective message designs for large group and individual settings.

**T42 Learning Strategies for College Students (3).** Students' learning strategies are assessed and their needs are given greatest emphasis. Learning through reading and listening are given major consideration as are the corollary skills of vocabulary expansion, studying and note taking.

**G446 Biofeedback in Counseling Psychology (3).**

**T160 Aiding: Nursery/Day Care Programs (2-4).** Instructionally related duties in the preschool classroom during semesters and summer. Student works 30 hours with supervision for each credit. S/U credit only.

**T161 Aiding: Kindergarten (2).** Instructionally related duties in the kindergarten classroom during semesters and summer. Student works 30 hours with supervision for each credit. S/U credit only.

**T162 Aiding: Primary Grades (2).** Instructionally related duties in primary grades. Student works 30 hours with supervision for each credit. S/U credit only.

**T163 Aiding: Intermediate Grades (2).** Instructionally related duties in intermediate grade classrooms. Student works 30 hours with supervision for each credit. S/U credit only.

**T164 Aiding: Secondary Schools (1-4).** Instructionally related clinical/administrative and monitorial duties in the secondary classroom during semesters and summer. Student works 30 hours with supervision for each credit. S/U credit only.

**T165 Project PREME Aiding (4).** Project PREME (Preparing Regular Education for Mainstreaming Exceptional) students spend 60-72 hours in regular classrooms working with mainstreamed children. Once a week sessions are devoted to discussion of lab work.

**T190 Experimental Education (1-5).** Participation in experimental programs on projects approved by the college of education. Prerequisites: junior standing & project or program director's consent.

**T211 Teaching of Grammar and Usage in the Secondary School (3).** Teaching grammar, usage and other aspects of the English language. Prerequisite: A205.

**T213 Teaching of Speech in the Secondary School (3).** Techniques in teaching and evaluation of speech and dramatics in secondary schools. Prerequisite: Educational Psychology A205.

**T221 Science in the Elementary School (2).** Concepts, materials, methods in elementary school science program. Prerequisite: junior standing.

**T224 Teaching of Science in the Secondary School (3).** Techniques in teaching and evaluation of science in the secondary schools. Prerequisite: Educational Psychology A205.

**T230 Art Activities in the Elementary School (2).** Considers the vital role of art activities and creative experiences in the growth and development of children. Prerequisite: junior standing, cor.

**T233 The Structure of the Secondary Art Curriculum (3).** Principles of curriculum development and their application to art education. Includes art education philosophies and rationales and their relationship to organization, schedules and programs of secondary schools. Prerequisite: A205.

**T234 Secondary Art Education Methods, Media & Materials (3).** Studio and related experiences in the middle/junior and senior high school. A study of instructional methods and of materials and media appropriate to art education.

**T240 Teaching Skills (3).** Series of weekly experiences--demonstrations, observations, microteaching, small group discussions--to develop concepts of and skill in a variety of basic teaching tasks. Prerequisite: Educational Psychology A 205.

**T245 Teaching Practicum for Allied Health Sciences (3).** (same as Medical Technology 135, Occupational Therapy 135, Radiologic Technology 135, Respiratory Therapy 135). Designed to strengthen teaching competence. Projects, exercises, teaching experiences supervised by program directors in cooperation with College of Education. Prerequisites: Educational Psychology A102 & program director's consent.

**T250 Special Readings (1-3).** Directed study of literature and research reports in education. cor.

**T251 Teaching of Social Studies in the Secondary School (3).** Techniques in teaching and evaluation of social studies in secondary schools. Prerequisite: Educational Psychology A205.

**T255 Elementary School Music (2).** Pragmatic approaches in the development of concepts, knowledge and skills essential for music instruction within the elementary school curriculum. Required for early childhood and elementary education majors. Prerequisite: Music 1, 8, or competency; A205 or instructor's consent.

**T256 Music Literature for Children (3).** Study and survey of music literature and instructional teaching/learning materials for the comprehensive elementary school curriculum. Required for elementary music education majors. Prerequisite: T255 or T257 or equivalent.

**T257 Teaching Music in the Elementary School (3).** Study of concepts, materials and evaluation in teaching/learning procedures for music instruction in the comprehensive elementary school music program. Prerequisites: A205 and junior standing or instructor's consent.

**T258 Teaching of Secondary School Music (3).** A study of the various components for the teaching of a comprehensive secondary school music program. Prerequisite: A205 or instructor's consent.

**T259 Teaching of Instrumental Music (2).** Practical strategies in the development of instrumental music programs. For all instrumental music education majors. Prerequisites: junior standing and instructor's consent.

**T267 Teaching Mathematics in the Elementary School (3).** Instructional strategies and contemporary resource materials for the successful development of selected concepts and skills in elementary school mathematics programs. Prerequisite: Mathematics 7 and 8. cor.

**T268 Teaching of Mathematics in the Secondary School (3).** Techniques in teaching and evaluation of mathematics in the secondary schools. Prerequisite: Educational Psychology A205.

**T280 Teaching of Romance Languages in the Secondary School (3).** Techniques in teaching and evaluation of romance languages in secondary schools. Prerequisite: Educational Psychology A205.

**T283 Teaching of German in Elementary School (3).** Offers future language teachers an opportunity to work with children in elementary school. Introduces students to curriculum planning, selection of teaching methods and materials and their implementation in classroom settings. Prerequisite: 2 semesters of German or equivalent.

**T299 Student Teaching (cr. arr.)** Hours, credit must be arranged with director of student teaching. Must apply during February for following year. Prerequisites: T240 and special methods courses in area of specialization.

**T301 Child Study (3).** Presents physical, mental, social, emotional aspects of the child from birth through age eight with implications for program and curriculum planning.

**T303 Emergent Language in Early Childhood (3).** Study of language learning in young children; how meaning of the environment is gained through language; implications for teachers working with children from varying language-learning environments. Prerequisite: T301 or Educational Psychology A205.

**T304 Family and Community Resources for Early Childhood Education (3).** Lectures, visits to schools, investigation into developments in methods, materials, programs, and resources used in working with young children and their parents. Prerequisite: junior standing.

**T305 Early Childhood Curriculum and Methods (3).** Development, theory and practice in early childhood education. Prerequisite: junior standing.

**T306 Strategies of Diagnosis & Intervention in Early Childhood (3).** Examines screening and diagnostic instruments and procedures, focusing on synthesizing data and prescribing preventive measures. Course provides a foundation for preventive academic work with "high risk" children. Open to upper-level undergraduates and graduates.

**T309 Literature in the Elementary School (3).** Surveys the field of literature for children and adolescents, with emphasis on selected readings of various types of literature. Prerequisite: junior standing or instructor's consent.

**T310 Seminar in Curriculum & Instruction (1-3).**

**T311 English Language Study in the Schools (3).** Problems in teaching of standard English usage and in the use of current linguistic materials in the schools.

**T312 Teaching the Language Arts in Elementary School (2).** Procedures used in teaching integrated language arts in elementary grades. Prerequisite: Educational Psychology A102.

**T313 Literature for Adolescents (1-3).** Selection and organization of materials for teaching literature to adolescents. Emphasizes literature of written for adolescents and includes a unit on literature of American ethnic groups.

**T314 Teaching of Composition (3).** Current approaches to teaching composition in elementary and secondary schools with emphasis on the process of composing and evaluation of student writing. Prerequisite: English 60 or equivalent.

**T315 Teaching of Reading (3).** Materials, methods used in teaching reading in elementary grades. Prerequisite: Educational Psychology A102. cor.

**T316 Teaching Reading in the Content Areas (3).** For secondary school teachers. Specific ways teachers can help students improve reading skills in content areas and ways reading can be taught in reading classes. Prerequisites: Educational Psychology A102 & a methods course.

**T317 Diagnostic and Corrective Reading in the Classroom (3).** Procedures for diagnosing and correcting reading problems within the classroom. Prerequisite: T315 or equivalent.

**T318 Analysis and Correction of Reading Disabilities (3).** Causes of reading disabilities; procedures that may be used to diagnose, correct. Prerequisite: T315, T316 or equivalent.

**T319 Practical Experiences in Reading (2).** Practical application of theory and knowledge involved in teaching reading in the elementary school. Provides opportunity for those enrolled in student teaching to discuss reading-related experiences and offers assistance with reading-related problems.

**T321 Advanced Teaching of Elementary Science (3).** For experienced teachers. Studies science program in elementary school from viewpoint of objectives, content, techniques, evaluation, developing trends. Prerequisite: instructor's consent.

**T322 Food Experiences for Children (3).** (same as Human Nutrition, Foods & Food Systems Management 322).

**T324 Advanced Teaching of Secondary Science (3).** Advanced methods course to prepare secondary science teachers and to insure professional competency for practicing teachers. Prerequisite: undergraduate science methods course.

**T332 Organization of Public School Art (2).** Purposes, practices of art experiences in elementary, secondary schools. Designed for teachers, supervisors, administrators.

**T350 Social Studies in the Elementary School (3).** Problems in preparation, teaching of units with suitable materials, techniques. Prerequisite: Educational Psychology A102.

**T351 Teaching Legal Rights and Responsibilities of Citizenship (2).** An introductory course for teachers and undergraduate students dealing with the teaching of the basic legal concepts which underlie effective citizenship.

**T355 Administration and Supervision of Music Programs (2).** An analysis of administrative and supervisory factors in the development of music curricula and organizational structures. Prerequisite: instructor's consent.

**T356 Advanced Techniques in Music Teaching (2-5).** A review and evaluation of teaching/learning strategies in selected areas and levels of music instruction. Prerequisite: music methods or instructor's consent.

**T360 Topics in Curriculum and Instruction (cr. arr.)**

**T367 Teaching Techniques and Curriculum in Elementary School Math (3).** The mathematics program in the elementary school from viewpoint of goals, content, techniques and evaluation.

**T368 Teaching of Algebra in the Secondary School (3).** Familiarizes prospective and in-service mathematics teachers with algebraic content in current secondary school mathematics programs and successful techniques for teaching this content.

**T369 Teaching of Geometry in the Secondary School (3).** Acquaints prospective and in-service teachers with geometric topics found in contemporary secondary school mathematics and effective techniques for teaching this content.

**T371 Production of Instructional Media Materials (3).** For classroom teachers. Evaluation of visual education procedures and classroom instruction, including preparation of visual education materials. Prerequisite: Educational Psychology A102; an elementary or secondary education methods course.

**T372 Selection, Utilization and Evaluation of Media Resources (3).** Lectures, discussions and independent investigations directed to development of criteria sets for selection and evaluation of instructional media and materials. Includes familiarization with current utilization practices.

**T373 Photography for Teachers (3).** Basic 35mm photography techniques and processes: basic darkroom; photo publications; basic slide/tape production as they apply to educational settings.

**T375 Programmed Instruction (3).** Historical, psychological and research foundations of self-instructional materials from linear booklets to computer-assisted programs. Lab exercises: production, selection, utilization, evaluation. Prerequisite: teaching experience or instructor's consent.

**T376 Instructional Television (3).** Prerequisite: T240.

**T377 Production of Educational Motion Pictures (3).** Provides practical transferable skills in the production of teacher- and student-made Super 8mm sound and silent motion pictures. Experiences in selecting and operating equipment, planning, shooting, editing, revising film.

**T378 School Learning Resource Centers (3).** (same as Library Science 342).

**T380 Studies in the Techniques of Teaching German (3).** (same as Germanic & Slavic Studies 380).

**T400 Problems (cr. arr.)**

**T401 Perspectives in Parent Education/Parent Involvement (3).** Consideration of the history and the influences of social, economic, political and educational changes leading to the development of parent involvement program components in the education of children in the primary grades.

**T402 Early Childhood Research-Based Curriculum Models (3).** Selected research-based curriculum models in early childhood education; study of home-based, center-based models; experiments in primary education; theoretical and philosophical differences. Prerequisite: learning or child development course or instructor's consent.

**T409 Literature for Children and Youth (3).** Systematic study of selected areas of particular importance to students of literature, teachers, librarians, supervisors, and school administrators. Prerequisite: T209 or instructor's consent.

**T410 Seminar in Curriculum and Instruction (1-3).**

**T411 Studies in English Education (3).** (same as English 411).

**T412 Elementary Language Arts Curriculum (3).** Advanced study of language arts curricula including curriculum models, curriculum design and construction, concomitant instructional methods and evaluation. Prerequisite: undergraduate language arts methods course or instructor's consent.

**T414 Instructional Materials in Reading and Language Arts (3).** Studies and investigations of types of instructional materials for

developmental, corrective and remedial reading.

**T415 Practicum in Child Study I (3-5).** Practicum experiences in diagnosing educational problems of school children. Prerequisites: T315 or T316, T318, Educational Psychology A303.

**T416 Practicum in Child Study II (3-5).** Practicum experiences in applying remedial procedures to children with educational problems. Prerequisite: T415.

**T417 Practicum in Child Study Supervision (3-5).** Practicum experience in supervising and directing a clinic involved with educational evaluation. Prerequisites: T415 & T416.

**T418 Reading Miscue Analysis (3).** The process in which readers construct meaning by relating their sociopsycholinguistic backgrounds to discourse. 15 studied miscues (text deviations) are analyzed at several linguistic levels. A comprehension centered reading program is developed. Prerequisite: T315 or T316, or equivalent.

**T419 Seminar in Reading and Language Arts (1-2).** Critical consideration of selected research and investigations in reading and language arts. Prerequisite: T315 or T316.

**T420 Issues and Trends in Reading Instruction (3).** Provides intensive study of significant issues and current trends in reading on all instructional levels. Prerequisite: T315, T316 or equivalents or instructor's consent. cor.

**T421 Survey of Science Education (3).** Survey of development of science education and study of changes in methodology and philosophy. Prerequisite: undergraduate course in science methods.

**T422 Curricula in Science Education (3).** Advanced study of science education curricula with option for elementary or secondary emphasis. Study of exemplary science programs, curriculum models, curriculum design and construction, concomitant instructional methods and evaluation. Prerequisite: undergraduate course in science education.

**T423 Review of Research in Science Education (3).** Studies appropriate research methodologies and reviews research and selected readings in science education. Allows option for elementary or secondary emphasis for specific areas: life, physical or earth sciences. Prerequisite: undergraduate course in science education.

**T424 Trends and Issues in Science Education (3).** Provides intensive study of current trends and significant issues of science affecting both the elementary and secondary levels of science education. Prerequisite: undergraduate course in science education.

**T430 Survey of Art Education (3).** Provides survey of the development of art education and problems in the field by means of a critical inquiry. Prerequisite: graduate standing.

**T431 Curriculum in Art Education (3).** Advanced study of art education curricula, with option for elementary or secondary emphasis. Study of exemplary art programs, standards of quality, curriculum models, curriculum design and construction, concomitant instructional methods and evaluation. Prerequisite: graduate standing.

**T432 Review of Research in Art Education (3).** Studies appropriate research methodologies and reviews research and selected readings in art education. Prerequisite: graduate standing.

**T438 Extracurricular Activities (3).** (same as Educational Administration 438).

**T440 The Elementary School Curriculum (3).** Studies elementary curriculum with regard to selection of objectives and content, and to provisions for curricular change.

**T441 Trends in Elementary School Curriculum (1-2).** Comparative study of selected areas of the elementary school curriculum with special emphasis on research and promising innovative and experimental projects. Prerequisite: T440.

**T442 Psychology of Affective Growth (3).** Systematic review of research on selected affective (noncognitive) variables; emphasizes potential applicability of research findings to school settings.

**T443 Tests and Measurements for Elementary and Secondary Schools (3).** Educational tests, measurements from points of view of teachers, supervisors, administrators.

**T444 The Supervision of Student Teaching (3).** Theory, knowledge and practices involved in supervision of student teaching and other professional lab experiences. Offers assistance in all major aspects of supervision of student teaching.

**T445 The Secondary School Curriculum (3).** For secondary school principals, teachers, superintendents. Present trends in curricular change, methods of curricular investigation. cor.

**T446 Curriculum Construction for Secondary Schools (3).** Designed for those engaged in curriculum revision work and construction of new secondary school courses. Prerequisite: T445 or instructor's consent.

**T447 Improvement of Secondary School Teaching (3).** For secondary school teachers, principals, superintendents with considerable training in education and teaching experience. Recent developments in secondary school teaching.

**T448 Analysis of Instructional Behavior (3).** (same as Educational Psychology A448). Teaching models and a systematic review of literature on instructional behavior and student achievement. Methodological strategies for conducting naturalistic classroom research stressed. For advanced master's and doctoral students. Prerequisite: graduate standing.

**T449 Classroom Discipline and Interpersonal Relations (3).** Designed for elementary and secondary teachers and administrators. Deals with a variety of responses to discipline problems, uses critical incidents to identify and illustrate their distinguishing characteristics, and provides small group practice opportunities.

**T450 Patterns for Instruction in Secondary Social Studies (3).** Examines and evaluates alternative instructional patterns or strategies for secondary school social studies.

**T451 Teaching Contemporary Legal Issues of Citizenship (3).** An advanced course in citizenship education dealing with the complexities

of contemporary moral, social and legal issues. Introduces specific strategies for helping children and youth deal with social and moral dilemmas. Recommended: T351.

**T452 Secondary Social Studies Curriculum (3).** Examines current theory, trends and practices in secondary social studies curriculum with a practicum in curriculum development.

**T453 Elementary Social Studies Curriculum (3).** An in-depth study of objectives, goals, patterns and practices in elementary social studies curriculum. Focus will be upon instructional strategies and materials and current trends influencing curriculum development.

**T456 Foundations of Music Education (3).** A study of the history, philosophy and rationale of music education. Prerequisite: instructor's consent.

**T457 Curriculum Materials in Music Education (2-5).** A development of critical abilities in evaluation and selection of music education materials. Section 1: Elementary; Section 2: Secondary Vocal; Section 3: Instrumental. Prerequisite: instructor's consent.

**T458 Techniques in Instrumental Music Teaching (3).** A practical study of the organization and instruction of class teaching, with demonstrations by instructor and class. Prerequisite: instructor's consent.

**T459 Teaching Vocal Music (3).** Studies in voice development techniques and the organization of choral programs.

**T460 Advanced Topics (cr. arr.)**

**T461 Advanced Piano Pedagogy I (3).** (same as Music 461).

**T462 Advanced Piano Pedagogy II (3).** (same as Music 462).

**T465 Diagnosis and Remediation of Learning Difficulties in Mathematics (3).** Formal and informal diagnostic techniques and instruments for assessing pupil difficulties in the area of mathematics. Multiple methods of remediating learning problems associated with specific mathematical topics.

**T467 Using Manipulative Materials in Teaching Mathematics III (3).** Mathematics laboratory is developed and integrated with experiences in setting. Emphasis on materials for primary and intermediate grades.

**T468 Secondary Mathematics Curriculum & Teaching (3).** Discussion and application of theories of learning, strategies of instruction, curriculum development, evaluation techniques and research to secondary mathematics programs. Prerequisite: mathematics secondary school teaching experience or equivalent.

**T470 In-School Course in Curriculum and Instruction (cr. arr.)** Course work adapted to current vocational needs. Prerequisite: instructor's consent.

**T471 Instructional Systems Design and Mediation (3).** Considers principles and components of a systems approach for integrating educational resources into an instruction situation. Emphasizes management role of the media specialist for organizing a program of instructional development.

**T472 Review of Research and Theory in Media (3).** Surveys educational media research, including programmed and computer-mediated instruction, television and film, media utilization and evaluation, and management of media resource centers. Prerequisites: T371 or T372 & instructor's consent.

**T480 Internship in Curriculum and Instruction (cr. arr.)** Provides internship experience under supervision in advanced levels of curriculum and instruction. Prerequisite: department chairman's consent.

**T490 Research in Curriculum and Instruction (cr. arr.)**

## DAIRY SCIENCE

**1 Dairy Science (3).** Fundamentals of dairy industry. Includes production, manufacturing, technology, public health, economic aspects. Prerequisite to all other courses in dairy science. f,w.

**110 Dairy Cattle Judging (2).** Dairy breeds, comparative judging, selections. f.

**150 Physiology of Domestic Animals (3-5).** (lecture 3 hours; lecture and lab 5 hours). Basic concepts of physiology and anatomy as related to domestic animals; optional laboratory; enrollment limited. Prerequisites: 12 or Biological Sciences 1 and Chemistry 1 or 11. w.

**200 Problems (cr. arr.)** Studies in some phase of dairy science. f, w.

**300 Problems (cr. arr.)** Advanced problems in a selected field to understand scientific problems, research methods.

**335 Neurobiology and Animal Behavior (3).** Analyzes of neural and neuroendocrine control systems and their role in organismic integration, environmental adaptation and behavior. Prerequisites: 5 hours animal physiology and 5 hours biochemistry, or instructors consent.

**390 Field Training in Dairy Husbandry (cr. arr.)** Subfield of study to be indicated. Combination of study, employment in selected fields. Planned study program, reports, final examination. Prerequisite: one or more of the following: 310, 380, 385 & instructor's consent.

**391 Field Instruction in Animal Science (1-3).** (same as Animal Science 391, Poultry Science 391).

**400 Problems (cr. arr.)** Individual studies include a minor research problem.

**401 Topics in Dairy Science (cr. arr.)** Prerequisite: graduate standing and instructor's consent.

**410 Seminar (1).** Reviews literature and current research in milk production, farm and milking management, nutrition, breeding, endocrinology, milk secretion and environmental physiology. May be divided into two or more sections to fit needs of students. f, w.

**420 Endocrinology (3).** (same as Biological Sciences 420). Hormones of pituitary and endocrine glands; special reference to influence on growth, reproduction, milk secretion. f.

**425 Anatomy of the Mammary Gland (2).** Comparative anatomy of mammary gland with special reference to dairy cow. f.

**427 Recent Advances in Environmental and Endocrine Physiology (1).** Seminar. Presentation, discussion, and critical evaluation of current status of selected topics in environmental and endocrine physiology. f,w.

**430 Physiology of Milk Secretion (3).** Physiology, biochemistry of milk secretion. w.

**435 Physiology of Cell Preservation (3).** Comparative physiological and biophysical changes occurring in cells, especially in spermatozoa, ova and bacteria, which are exposed to various storage environments including cryogenic temperatures and dehydration. w.

**437 Environmental Physiology (3).** Principles of environmental physiology and animal adaptation with emphasis on mechanisms of temperature regulation and related nutritional and metabolic-hormonal functions. f.

**440 Bioenergetics (3).** (same as Nutrition 440). Energetic interactions of animals and their physical and nutrient environments. alt. w. odd yrs.

**445 Advanced Dairy Production (2).** Advanced dairy science, with emphasis on management, organization of dairy enterprise, business and economics, production problems, market problems, producer organizations. Prerequisite: 310 or equivalent. w.

**450 Research (cr. arr.)** Original investigations, usually in connection with one of the research projects of Agricultural Experiment Station.

**490 Research (cr. arr.)** Continuation of 450. Leads to graduate school dissertation.

## ECONOMICS

**1 Fundamentals of Macroeconomics (3).** Survey of macroeconomic principles and their application to contemporary economic issues. Not open to students who have completed 41 or 51. cor.

**2 Fundamentals of Microeconomics (3).** Elementary analysis of the price system and the allocation of economic resources. Not open to students who have completed 41 or 51. Prerequisite: 1. cor.

**3 Economic Analysis for Social Issues (3).** An introduction to the basic tools of economic analysis and their use in analyzing current economic and social issues. Cannot be substituted for Economics 1, 2, 41 or 51. cor only.

**41 Principles of Economics (3).** Introduces study of economics. Prerequisite: Mathematics 80 or instructor's consent.

**51 General Economics (5).** Introduces economics; emphasizes certain fundamental principles, their application to questions of policy. Prerequisite: 15 credit hours.

**141 Evolution of Industrial Society (2).** Development, meaning and functioning of those socioeconomic institutions which characterize the American economy.

**198 Honors Proseminar (2-3).** Readings in selected topics in economics. Open only to economics majors eligible for Honors courses. May be repeated twice.

**199 Honors Proseminar (2-3).** Research for graduation with Honors in economics. Prerequisite: 198.

**201 Topics in Economics (1-5).** Economic principles applied to the analysis of specific areas of interest or directed toward a specific group of students. May repeat to a maximum of 5 hours credit. Prerequisite: instructor's consent.

**210 Labor Economics (3).** Surveys economic activity of the population, trade unionism, wage and employment determination, employment and income insecurity, and underutilization of human resources from the standpoint of public policy. Prerequisite: 1 and 2, or 41 or 51.

**215 Economics of Public Policy: Government Finance (3).** Analyzes policy issues in the public sector. Topics include governmental structure, cost-benefit analysis, public debt, urban problems and other issues. No credit for A.B. majors in economics. Prerequisite: 1 and 2, or 41 or 51.

**221 Economics of Regulation (3).** Economic issues of the regulation of power firms and the regulatory process, including implications for pricing efficiency, incentives for management and more concrete performance criteria. Prerequisites: 1 and 2, or 41 or 51.

**229 Money and Banking (3).** American monetary and banking systems; their influence on economic activities. Prerequisite: 1 and 2, or 41 or 51.

**231 Economic Analysis for Journalists (3).** (same as Journalism 231). Enrollment restricted to students in the School of Journalism. An analysis of the application of theory to current economic problems, the development of economic institutions. Prerequisite: 1 and 2, or 41 or 51. w.

**251 Theory of the Firm (3).** Introduces price theory and economics of the firm. Prerequisite: 1 and 2, or 41 or 51.

**253 Macroeconomic Policy (3).** Analyzes economics as aggregate systems. Functions and operations of the economy interpreted in terms of the decision framework and policy objectives. Prerequisite: 1 and 2, or 41 or 51.

**256 Economics of Public Policy: Antitrust Economics (3).** Competition and monopoly and their roles in the American economy. Prerequisite: 1 and 2, or 41 or 51.

**260 Economic Development (3).** (same as Peace Studies 260). Process of economic development examined. Structural transformation of the economy analyzed, with problems of backward economies highlighted. Prerequisite: 1 and 2, or 41 or 51.

**261 Introduction to the Soviet Economy (3).** Analyzes resource allocation and income distribution in the Soviet-type economy. Emphasizes Soviet objectives, the role of central controls, and decentralization measures. Prerequisite: 1 and 2, or 41 or 51.

**265 The Economics of Location (3).** Influence of space on market structure, location of industry, land use, internal community structure, central place theory and general law of market areas considered.

Prerequisites: 12 hours social science and either 1 and 2, or 41 or 51.

**300 Problems (cr. arr.)**

**301 Topics in Economics (1-5).** Study in applied or theoretical economics. May be repeated for credit to a maximum of 5 hours. Prerequisite: instructor's consent.

**302 Introduction to the Economics of Planning (3).** Examines characteristics of planning problems. Identifies principal decision variables, constraints. Comparative studies of alternative optimization and evaluation techniques implied by economic theory. Prerequisite: 251 or 351 and Statistics 234 or equivalent.

**308 Development of the American Labor Movement (3).** Origin/development of labor movement/unions—colonial era to present. Exposition of major social, economic, political factors influencing structure, philosophy, character of trade unions of past/present. Prerequisite: 1 and 2, or 41 or 51.

**311 Labor Market, Employment and Wages (3).** Surveys theoretical explanations of wage and employment determination in contemporary labor markets. Prerequisites: 251 or 351.

**312 Introduction to the Economics of Human Resources (3).** Labor force concepts and trends, underutilization of human resources in the United States and the nation's employment and training policies. Prerequisite: 210.

**313 Labor Market Information (3).** Information requirements and sources for planning and delivery of human resources services. Economic implications of alternative human resource services; their impact on employment, training, education, welfare institutions. Prerequisites: 311 & 312 or instructor's consent.

**315 Public Finance (3).** Analyzes economic effects of government expenditures, taxes and debt. Expenditure and taxation principles, tax reform, cost-benefit analysis, fiscal policy. Prerequisite: 251 or 351.

**316 State and Local Finance (3).** State and local tax and expenditure programs, intergovernmental fiscal relations, problems of metropolitan areas. Prerequisite: 251 or 351 or instructor's consent.

**317 Social Insurance (3).** (same as Finance 317). Economic problems arising from disability, unemployment, aging. Special problems of low-income and minority groups. Future of the American system of social insurance and public assistance. Prerequisites: Finance 218 and Economics 1 and 2, or 41 or 51.

**318 Labor Law and Legislation (3).** Laws governing labor-management relations and regulating trade union activity: Taft-Hartley, Landrum-Griffin, EEOC, Walsh-Healy, Davis-Bacon, etc. Impact of NLRB/court decisions on labor union activities. Prerequisite: 1 and 2, 41 or 51, or consent of instructor.

**319 Public Sector Labor Relations (3).** Federal, state, local collective bargaining laws, regulations, practices examined; special emphasis on Presidential Executive Order #11491, postal employee negotiations and state legislation related to education, public safety and service employees. Prerequisite: 318.

**320 Introduction to Economic Doctrines (3).** Origins of modern economic thought in the context of social and intellectual environment of the time in which they originated; their contribution to their period and to modern thought. Prerequisite: 1 and 2, or 41 or 51.

**325 International Economics (3).** Surveys theory of foreign trade, foreign exchange; export and import practices. Prerequisite: 229.

**329 The Banking System and the Money Market (3).** Organization of the money market; credit control procedures and aims; effect of bank expansion and contraction on money market and national income. Prerequisite: 229.

**332 Economics for Managers (3).** Macro- and microeconomic concepts, theory and methods as tools of analysis for management. Prerequisite: graduate standing or instructor's consent.

**335 Economics for Decision Making (3).** Process of economic reasoning and application of economic concepts, theory and methods to a wide range of management problems at both private firm and public agency levels. Prerequisites: 229 and either 251 or 351.

**348 Economic Foundations of the Community (3).** Economic forces which account for organization and development of communities. Internal functioning of the local economy and patterns of external trade. Prerequisites: 12 hours social science, and either 1 and 2 or 41 or 51, and instructor's consent.

**351 Intermediate Price Theory (3).** Analyzes influences underlying economic value. The pricing process under various market conditions considered; functioning of enterprise system evaluated. Prerequisite: 1 and 2, or 41 or 51.

**353 Intermediate Income Analysis (3).** National income concepts; national income accounting; theory of income determination. Prerequisite: 229.

**355 The Structure of Industry (3).** Analyzes the structure of industry; its impact upon operations of the firm; significance for public policy. Prerequisite: 251 or 351.

**358 Regional Economic Analysis (3).** Functioning of regional economies considered. Alternative techniques for regional economic analysis introduced and evaluated. Prerequisites: 353 and 251 or 351.

**361 Comparative Economic Systems (3).** Study of capitalism, market socialism, and central planning. Prerequisite: 1 and 2, or 41 or 51.

**362 Welfare Economics (3).** Role of value judgements; meaning and measurement of economic welfare; interpersonal comparisons: cardinal and ordinal utility; Pareto optimality, conflicts of interest, and distribution of income; individual values and social choice. Prerequisite: 351.

**365 Urban Economics (3).** General economic character of cities, interaction among various segments explored. Special attention paid to urban housing market, slums, the impact of new life styles, and problems of urban finance. Prerequisites: 265, 353, & 351 or 251.

**368 Business Fluctuations (3).** Definition and analysis of trends in

economic activity; business cycle theory; introduction to forecasting; policy for control; emphasis on work of the National Bureau of Economic Research. Prerequisite: 229.

**370 Introduction to Quantitative Economics (3).** Development of mathematical methods used in economics, with applications. Prerequisite: 251 or 351 and either Mathematics 60 or Mathematics 205 or instructor's consent.

**371 Applied Econometrics (3).** Studies methods for quantitative analysis of economic data. Estimating techniques, tests of significance, prediction/forecasting reviewed with respect to problems presented by economic data and information demands of economic decision models. Prerequisite: 251 or 351 and 253 or 353 and Statistics 234 or equivalent.

**372 Mathematical Economics (3).** Application of mathematical methods to selected topics in economic analysis. Prerequisite: 370 or Mathematics 201 or instructor's consent.

**384 Economic and Demographic Change (3).** Economic theory of demographic change is developed and related to industrial development, based upon both demand shifts and supply shifts; European development examined. Prerequisite: 1 and 2, or 41 or 51.

**388 Comparative Labor Movements (3).** Introduces the study of unionism on a world basis; emphasizes similarities and differences between American and foreign labor movements; the major problems confronting labor unions in selected European, Asian and African nations. Prerequisite: 308 and 318.

**389 Theory of the Labor Movement (3).** Concepts of labor movement theory, including historical perspective. Views of the Webbs, and Commons, Pulman, Marx, DeLeon, Debs, etc., examined. Theorist's role and his impact on trade union activity considered. Prerequisite: 308 or 318.

**399 Independent Study (cr. arr.)** Individual work, with conferences adjusted to needs of student. Prerequisite: instructor's consent.

**400 Problems (cr. arr.)** Graduate students may select topics for study and investigation from fields suggested by undergraduate courses listed above.

**402 Problems in Economic Education (1).** Seminar devoted to increased effectiveness of the classroom teacher in economics. Course required for graduate students in the first year of teaching.

**405 Advanced Microeconomic Analysis (3).** Develops microeconomic analytical thinking through solving a wide range of problems. Concentration is on the application and usability of methods. Prerequisite: 351.

**411 Topics in Wage and Employment Theory (3).** Analysis of the determination of wages and employment and the relation of trade unionism to the economy. May repeat for credit. Prerequisite: instructor's consent.

**413 M. A. Research Seminar (3).** Seminar on the preparation and presentation of paper in lieu of thesis for masters' candidates. Required of all M. A. students choosing the non-thesis option.

**415 Advanced Public Finance I (3).** Fiscal policy, alternative budgetary policies, burden of the debt, debt management, coordination with monetary authorities and governmental programs for price stability and economic growth. Prerequisites: 351 and 353.

**416 Advanced Public Finance II (3).** Expenditure theories, budgeting process, cost-benefit analysis, tax incidence, welfare economics of public finance and technical problems of income, sales, profits, and property taxes. Prerequisite: 351 and 353.

**420 History of Economic Thought (3).** Analysis of development of economic theory; emphasis on evaluation of classical doctrine. Prerequisites: instructor's consent.

**424 Public Health and Medical Care Economics (3).** (same as Health Services Management 424). Demand and supply dynamics in public health and medical care. Prerequisite: 201 or 351 or instructor's consent.

**425 International Finance (3).** Balance of international payments, international lending; problem of international monetary equilibrium. Prerequisites: 329 or 353 or instructor's consent.

**426 International Trade (3).** Pure theory of international trade and commercial policy. Prerequisite: 351.

**430 Advanced Money and Banking (3).** Theories of determination of quantity of money and influence of money and near-money on income and prices. Theories explaining level and structure of interest rates. Prerequisite: 353 or instructor's consent.

**431 Central Banking Policies (3).** Examines central banking procedures, policies and the part they may play in maintaining economic stability. Special attention to connection of Federal Reserve System with money, capital markets. Prerequisite: 329 or 430 or instructor's consent.

**451 Advanced Price Theory (3).** Surveys major issues and writings in consumption, production, exchange and distribution theory, including a development of historical and current controversies. Prerequisite: 351.

**452 Seminar in Microeconomics (3).** Analysis of topics in price theory. May be repeated for credit. Prerequisite: instructor's consent.

**453 Advanced Income Analysis (3).** Surveys major issues and writings of the classical, Keynesian and post-Keynesian income and employment theory with applications to public policy. Prerequisite: 353.

**454 Seminar in Macroeconomics (3).** Analyzes topics in income analysis, including capital theory and economic dynamics. May be repeated for credit. Prerequisite: instructor's consent.

**455 Monopoly and Competition (3).** Antitrust policy and its impact on structure and performance of industrial enterprise. Prerequisite: 355.

**456 Seminar in Public Utility Regulation (3).** Pricing and investment in public utility industries.

**460 Theory of Economic Development (3).** Theories of economic

development critically examined. Sources and consequences of growth processes analyzed in context of economic theory and historical occurrence.

**468 Analysis of Economic Trends (3).** Analysis of current business situations and outlook through examination and appraisal of economic indicators, governmental policies, and consideration of basic economic, political, and social trends.

**469 Public Policy and Private Enterprise (3).** Examines impact of government economic policies upon private enterprise sector. Special emphasis on use of public controls to maintain economic stability and growth in an expanding economy.

**470 Mathematical Economics I (3).** Application of mathematical tools to advanced economic analysis. Prerequisite: 370.

**472 Introduction to Econometrics (3).** Examines fundamentals of constructing economic models and econometric techniques used in estimating associated behavioral relationships. Prerequisite: Statistics 385 or instructor's consent.

**474 Advanced Mathematical Economics (3).** General equilibrium models—the existence, efficiency, and stability of competitive equilibrium. Prerequisites: 451, 471, 473 and Mathematics 311.

**475 Econometrics I (3).** (same as Agricultural Economics 475). Study of a single equation method for estimating parameters of economic models. Emphasis is given to special estimation problems which occur in integrating the theory with various types of economic data.

**476 Econometrics II (3).** (same as Agricultural Economics 476). Models for simultaneous relationships, problems of identification, methods of estimation, tests of significance and prediction, errors in the variables, serial correlation and problems of aggregation. Prerequisite: 475.

**478 Input-Output Analysis (3).** Rationale of intersectoral analysis explored; theoretical and practical problems of construction discussed; applications of input-output demonstrated. Prerequisite: 370 or instructor's consent.

**479 Advanced Seminar in Quantitative Economics (3).** Current topics in quantitative economics. May repeat for credit. Prerequisite: instructor's consent.

**480 Independent Readings for Ph.D. Comprehensive Examinations (1-6).**

**484 Economics of Technological Change (3).** Explores American technological development from earliest colonial beginnings.

**490 Research (cr. arr.)** Thesis research for M.A. or Ph.D. degree.

## EDUCATION HONORS

**151EH Special Readings (1-4).** Directed study of literature and research reports in education. Prerequisites: consent of instructor and Honors program director.

**152EH Honors Seminar (1-2).** Prerequisites: consent of instructor and Honors program director.

**153EH Special Practicum (1-4).** Directed practicum experience with students in educational settings. Prerequisites: consent of instructor and Honors program director.

**154EH Honors Research (1-4).** Joint research in education with a member of the education faculty. Prerequisites: consent of instructor and Honors program director.

## EDUCATION ADMISSIONS SEMINAR

**S35 Perspectives in Education (1).** Required of freshmen and sophomore students in Education, optional for others. Orientation to UMC and College of Education, rules and regulations. Systematic process of career decision-making. S/U only.

**S60 The Health Related Professions (1).** Acquaints students with information about individual interests, abilities and aptitudes and requirements of various health careers; assists student with career planning and selection of preparation program.

## EDUCATION STUDIES

**B161 Observation of English Schools (3-5).** Visits to English schools of many types: infant, junior, grammar, modern, technical, and comprehensive schools, colleges of education, and universities. Assigned readings and preparation of papers on English schools, and tutorial sessions.

**B162 Observation of European Schools (2-4).** Visits to French (or Belgian) schools of many types. Visits planned with cooperation of the respective ministries of education and supplemented by lectures and readings.

**B163 Semester Abroad Seminar (2-4).** Lectures in an academic subject (usually a branch of English literature or a social science), supplemented by papers and discussions in tutorial groups. Prerequisites: junior standing, approval of a faculty committee, and B352.

**B350 Historical Foundations of Modern Education (2-3).** Educational

practices and theory from ancient times to present.

**B351 Historical Foundations of American Education (2.5-3).** Development of American educational institutions and ideas, and of social forces which have influenced them. Prerequisite: course in American history. cor.

**B352 Comparative Foundations of Education (2.5-3).** Educational institutions and ideas of major nations of Western Europe.

**B353 Intellectual Foundations of Education (2.5-3).** Analyzes, interprets, and evaluates fundamental concepts and controversial issues in contemporary education, with attention to ideological and social contexts of each.

**B360 Topics in Educational Studies (cr. arr.)** Group and/or independent study of selected topics in the social and philosophic foundations of education. Prerequisite: instructor's consent.

**B400 Problems (cr. arr.)** Prerequisite: instructor's consent.

**B410 Seminar in Education Studies (1-3).**

**B471 Philosophic Theory in Education (3).** Examines major ideological movements in modern education; their social antecedents and philosophic underpinnings.

**B472 Readings in History of Education (3).** Readings in selected topics in American educational history.

**B473 The Development of Higher Education in the United States (3).** Historical approach to main issues confronting higher education in United States.

**B481 Classic and Contemporary Educational Thought (3).** Study of selected major theorists in education, past and present, whose views are of basic significance to the analysis of educational theory and practice.

**B490 Research in the History and Philosophy of Education (cr. arr.)**

## EDUCATIONAL ADMINISTRATION

**C240 School Organization & Administration for Secondary Teachers (2).** Required for certificated secondary school teachers. Problems of effective methods of school management from standpoint of teachers in secondary schools. Prerequisite: Educational Psychology A205. cor.

**C241 School Organization & Administration for Elementary Teachers (2).** Required for certificated elementary school teachers. Major problems of school organization, administration and management from the viewpoint of the elementary school teacher. Prerequisite: Educational Psychology A205. cor.

**C390 Foundations of Educational Administration (2-3).** Surveys the field of educational administration designed to serve as a foundation for more specialized courses. Emphasizes history and development of administrative theory.

**C400 Problems (cr. arr.)**

**C404 Elementary and Secondary School Supervision (3).** Organized study of the theory and practice in the field of supervision designed to meet the needs of school superintendents, principals, department chairpersons and special supervisors.

**C406 Secondary School Administration (2-3).** Functions and principles of educational administration applicable to the leadership tasks of department chairmen, secondary school administrators and school superintendents. Prerequisite: C240 or equivalent.

**C408 Elementary School Administration (3).** Specialized course in elementary school administration for administrators, supervisors and teachers. Prerequisite: C241 or equivalent.

**C410 Seminar in Educational Administration (1-3).**

**C411 Politics of American Education (3).** Organization and control of American education at national, state, and local levels, studied from the perspective of social and economic conditions, and political processes related to decision making.

**C412 City School Administration (2-3).** Principles and problems growing out of the relationships between the local board of education, the employed personnel, and the community.

**C413 Administration of Student Personnel Services (3).** Organization and administration of school programs supporting student needs and education; student activities, food service, transportation, learning media, special education, guidance, health service, housing, records, conduct/discipline, advisement, admission, enrollment, promotion.

**C414 Development of School Facilities (3).** The responsibility of school personnel for the planning, operation, and maintenance of school facilities.

**C416 Seminar in Elementary School Administration and Organization (1-2).** Studies and investigates selected topics in elementary school administration and organization. Prerequisite: C408 or equivalent.

**C430 The Junior High and Middle Schools (3).** Organization and development of educational programs and practices for junior high schools and middle schools to meet requirements and serve the unique characteristics of late pre-adolescent and early adolescent age groups.

**C438 Extracurricular Activities (3).** (same as Curriculum and Instruction T438). Study of cocurricular activities in schools. For sponsors and administrators.

**C440 Issues in School Finance (2-3).** Fundamental principles and techniques of public school finance for teachers, counselors, principals and superintendents.

**C441 Advanced School Finance (3).** Advanced problems in theory and practice of financing education. Prerequisite: C440 or instructor's consent.

**C442 Educational Systems--Design and Analysis (3).** Design and analysis of educational systems utilizing systems models as they apply to planning, organization, administration, operation, and evaluation of

educational programs and institutions. Prerequisite: C440 or instructor's consent.

**C444 Current Issues in School Administration (2).** In-depth study of current issues and individual cases encountered by administrators in all levels of schools. Prerequisite: C406 or equivalent.

**C446 School Surveys (2-3).** Techniques of the survey movement. The survey as an administrative instrument for improvement of education programs. Prerequisite: C411, C412, C414 or instructor's consent.

**C451 School Staff Personnel Administration (2-3).** Principles and practices of modern school staff personnel administration as applied to human relations in educational institutions and programs, including higher education.

**C452 School-Community Relations (3).** Principles of good school public relations, unique public functions of various school and community groups. Technique for conducting school public relations. Prerequisite: C412 or instructor's consent.

**C453 Advanced School Facilities Planning Practices (3).** Problems in the principles and practices of school plant planning, development, and operation in various types of educational institutions and programs. Prerequisite: C414 or instructor's consent.

**C454 Legal Aspects of Education (3).** The law pertaining to education as it applies to educational institutions and personnel in the United States, including theory, organization, sources, processes and effects.

**C460 Topics in Educational Administration II (cr. arr.)** Group experiences in educational administration.

**C470 In-Service Course in Educational Administration (cr. arr.)**

**C490 Research in Educational Administration (cr. arr.)**

## EDUCATIONAL PSYCHOLOGY

**A102 Educational Psychology (2).** General elementary course to acquaint students with scientific psychological principles underlying education. Prerequisites: general psychology & sophomore standing. cor.

**A205 Psychology of Learning and Instruction (2).** Introduces the education major to the nature of human learning processes and its implications for instruction. Emphasis on bases of and readiness for learning, types of learning, memory, forgetting and transfer, and related topics.

**A207 The Psychological and Educational Development of the Child (3).** Provides basic knowledge for identifying, explaining, predicting, and controlling child behavior by presenting a theoretical and empirical orientation on psychological and educational stages of development. Prerequisite: A102. cor.

**A208 The Psychological and Educational Development of the Adolescent (3).** Provides basic knowledge of the physical, social and psychological development of the adolescent and is designed for anyone who may be contemplating teaching, counseling or working with teenagers.

**A240 Introduction to Educational Measurement and Evaluation (2).** Use of educational and mental tests in improvement of instruction at elementary and secondary school levels. Prerequisite: A102. cor.

**A302 Group Intelligence Testing (3).** Principles of psychometrics and a critical examination of various group tests of ability. Prerequisites: A102 and Education R370 or equivalent training.

**A315 Essentials of Learning (3).** An introduction to the basic principles of learning. Focus is on principles of learning which have the greatest utility for professional educators. This course provides a foundation for more advanced courses in human learning. Prerequisite: A102 or equivalent.

**A400 Topics (cr. arr.)**

**A400 Problems (cr. arr.)**

**A403 Individual Intelligence Testing (3).** Study of Stanford-Binet Scale and other individual tests of intelligence. Practice in administering and interpreting the tests. Prerequisite: A302 or equivalent training.

**A404 Psychology of Affective Growth (3).** Systematic review of research on selected affective (noncognitive) variables, with emphasis on the potential applicability of research findings to school settings.

**A405 The Psychology of Education (3).** Advanced course covering entire field of educational psychology.

**A407 Psychology of the Elementary School Child (3).** Applies educational psychology to problems of teaching in elementary school. Prerequisite: A405. cor.

**A408 The Psychology of Adolescence (3).** Critical psychological analysis of studies and investigations of various aspects of adolescence.

**A410 Seminar in Educational Psychology (1-3).**

**A411 Evaluation of Educational Programs and Products (3).** Examines possible roles of evaluators, models used for evaluation and methods available for analysis of results. Competencies in planning, analyzing and administering program evaluations are developed. Existing evaluation reports are reviewed. Prerequisite: Education R370 or equivalent.

**A412 Design and Construction of Attitude Measures (3).** Theory and techniques for use in constructing devices for the measurement of attitudes. Practical experience is obtained in the construction and administration of attitude measures. Prerequisite: A302, Counseling and Personnel Services G404 or equivalent background in measurement concepts.

**A415 School Psychology Practicum (6).** Supervised practice of procedures of a school psychologist including evaluation and in-service training. Prerequisite: @departmental consent.

**A416 Learning Applications (3).** Examines present day educational

applications of learning theory. Various contemporary educational practices are examined and critiqued to determine where learning principles are appropriately applied and where those principles are violated. Prerequisite: A315 or equivalent.

**A417 Learning Theory for Educators (3).** Examines learning theory, instructional theory and psychoeducational design. The theoretical base for educational practice is thoroughly examined. A historical perspective is provided. Prerequisite: A315 or equivalent.

**A448 Analysis of Instructional Behavior (3).** (same as Curriculum & Instruction T448).

**A460 Topics (cr. arr.)**

**A475 Internship (cr. arr.)** Supervised experience in an institutional or applied setting. Prerequisite: department chairman's consent.

**A490 Research in Educational Psychology (cr. arr.)**

## EDUCATIONAL RESEARCH AND STATISTICS

**R320 Introduction to Microcomputers (3).** A study of the hardware and software components of a microcomputer system. The BASIC language will be used to explore a variety of educational applications.

**R330 Instructional Applications of Microcomputers (3).** A study of the microcomputer as a teaching tool. The PILOT language will be used to develop units for computer-assisted instruction and computer-managed instruction. Prerequisite: A205 or equivalent.

**R360 Topics in Educational Research and Statistics (1-3).**

**R370 Educational Statistics I (3).** Introduces statistical techniques employed in education, including descriptive statistics, correlation, simple regression and hypothesis testing. cor.

**R400 Problems in Educational Research and Statistics (cr. arr.)**

**R409 Overview of Educational Research (2).** Design and interpretation of educational research: methods of gathering and evaluating data. For master's and specialist's candidates. Doctoral students should take R441 instead of R409. Prerequisite: R370 or equivalent.

**R410 Seminar in Educational Research and Statistics (1-3).**

**R435 Educational Statistics II (3).** Analysis of variance and design of experiments for educational research. Prerequisite: a grade of B or higher in R370 or its equivalent.

**R438 Computer Applications in Educational Research (3).** Principles and techniques of utilization of computing as a tool in educational research. Prerequisites: R370 & R435 or R435 concurrently.

**R441 Foundations of Educational Research (3).** Principles and techniques of research problems, formulation of hypotheses, and selection of appropriate design, instrumentation, and analyses. For doctoral students. Prerequisites: R370 & R435.

## ELECTRICAL ENGINEERING

**17 Experimental Course (cr. arr.)** For freshman-level students. Content and number of credit hours to be listed in Schedule of Courses.

**101 Computer Basics and Applications (3).** Not for engineering students; open to freshmen. What computers are, how they work and are used. History, scope of applications, low-level/high-level programming, computer arithmetic and equipment; uses University computers. Supplementary guest lectures.

**117 Experimental Course (cr. arr.)** For sophomore-level students. Content and number of credit hours to be listed in Schedule of Courses.

**205 Circuit Theory II (3).** Fundamental general circuit theory, simple transients, complete solutions for sinusoidally driven circuits, matrix methods of network analysis. Prerequisite: Engineering 124.

**206 Feedback Theory (3).** Feedback techniques, with applications to electronic circuits and control systems, including modeling methods, Bode plots, Nyquist diagrams. Experimental homework using the servotrainers of the control laboratory. Prerequisite: 216 or equivalent background in Laplace transforms.

**216 Linear Systems and Circuits (3).** Fourier series, Laplace transforms and operational methods applied to linear systems; analogous electrical and nonelectrical systems; polyphase circuits; signal flow graphs. Prerequisite: 205.

**225 Electromagnetic Fields (3).** Elements of vector analysis, electrostatic, magnetostatic, and time-varying fields, plane waves. Prerequisites: Physics 123 & Mathematics 304 concurrently.

**226 Logic Design (4).** Design of digital logic structures with small and medium scale integrated circuits. Introduction of propagation delay, loading, voltage and timing diagrams emphasizes design techniques for combinatorial and sequential design. Includes 1 hour laboratory. Prerequisites: 124, 126. Corequisite: 255 or instructor's consent.

**227 Assembly Language Programming (3).** Techniques of programming in assembly language, starting from basic fundamentals, different classes of instruction types in data manipulation, logical flow control, introduction to input/output instructions and channel programming. Prerequisite: Engineering 126.

**235 Physical Electronics (3).** Junction theory, semiconductor diodes and models, bipolar transistors and models, field-effect transistors and models, selected electron devices and models. Prerequisite: Mathematics 304.

**255 Experimental Electrical Engineering I (3).** Application of standard electronic test equipment to basic experimental tasks of

measurement and characterization of electronic phenomena and devices. Prerequisite: 205 or concurrently.

**256 Experimental Electrical Engineering II (3).** Continuation of 255, emphasizing experimental techniques in analysis, design, and practical optimization. Topics selected from circuits, electromagnetics, electromechanical systems, and electronics. Prerequisite: 255.

**266 Power Engineering I (3).** Magnetic circuitry in general and in machinery; DC machine theory, operation, applications; transformer circuits, synchronous machine theory, applications; basic principles of energy conversion; use of matrices; basic principles of power transmission and control. Prerequisite: 205.

**286 Electronic Circuits and Signals I (3).** Electron devices, modeling, and applications to basic electronic circuits, including RC amplifiers and power supplies. Prerequisite: 235 or Physics 215.

**300 Problems (2-4).** Analytical or experimental problems pertaining to electric circuits, machines, fields or electronics. Prerequisite: instructor's consent.

**301 Topics in Electrical Engineering (3).** Current and new technical developments in electrical engineering. Prerequisite: senior standing or equivalent.

**302 Microcomputers for Non-Electrical Engineers (3).** Basic topics regarding use of microcomputers including digital logic and computer fundamentals. For students with no background in electrical engineering. Prerequisite: engineering students--junior standing; others--instructor's consent.

**304 Digital Computer Applications in Engineering (3).** (same as Chemical Engineering 304, Mechanical and Aerospace Engineering 304, Nuclear Engineering 304).

**305 Basic Analog Computer Applications in Engineering (3).** Analog computer techniques used in obtaining solutions of differential equations of diverse physical systems. Laboratory and project work assigned. Prerequisite: Mathematics 304 or equivalent.

**306 Introduction to Minicomputers (4).** Fundamentals of small computers including architecture, software, peripherals, channels, addressing modes and system parameters. Use of these machines in laboratory and communication environments is studied. Prerequisite: 227.

**307 Introduction to Digital Signal Processing (3).** Concepts, analytical tools, design techniques used in computer processing of signals; includes signal representation, sampling, discrete time systems analysis, recursive/nonrecursive filters, design/implementation, discrete Fourier transform/two-dimensional filtering. Prerequisites: 216, Engineering 126.

**310 Introduction to Bioengineering (3).** (same as Mechanical and Aerospace Engineering 310). Detailed look at selected biological systems and problems; emphasis on engineering aspects such as measurement, analysis synthesis and modeling. Prerequisite: 256 or Mechanical and Aerospace Engineering 252.

**315 Engineering Evaluation of Energy Systems and Resources (3).** (same as Mechanical & Aerospace Engineering 315, Nuclear Engineering 315). Evaluation of energy resources, their potential utilization; economic, environmental, political, technical factors governing alternatives and their selection; time changes in energy needs, technology. Prerequisites: Engineering 99 & junior standing in engineering.

**317 Network Analysis (3).** Fundamentals, including matrix algebra, linear graph theory, topological formulas, state variable equations with an introduction to sparse matrix methods. Prerequisite: 216.

**318 Network Synthesis and Filter Design (4).** Fundamentals with emphasis on design of filters; positive real functions, physical realizability conditions, the approximation problem, RLC and RC passive filters and RC active filters. Lecture and laboratory. Prerequisite: 216 & 256.

**326 Introduction to Microcomputers (4).** Basics of microcomputer architecture, survey of current technology and hardware. Prerequisite: 226 or equivalent.

**327 Computer Architecture (3).** Covers rationale behind the logical structure of digital systems including: concepts of stored-program computers, program control, addressing of memory, fixed-point arithmetic operations, floating-point arithmetic operations. Prerequisites: 226, 227.

**328 Design of Digital Subsystems (3).** Covers methodology and techniques of logical design of structures discussed in 327. Companion course to 327. Prerequisites: 226.

**330 Electronic Circuits and Signals II (4).** Study of operating point stability, feedback amplifiers, oscillators, modulation and detection, typical IC circuits for both digital and analog signals, and power supplies. Prerequisites: 256, 286.

**333 Semiconductor Device Theory (3).** Semiconductor devices and their terminal characteristics. Theories of P-N junctions, junction transistors and field effect transistors. Surveys modern semiconductor devices. Prerequisite: 235.

**334 Design and Analysis of Integrated Circuits (3).** Principles and technology of monolithic integrated circuits. Design, layout and implementation of digital and linear circuits. Surveys of current circuits and their application. Prerequisites: 235, 286.

**336 Solid State Power Circuits (4).** Circuits employing solid state power devices including transistor and thyristor power amplifiers, regulated power supplies, static switching techniques, and thyristor phase control. Includes laboratory projects. Prerequisites: 256, 286.

**338 Amplifier Analysis and Design (3).** Design of electronic networks with application to instrumentation, control and communication systems. Practical specifications and problems in design. Lectures and projects. Prerequisite: 330.

**345 Electromechanical Conversion I (4).** Theory and practice of electrical machinery. Lecture and laboratory. Prerequisites: 256, 266.

**347 Electric Transportation and Industrial Drives (3).** Electric

vehicle propulsion and industrial drives: review of DC and AC machine principles, traction motor requirements and performance, DC and AC industrial drives, heating effects. Lecture and lab. Prerequisites: 266.

**354 Microprogramming (3).** Reviews classical computer architecture and control units. Modern microprogram controlled computer architecture, advantages/disadvantages, architectural implications of writable control stores. Microprogramming examples (IBM 360, Interdata 70 and 85, National IMP-16). Emulation, microdiagnostics. Prerequisites: 226 & 227.

**357 Experimental Electrical Engineering III (3).** Realistic engineering task assignments of four-week or longer duration requiring experimentation in their solutions. Written and oral communication of plans, progress and results. Prerequisite: 256.

**358 Automatic Control System Design (4).** Techniques for feedback system design and analysis: computational aids, compensator design and examples, state variable methods, nonlinear systems and sampled-data control systems. Lecture and laboratory. Prerequisites: 206, 256.

**359 Computer Process Control (3).** Introduces process control; role of analog and digital computers in the control of automatic processing systems; digital control systems analysis and design algorithms; process control applications. Prerequisites: 206 & Engineering 126.

**361 Introduction to Power Systems (4).** Introduces concepts of equipment, regulation, trade terms and engineering economics applications to power systems. Prerequisites: 256, 266 and Economics 41.

**362 Power Systems Analysis (3).** Transmission line equations including resistance, inductance, and capacitance. Introduces per unit system and voltage regulation. Prerequisite: 266.

**363 Symmetrical Components Analysis of Power Systems (3).** Short circuit analysis using symmetrical components. Simultaneous faults and open conductors. Prerequisite: 266.

**364 Computer Applications to Power Systems (3).** Load flow, fault, network reduction, and transient stability studies on digital and analog computers. Prerequisite: 361 or 362.

**366 Introduction to Pattern Recognition (3).** Aspects of pattern recognition theory; computer application to design and training of pattern recognizers using examples from speech recognition, visual inspection, clinical medicine, automatic photographic recognition, and advanced automation. Prerequisite: Statistics 320 or equivalent.

**369 Principles of Direct Energy Conversion (3).** (same as Mechanical and Aerospace Engineering 369).

**372 Modulation and Transmission of Signals (3).** Review of Fourier analysis of signals, study of signal transmission. Analog modulation and demodulation, use of nonlinear devices in modulation systems, sampling and pulse modulation. Prerequisite: 330 or instructor's consent.

**375 Introduction to Plasmas (3).** (same as Mechanical and Aerospace Engineering 375, Nuclear Engineering 375). Equations of plasma physics, interaction of waves and plasmas; plasma sheaths and oscillations; measurements and applications. Prerequisite: 376 or instructor's consent.

**376 Distributed Transmission Systems (4).** Theory and application of distributed parameter systems, with emphasis on transmission lines for low and high frequencies. Lecture and laboratory. Prerequisites: 225 and 256.

**378 Microwave Principles (4).** Plane and spherical waves; wave guides; resonators; antennas; high frequency generators; radio wave propagation. Lecture and laboratory. Prerequisites: 225, 256.

**379 Fundamentals of Acoustical Engineering (4).** Fundamental concepts of sound waves, sound production and radiation, electro-acoustic devices, sound control. Lecture and laboratory. Prerequisite: 225, 256.

**382 Lasers and Their Applications (3).** (same as Mechanical and Aerospace Engineering 382, Nuclear Engineering 382).

**388 Logic and Wave-shaping Circuits (3).** Analysis and design of electronic logic circuits with applications to analog and digital computers and instrumentation. Prerequisite: 286.

**400 Problems (2-5).** Supervised investigation in electrical engineering to be presented in form of report.

**401 Advanced Topics in Electrical Engineering (3).**

**402 Thyristor Power Control and Conversion (3).** Advanced study of thyristor phase controlled rectifiers, inverters, cycloconverters, and DC to DC converters. Prerequisite: 336.

**405 Advanced Analog, Iterative and Hybrid Computer Techniques (3).** Analog computer generation of odd periodic wave shapes, mode cycling, analog memories, iterative operation and hybrid computation techniques. Prerequisite: 305 or instructor's consent.

**408 State Variable Methods in Automatic Control (3).** (same as Chemical Engineering 408, Mechanical and Aerospace Engineering 408, Nuclear Engineering 408).

**410 Seminar (1).** Reviews of recent investigations, projects of major importance. Prerequisite: graduate standing.

**411 Advanced Electrical Machinery Theory (3).** Electrical machinery fundamentals necessary for understanding advanced literature. Applications of symmetrical components to machinery analysis. Prerequisite: 347 or equivalent.

**413 Introduction to Fourier Optics (3).** Diffraction, lenses, and coherence treated in terms of systems and transform concepts with applications: two- and three-dimensional signals, Fourier and Hankel transforms, random signals, diffraction, and holography. Prerequisite: 372 or instructor's consent.

**420 Analysis of Biological Control Systems (3).** Analysis and formulation of mathematical models for selected biological control systems. Models studied with emphasis on digital and analog computer simulation.

**424 Digital Electronics (3).** Electronic hardware aspects of digital systems. Includes state-of-the-art information on integrated-circuit

logic devices and their applications. Prerequisite: 388 or instructor's consent.

**427 Digital Software Systems Design (3).** Characteristics and parameters of various software subsystems including assemblers, compilers, utility programs, special programming packages, interpreters, and operating systems; and principles of organization into efficient systems. Prerequisite: 327.

**428 Digital Hardware Systems Design (3).** Characteristics and parameters of various hardware subsystems including main memory, auxiliary memory, arithmetic units, card equipment, etc., and principles of organization into efficient system. Prerequisite: 328.

**430 Power-Systems Stability (3).** Performance of synchronous machines under transient conditions; power system stability; system fault computations using symmetrical components.

**431 Economics of Power Systems (3).** Transmission loss formula coefficients, incremental costs and losses, economic scheduling of generation, and applications. Prerequisite: 364.

**433 Extra High Voltage Power Systems (3).** Design and performance criteria for extra high voltage including insulation, apparatus, line and related system equipment. Prerequisite: 362 or equivalent.

**434 Direct Current Power Systems (3).** Characteristic and performance analysis of DC transmission lines and associated conversion systems. Prerequisites: 362 or equivalent and graduate standing.

**435 Power System Relaying (3).** Theory of relaying systems for power system protection, improvement of power system stability. Relay coordination; performance of relays during transient swings and out-of-step conditions. Prerequisite: 361 or equivalent.

**436 Lightning and Switching Surges in Power Systems (3).** Overvoltage, switching surge and lightning effects on a power system. Use of grounding and lightning arresters. Effects of surges of and on machines. Prerequisite: 362.

**437 Solid State Energy Conversion (3).** Solid state direct energy conversion; design of thermoelectric generators and heat pumps. Prerequisites: graduate standing and instructor's consent.

**438 Computer Simulation (3).** Investigates various methods for solving differential equations toward the goal of using these methods to carry out dynamical simulations of physical systems. Both analog and digital computers utilized.

**442 Advanced Integrated Circuits (3).** Fundamentals of advanced integrated circuit design; diffusion, ion implantation and epitaxy; MOS and bipolar techniques; survey of current LSI design, fabrication and testing.

**443 Solid State Theory I (3).** Principles of quantum and wave mechanics as applied to solid state; Boltzman and Fermi statistics; energy band theory of crystals; electrons, holes in semiconductors. Current flow in P-N junctions, semiconductor devices. Prerequisite: graduate standing.

**444 Solid State Theory II (3).** Fundamentals of crystallography; application of X-ray analysis to the study of crystallinity. Quantum mechanical solution for the wave function of an electron in a solid; concepts of reciprocal space. Prerequisite: 443 or Physics 415.

**446 Semiconductor Device Theory (3).** Energy band structure of semiconductors; influence of an electric and magnetic field on holes and electrons in a solid; conductivity of solids; nonequilibrium carrier densities; transport of excess carrier densities; interface studies. Prerequisite: 444.

**447 Magnetogasdynamics (3).** (same as Mechanical and Aerospace Engineering 447). Flow of electrically conducting fluids in the presence of applied electromagnetic field. Prerequisite: 375 or instructor's consent.

**448 Quantum Electronics (3).** Optical pumping of metastable quantum states, magnetic state inversion. Semiconductor junction/electron injection. Optical cavities, induced emission and optical regeneration. Parametric amplification. Prerequisite: Physics 215 or equivalent.

**455 Biomedical Instrumentation (3).** Biomedical objectives, physical and engineering principles; optimal equipment design and actual performance of biomedical instrumentation; considers practical instrumentation problem solutions and unsolved problems. Prerequisites: 286 or Physics 305 or equivalent, and instructor's consent.

**456 Interactive Computer Graphics (3).** Survey of interactive graphics techniques and methodologies. Emphasizes computer graphics software. Topics include instruction sets for current display processors and mathematical techniques (e.g., clipping, windowing, shading, perspective transformation). Prerequisite: 227, Mathematics 331 or instructor's consent.

**457 Machine Intelligence (3).** Formal languages in relation to natural language processing; formal languages, graphs, and image processing; formal logic and automated theorem proving; natural language processing; aspects of problem solving and heuristic programming. Prerequisite: 341.

**460 Advanced Electric Circuit Analysis (3).** Specialized study of mathematical analysis as applied to solutions of circuit networks with fixed and variable parameters.

**461 Network Synthesis (3).** Surveys linear active and nonreciprocal circuit elements, realizability conditions, methods for synthesizing active networks, and practical applications. Prerequisite: 460.

**462 Linear Graphs and Electrical Networks (3).** Specialized study of linear graph theory as applied to electrical networks. Prerequisite: 460 or equivalent.

**463 N-Port Networks Synthesis (3).** Synthesis of N-port networks including realizability conditions and synthesis conditions. Prerequisite: 461 or equivalent.

**466 Liapunov and Related Nonlinear Methods in Automatic Control (3).** Nonlinear methods in automatic control including phase plane analysis, describing function techniques, generation and application of Liapunov's method. Prerequisites: 408 and Mathematics 331 or instructor's consent.



**467 Optimal Control Theory (3).** Analysis and design of dynamic systems using optimal control theory: parameter optimization, dynamic optimization, computational methods, differential games. Prerequisite: 408.

**468 Stochastic Optimal Estimation and Control (3).** Surveys random process theory; stochastic control and optimization; estimation and filtering based on Kalman-Bucy techniques; stochastic stability; adaptive and learning control systems. Prerequisites: 408 & Statistics 325.

**469 Digital and Sample-Data Systems (3).** Introduces sampling and quantization, design of digital and sample-data systems, digital filters, adaptive sampling and quantization. Prerequisite: 307, Mathematics 310 or instructor's consent.

**470 Applications of Transforms (3).** Application of the Laplace, other transform methods of solution of circuit and field problems.

**472 Communication Theory I (3).** Generalized communication systems, signal processing, signals as random processes, optimum receivers. Prerequisite: Statistics 325 or equivalent.

**473 Communication Theory II (3).** Encoding methods, probability of error, detection schemes; decision methods for communication systems. Prerequisite: 472.

**474 Artificial Intelligence (3).** Concepts, theories, and models pertaining to neural nets, pattern recognition, learning systems, and programmed problem solving. Prerequisites: graduate standing and instructor's consent.

**475 Information Theory (3).** Shannon-McMillan theorem, its generalizations and coding-decoding methods proposed to satisfy this theorem. Prerequisite: instructor's consent.

**476 Theory of Automata (3).** Sequential machines; Turing machines; deterministic and stochastic automata; applications of automata. Prerequisite: instructor's consent.

**477 Coding Theory I (3).** Coding and error-correcting codes: group codes, linear codes, decoding methods and probability of error. Prerequisites: 472 and Mathematics 340 or equivalent.

**478 Coding Theory II (3).** Further study of error-correcting codes: ring and cyclic codes, linear switching circuits, burst error codes, codes for arithmetic units, etc. Prerequisite: 477.

**479 Digital Image Processing (3).** Modern techniques in computer processing of pictorial information; techniques of image digitization, contrast enhancement, spatial filtering, evaluation of quality, feature extraction, image recognition, description and applications. Prerequisite: 327 or instructor's consent.

**480 High Frequency Transmission and Radiation (3).** Skin effect; theory of transmission lines, wave guides, resonators.

**481 Antennas (3).** Point and aperture sources; simple antennas; antenna array; slot, horn, lens antennas.

**490 Research (cr. arr.)** Independent investigation in field of electrical engineering, to be presented as thesis or dissertation.

## ENGINEERING

**5 Digital Computer Computation (2).** Primarily for freshman engineering students. Analysis and synthesis of digital computer programs for solving problems.

**17 Experimental Course (cr. arr.)** For freshman-level students. Content and number of credit of hours to be listed in Schedule of Courses.

**30 Engineering Graphics (3).** Lettering, drafting equipment, technique and standards. Engineering measurements, charts and graphs. Multiview and pictorial drawing, sketching and interpretation. Three-dimensional space analysis of lines, planes and solids. Dimensioning, sectioning, shop drawings, organization charts and flow diagrams.

**85 Static and Elementary Strength of Materials (3).** Fundamentals of statics; static equilibrium and introduction to elements of mechanics of elastic materials. Prerequisites: Mathematics 80 or Mathematics 175, Physics 123 or Physics 123 concurrently.

**99 Engineering Thermodynamics I (3).** Fluid properties, work and heat, first law, second law, entropy, applications to vapor and ideal gas processes. Prerequisites: Physics 123 and Mathematics 175.

**110 Software Engineering (3).** Examines techniques in software engineering, including top down design, levels of abstractions, control structures, data structures, speed and storage optimization. Prerequisite: 5.

**124 Circuits, Devices and Systems (3).** Electric circuit laws; power and energy relationships; analysis techniques based upon these laws and relationships; dc resistive circuits; R-L-C circuits in ac sinusoidal steady state. Prerequisite: Physics 124 con.

**126 Computers and Information Systems (3).** Introduces organization, operation and interfacing of digital computers as applied to instrumentation, data management and problem solving. Prerequisite: 5.

**132 Probabilistic Models (3).** Introduction to logical and probabilistic description of constant-time and variable-time engineering systems. Prerequisite: Mathematics 201 concurrently.

**195 Intermediate Strength of Materials (3).** Elements of mechanics of elastic materials. Prerequisite: 85.

## ENGLISH

**1 Composition (3).** Required. Theory and practice of composition. cor.

**1A Developmental Writing (1).** (credit toward residency only). Five-week course designed to improve syntax and diction. Open to all students, but especially useful to students in English 1. S/U grading only.

**1B Developmental Reading (1).** (credit toward residency only). Five-week course designed to develop reading comprehension skills that will enhance writing skills. Open to all students, but especially useful to students in English 1. S/U grading only.

**2 Introduction to Poetry (3).** Open to underclassmen. Designed to acquaint beginning students with necessary critical tools for understanding and analyzing poetry. This course and either 3 or 4 prerequisite for English majors. Prerequisite: 1 or placement test exemption.

**3 Introduction to Fiction (3).** Open to underclassmen. Designed to acquaint beginning students with necessary critical tools for understanding and analyzing fiction. This course or 4, and 2 prerequisite for English majors. Prerequisite: 1 or placement test exemption.

**4 Introduction to Drama (3).** Open to underclassmen. Designed to acquaint beginning students with necessary critical tools for understanding and analyzing drama. This course or 3, and 2 prerequisite for English majors. Prerequisite: 1 or placement test exemption.

**5 Masterpieces (2).** Open to underclassmen and intended primarily for students not intending to major in language or literature. Appreciation of great writings of American, English, and Continental literature.

**6 Masterpieces (2).** Open to underclassmen and intended primarily for students not intending to major in language or literature. Appreciation of great writings of American, English, and Continental literature.

**50 Creative Writing: Short Story (3).** Introduces basic material techniques including writing original stories. Prerequisites: 1 or equivalent. cor.

**60 Exposition (3).** Required. Theory and practice of expository writing. Prerequisites: 1 or placement test exemption, and sophomore standing or above. cor.

**65GH Honors Exposition (3).** Theory and practice of exposition for freshmen qualifying for Honors on placement tests. Students completing this course may not take English 60.

**70 Creative Writing: Poetry (3).** Introduces basic poetic techniques, including writing original poems. Prerequisite: 1 or equivalent. cor.

**91 Introduction to Film: The Beginnings to 1945 (3).** A survey of early classic American and European films (like Citizen Kane and Casablanca), and their basic film techniques. Students who have taken 90 may take either 91 or 92 but not both for an additional 3 hours.

**92 Introduction to Film: 1945-Present (3).** A survey of classic postwar films from Europe, Asia and the USA, and their basic film techniques. Students who have taken 90 may take either 91 or 92 but not both for an additional 3 hours.

**101 Topics (3).** Underclass topics. Subjects may vary from semester to semester. May be repeated to six hours maximum. cor.

**102 General Literature (2).** Primarily for upperclassmen not specializing in literature. Reading in American and European literature. Prerequisite: 1 or equivalent.

**103 General Literature (2).** Primarily for upperclassmen not specializing in literature. Reading in American and European literature. Prerequisite: 1 or equivalent.

**104-125 Afro-American Literature (3).** Surveys representative fiction, poetry and essays written by American black authors from emancipation to the Harlem renaissance. Open to undergraduates. Prerequisites: 1 or equivalent.

**108 Introduction to Women's Literature (3).** A study of feminist themes, love, power, work, family and other relations, in traditional and non-traditional literature written by women. Prerequisite: English 1 or equivalent.

**110 Science Fiction (3).** Introduction to history of science fiction and its literary conventions and themes. Prerequisite: 1 or equivalent.

**135 Introduction to Shakespeare (3).** Shakespeare's life and background of his age; a reading of twelve to fourteen of his major plays, histories, comedies, and tragedies, representing all phases of his development, and including Hamlet, Othello, King Lear, and Macbeth. Prerequisite: 1 or equivalent.

**161 Technical Writing (3).** Advanced composition for premedical students, science majors in arts and science, and special sections for students in various professional schools and other technical curricula. Prerequisite: 60 and junior standing. cor.

**175 American Literature (3).** Not open to freshmen. General survey of American literature; emphasizes major figures. Prerequisite: 1 or equivalent.

**177 The American Novel (3).** Representative American novels of the 19th and 20th centuries. Prerequisite: 1 or equivalent.

**179 Epic America: The Twilight of the Sioux (2).** Epic period of American life beginning in 1882, ending in 1890. Based on Neihardt's A Cycle of the West. Prerequisite: 1 or equivalent.

**185 Introduction to Folklore (3).** Introduces the study of folklore, including the methodology, approaches and genres of folklore. Prerequisite: sophomore standing. cor.

**189 Twentieth-Century Literature (3).** A survey of fiction, poetry and drama, this course introduces the student to key works of American and British literature within the intellectual and cultural context of our time. Prerequisite: 1 or equivalent.

**190 Honors Senior Essay (3).** Independent project for completion of Honors work in English.

**196 Honors Seminar: Critical Approaches to Literature (3).** Open to departmental Honors candidates only. Studies major critics from Aristotle to the present, with emphasis on the application of criticism to the study of literature. f.w.

**197 Honors Seminar: Historical Approach to Literature (3).** Introduces the historical approach to the study of literature and the development of major traditions of English literature, with readings selected from several periods. f.

**201 The Tradition of English Literature: Beginnings to 1784 (3).** Historical survey from beginnings of English literature through the age of Dr. Johnson, with readings representing significant writers, works,

and currents of thought. Strongly recommended for English majors. Prerequisite: sophomore standing. cor.

**202 The Tradition of English Literature: Romanticism to the Present (3).** Historical survey of English literature from the Romantic period to the present, emphasizing important writers and significant intellectual and cultural movements. Strongly recommended for English majors. Prerequisite: sophomore standing.

**203 Topics in Poetry (3).** Topics announced at time of registration. Prerequisite: junior standing.

**204 Topics in Fiction (3).** Topics announced at time of registration. Prerequisite: junior standing.

**206 Special Themes in Literature (3-6).** Topics announced at time of registration. Prerequisite: junior standing. May repeat to 6 hours maximum.

**208 Historical Survey of Women's Literature (3).** A study of writing by women from the Middle Ages to the present. Prerequisite: sophomore standing.

**210 Advanced Rhetoric (3).** Open to English majors in arts and science and education only.

**218 Theories of Literature (3).** A selected survey of the major statements in literary criticism from its beginning to the present. Emphasis is on the nature, function and evaluation of literature. Prerequisites: 60 or 65GH, and one literature course.

**221 Comparative Literature: Beginnings Through the Renaissance (3).** Selected masterpieces of Continental literature. Prerequisite: junior standing.

**223 Comparative Literature: Modern Continental Literature 1700-Present (3).** Selected masterpieces of European literature studied for intrinsic value and historical significance: special emphasis on major literary movements--neoclassicism, romanticism, realism, modernism, and existentialism. Prerequisite: Sophomore standing.

**301 Topics (cr. arr.)** Organized study of selected topics. Subjects and earnable credit may vary from semester to semester. May be repeated with departmental consent.

**302 The Writing of Fiction (3).** Advanced fiction writing with group discussion, individual conference.

**303 The Writing of Fiction (3).** Advanced fiction writing with group discussion, individual conference.

**304 Afro-American Literature (3).** Surveys literature written by black American authors beginning with the Harlem renaissance and continuing to the present. Major genres. No prerequisite.

**306 Theory and Practice of College Composition (3).** Current and historical theories of rhetoric and composition as applied to the teaching of college composition. Prerequisite: instructor's consent.

**308 Major Women Writers (3).** A study of from two to five significant women writers to be read intensively using contemporary feminist critical theory. Prerequisite: two courses in English or American literature numbered below 300.

**309 Topics in Linguistics (3-6).** (same as Linguistics 309). Topics announced at time of registration. May repeat to 6 hours maximum.

**310 The English Bible (3).** Studies the Old and New Testaments in the King James version, from an historical and literary perspective, to help students understand the influence of biblical genres, history and materials on English literature.

**311 Beginning Playwriting (3).** (same as Curriculum & Instruction T311). Critical analysis of modern theory and practice in the teaching of composition, language, and literature at secondary school level.

**313 The Writing of Poetry (3).** Poetry regarded as a mode of understanding. Poetic values related to other values. Practical consideration of verse techniques. Prerequisite: instructor's consent.

**314 The Writing of Poetry (3).** Poetry regarded as a mode of understanding. Poetic values related to other values. Practical consideration of verse techniques. Prerequisite: instructor's consent.

**315 Beginning Playwriting (3).** (same as Speech & Dramatic Art 315). Study and practice of playwriting fundamentals; emphasizes the one-act play.

**316 The Practice of Criticism (3).** Develops student's ability to use critical techniques through regular exercises in practical criticism and study of recent criticism of poetry and prose.

**317 History of Criticism (3).** Examines representative theories of literary criticism by the major figures from classical antiquity through the Romantic period: Plato, Aristotle, Horace, Longinus, Sidney, Dryden, Pope, Johnson, Wordsworth, Coleridge, Shelley.

**318 History of Criticism (3).** Surveys modern and contemporary theories of literary criticism: historical, archetypal, generic, formalistic, phenomenological and interdisciplinary. Emphasizes key writers in each field.

**319 The Structure of American English (3).** (same as Linguistics 319). For prospective teachers. Required of M.A. candidates in English and English majors in education. Study of current English: sounds, grammar, usage.

**320 History of the English Language (3).** (same as Linguistics 320). Development of English from its beginnings to modern times.

**322 Regional and Social Dialects of American English (3).** (same as Linguistics 322). Pronunciation, vocabulary and grammar of English as used by different social and age groups in the various regions of the United States. Prerequisite: 319 or equivalent.

**323 Principles of Teaching English as a Second Language (3).** (same as Linguistics 323). Linguistic and pedagogical principles of language teaching; study of phonology and grammar of English; contrastive linguistic analysis; review of textbooks; lesson plans. Prerequisite: 319 or equivalent.

**325 Chaucer (3).** Canterbury Tales and other works; social background of Chaucer's England; introduction to Middle English.

**326 Medieval English Literature (3).** Representative works largely in translation, from the Anglo-Saxon and Middle-English periods.

**331 Elizabethan Poetry and Prose (3).** Surveys nondramatic literature of 16th century including Ascham, Elyot, Wyatt, Surrey, Sidney, Spenser, Daniel, Drayton.

**333 Elizabethan Drama (3).** Surveys English drama from 1500 to 1642; emphasis on Marlowe, Jonson.

**335 Shakespeare (3).** A chronological study of the early works from the beginnings through Hamlet.

**336 Shakespeare (3).** A chronological study of the later works from Hamlet through the last plays.

**345 Milton (3).** Milton's life and works.

**350 Special Readings (cr. arr.)** Individual work with conferences adjusted to needs of student. Prerequisites: 300-level course in area of proposed work and written consent of instructor. Restricted to senior English majors in their final semester.

**351 Early Seventeenth-Century Poetry and Prose (3).** Survey of poetry and prose from 1600 to 1660.

**352 The Metaphysical Poets (3).** Intensive study of major 17th-century metaphysical poets: Donne, Herbert, Vaughan, Crashaw, Marvell.

**355 Literature of the Restoration and Early Eighteenth Century (3).** English literature from 1660 to 1740; Rochester, Bunyan and Dryden, the court wits, and dramatists of the restoration: Defoe, Swift, Pope, and Gay.

**356 The Later Eighteenth Century (3).** English literature from 1740 to 1790; major emphasis on works of Dr. Johnson and his circle.

**357 The Eighteenth-Century English Novel (3).** Representative novels and novelists to 1800.

**365 The Romantic Poets (3).** Representative authors and major literary tendencies.

**366 The Victorian Poets (3).** Representative authors and major literary tendencies.

**367 The Age of Victoria: Prose, Poetry and Drama (3).** Survey of Victorian literature from 1830 to 1900, with representative readings in poetry, drama, nonfictional and fictional prose. Included are Tennyson, Browning, Dickens, Carlyle, Arnold, Mill and Wilde.

**368 The Nineteenth-Century English Novel (3).** Representative novels and novelists, 1800 to 1900.

**369 Late Victorian and Edwardian Literature (3).** Representative authors and major literary tendencies from 1880 to 1914.

**375 American Romanticism (3).** American literature of early 19th century; emphasis on major figures: Emerson, Thoreau, Hawthorne, Melville, Poe, Whitman.

**377 The Nineteenth-Century American Novel (3).** Intensive study of six or seven major 19th-century American novelists. For majors in English and English education and for eligible graduate students.

**378 The Rise of Realism (3).** American literature from Civil War to 1900; emphasis on major figures: Mark Twain, Howells, James, Emily Dickinson, Henry Adams, Crane.

**385 Topics in Folklore (3).** Intensive study in a selected area of folklore: folk narrative, folk song, myth and literature, etc. May be repeated for a maximum of 6 hours. Instructor's consent required for repetition.

**389 Modern Literature (3).** A study of selected twentieth-century British and American authors within the intellectual and cultural contexts of the modern era.

**391 Chief Modern Novelists Prior to 1940 (3).** Study of nine to twelve representative American and British novelists.

**392 Chief Modern Poets Prior to 1940 (3).** Study of representative 20th-century poets in England and America.

**393 Modern Short Story 1900 to Present (3).** Directions and tendencies in 20th-century short fiction.

**394 Chief Contemporary Novelists (3).** Study of representative post-World War II American and British novelists.

**395 Chief Contemporary Poets (3).** Directions and tendencies in recent poetry.

**396 Modern Drama (3).** Survey of European and American drama from Ibsen to present.

**400 Problems (cr. arr.)** Individual work not leading to preparation of dissertation. Prerequisite: departmental approval.

**401 Bibliography and Methods of Research (3).** Principles and aims of literary scholarship and criticism; systematic study of bibliographic resources for research. Normally restricted to doctoral candidates.

**402 Advanced Writing of Fiction (3).** Advanced fiction writing designed primarily for graduate students, with the intention of producing work of professional quality. Prerequisites: instructor's consent and 302-303, except by special consent.

**403 Advanced Writing of Fiction (3).** Advanced fiction writing designed primarily for graduate students, with the intention of producing work of professional quality. Prerequisites: instructor's consent and 302-303, except by special consent.

**405 Internship in Publishing (3).** Students enrolled in one of two programs: assistant editors for Missouri Review, interns at University of Missouri Press. One year involvement, 3 hours credit per semester, second semester applicable to English degree requirements. Prerequisite: instructor's consent.

**407 Studies in Rhetorical Theory (3).** Studies in rhetorical theory of selected historical periods. May be repeated to a maximum of 9 hours.

**411 Studies in English Education (3).** (same as Curriculum & Instruction T411). Resources and strategies for teaching English in secondary schools. May be repeated to a maximum of 9 hours credit by graduate students in education.

**413 Advanced Writing of Poetry (3).** Advanced poetry writing designed for graduate students, with the intention of producing work of professional quality. Prerequisites: instructor's consent and 313-314, except by special consent.

**414 Advanced Writing of Poetry (3).** Advanced poetry writing

designed for graduate students, with the intention of producing work of professional quality. Prerequisites: instructor's consent and 313-314, except by special consent.

**416 Critical Approaches to Literature (3).** Survey of the major critical methods: formalistic, generic, archetypal, historical, interdisciplinary. Emphasis on focus and limitation of each approach. Reading in theory and illustrative models.

**417 Studies in the English Language (3).** (same as Linguistics 417). Descriptive and historical studies, ranging from the Germanic origins to modern syntactic analysis.

**418 Introduction to Old English (3).** (same as Linguistics 418, Germanic and Slavic Studies 418). Beginning study of Anglo-Saxon.

**420 Beowulf (3).** Close reading of the Old English poem. Prerequisite: 418 or equivalent.

**424 Medieval Drama (3).** Surveys English drama from ca. 1300 to ca. 1500; emphasis on craft cycles, morality plays.

**425 Studies in Chaucer (3).** Problems of modern scholarship, criticism. Prerequisite: 325 or equivalent.

**426 Studies in Medieval English Literature (3).** Representative works, such as *The Pearl* and *Sir Gawain and The Green Knight*, in the original language.

**430 Spenser (3).** *The Faerie Queen* and selected minor works.

**431 Studies in Tudor Literature (1-4).** Study of limited number of major Tudor authors, considered in relation to particular literary tradition. May be repeated to a maximum of 6 hours. Prerequisite: restricted to graduate students.

**433 Studies in Tudor and Stuart Drama (3).** Intensive study of one or two playwrights other than Shakespeare.

**435 Studies in Shakespeare (3).** Study of selected histories and comedies in light of current scholarship.

**436 Studies in Shakespeare (3).** Study of selected tragedies in light of current scholarship.

**445 Milton (3).** Intensive study of Milton's poetry and prose; particular emphasis on modern scholarship.

**451 Studies in Early Seventeenth-Century Poetry and Prose (3-6).** English literature from 1600-1660. Bacon, Burton, Browne, metaphysical and Cavalier poets, prose writers of the Puritan Commonwealth. May be repeated once.

**456 Studies in Literature of the Later Eighteenth Century (3).** Intensive study of major writers 1740-1800, normally excluding the novelists. Selected readings in Johnson, Boswell, Goldsmith, Reynolds, Burke, Gibbon, and their contemporaries.

**457 Studies in Restoration and Eighteenth-Century Fiction (3).** Intensive study of limited number of Restoration and 18th-century novelists.

**464 The Earlier Romantics (3).** Selected studies in the earlier generation of romantics: Blake, Wordsworth, Coleridge.

**465 The Later Romantics (3).** Selected studies in Byron, Shelley, Keats, and their circle.

**466 Studies in Victorian Poetry (3).** Intensive study of limited number of Victorian poets.

**467 Studies in Victorian Literature (3).** Selected writers of the period.

**468 Studies in Nineteenth-Century Fiction (3).** Intensive study of limited number of Victorian prose writers.

**471 Studies in American Literature (3-12).** Selected American writers of 19th century.

**473 Colonial American Literature (3).** American literature to 1800; emphasis on religious and political thought and expression.

**478 American Literature 1865-1914 (3).** Intensive study of major American writers of the period. Prerequisite: one upper-class course in American literature before 1900.

**490 Research (cr. arr.)** Leads to preparation of dissertation.

**491 Studies in Modern Literature (3).** Intensive study in one or more major modern writers.

**492 Studies in Modern Criticism (3).** Principles and practices of selected modern critics. w.

**493 Studies in Contemporary Literature (3).** Intensive study of one or more major contemporary writers.

**495 Studies in Modern Drama (3).** Detailed consideration of principal British and/or American playwrights of the 20th century. Focus placed on several several playwrights and their significance in the development of the modern drama.

**499 Seminars for Doctoral Candidates (3).** Prerequisites: undergraduate or graduate work in the field; instructor's consent. Offered as needed. A. Seminar in the English Language (3). B. Seminar in Medieval Literature (3). C. Seminar in Renaissance Literature (3). D. Seminar in 17th-Century Literature (3). E. Seminar in 18th-Century Literature (3). F. Seminar in Romantic Literature (3). G. Seminar in Victorian Literature (3). H. Seminar in American Literature (3). I. Seminar in 20th-Century Literature (3).

## ENTOMOLOGY

**101 Insects in the Environment (3).** Introduces the study of insects, with emphasis on species important to man and general principles of integrated insect control. Designed for all students interested in a study of insects affecting man's environment. f. cor.

**125 BEEKEEPING (3).** Introduction to the biology and management of honeybees. w.

**181 Pesticide Chemicals (3).** (same as Agriculture 181, Pest Management 181). Properties of insecticides, fungicides, herbicides, nematocides, rodenticides, and other chemicals used for pest control. For students in agriculture. Prerequisite: Biochemistry 110 or a course in organic chemistry. w.

**201 Topics in Entomology (cr. arr.)** Instruction in select subject matter areas in the field of entomology.

**204 General Entomology (3).** (same as Biological Sciences 204). Biology, classification evolution, ecology of insects. For upper-class students in agriculture, biological sciences, education, fisheries and wildlife. Prerequisite: 10 hours biological sciences. No credit for students receiving credit for 101. w.

**210 Forest Entomology (3).** (same as Forestry, Fisheries and Wildlife 210). Primarily for forestry students, open to others by arrangement. Life histories, habits, injuries, methods of controlling the more important insect pests of forests and forest products. w.

**300 Problems (cr. arr.)** By arrangement, students may take special problems in different entomology fields as preparation for research. Prerequisite: 10 hours entomology and biological sciences.

**301 Topics in Entomology (cr. arr.)** Instruction in select subject matter areas in the field of entomology. Prerequisites: 101, 204, or 210.

**302 Comparative Morphology of Insects (4).** Comparative study of external and internal structures and systems of insects, with emphasis on their functional forms. Prerequisite: 101 or 204. f.

**304 Systematic Entomology (3).** (same as Biological Sciences 304). General introduction to taxonomy of insects; emphasizes classification of orders and major families. Insect collection required. Prerequisite: 101 or 204 or 10 hours biological sciences. f.

**306 Aquatic Entomology (3).** Identification, life histories, ecology of aquatic arthropods; emphasizes fresh water insects. For students of wildlife, fisheries management, aquatic biology, advanced entomology. Prerequisites: 101 or 204 and Biological Sciences 11 and 304 or equivalent. alt. w.

**312 Bionomics of Insect Pests (3).** (2 hrs. lecture, 2 hrs. lab). A study of insect pests attacking plants grown for food, fiber, and ornamental purposes; their identification, bionomics, importance and control. Prerequisite: 101 or 204 or 210. w.

**315 Medical and Veterinary Entomology (3).** Insects, related pests of man, animals. Special attention to those transmitting diseases. For advanced students in entomology, medicine, sanitary engineering. Prerequisites: 101 or 204 and 304 or instructor's consent. alt. f. even yrs.

**316 Principles of Insect Physiology (4).** (same as Biological Sciences 316). (3 hrs. lecture, 2 hrs. lab) Major concepts of insects physiology emphasizing: functions of organ-systems; sensory physiology; hormones in development; nutrition. Prerequisites: 201 and 302 or equivalent. w.

**319 Insect Ecology (3).** General insect ecology. Zoogeography, physical factors, migration and dispersal, and population dynamics of insects. Prerequisite: 101 or 204 & 304. f. or w.

**321 Entomological Literature and History of Entomology (2).** Surveys entomological literature from early to modern times. History of development of the science; emphasizes prominent entomologists, their contributions. For advanced entomology students. Prerequisite: 10 hours entomology. alt. f. odd yrs.

**322 Biological Control of Insects (3).** Presents principles of biological control of insects, emphasizing parasites, predators, diseases of insects, characteristics of natural insect populations. Prerequisites: 319 and 304 or instructor's consent. f. or w.

**350 Special Readings (cr. arr.)** Publications in a chosen field will be studied to acquaint students with technical literature.

**361 Insects in Relation to Plant Diseases (3).** (same as Plant Pathology 361).

**370 Advances in Insect Pest Management (3).** (same as Pest Management 370). Presents current concepts, techniques, and applications for developing and implementing pest management systems. Prerequisites: 312, Pest Management 180, Biological Sciences 362 or equivalent. alt. w. even yrs.

**400 Problems (cr. arr.)** Advanced individual studies; includes minor research problem.

**401 Topics in Entomology (cr. arr.)** Instruction in specific subject matter areas in the field of entomology. Prerequisites: graduate standing & instructor's consent.

**405 Taxonomy of Immature Insects (3).** Introduces identification of orders, families, genera, species of insects in immature stages. Surveys pertinent literature. Prerequisite: 304 or equivalent. f.

**410 Seminar (cr. arr.)** Reviews of current literature, reports on original investigations. Prerequisite: 10 hours entomology. f.w.

**414 Research Techniques in Entomology (3).** Advanced course for students intending to enter economic entomology. Prerequisite: 10 hours entomology. w.

**418 Acarology--Mites and Ticks (3).** Taxonomy, phylogeny, biology, ecology of mites and ticks. Prerequisite: 101 or 204 & 304 and 3 hours biological systematics. alt. w. even yrs.

**420 Insect Toxicology (3).** Mode of action, metabolism, and relation of chemical structure to toxicity of insecticides. Recent developments in insecticides, attractants, repellents, and chemosterilants. Prerequisite: 10 hours entomology or instructor's consent. f.

**422 Advanced Systematic Entomology (3).** Theories, concepts of higher systematics. Taxonomy of insects; revisionary problems at the generic level. Prerequisite: 302 & 304 & 321 or 6 hours systematics in biological science exclusive of 304. w.

**450 Research (cr. arr.)** Original investigation not leading to preparation of dissertation.

**490 Research (cr. arr.)** Reading knowledge of French, German, desirable. Original research in economic entomology, biological control of insects, insect taxonomy, insect toxicology, morphology, physiology, ecology, acarology, beekeeping. Prerequisite: 20 hours entomology.

# EXTENSION EDUCATION

**150 Problems (cr. arr.)** For advanced undergraduates majoring in agricultural journalism.

**160 Seminar (1-2).** Designed for nontraditional students not on campus. Opportunity for faculty-student interaction; presents current information concerning production/management/marketing aspects of agriculture/agribusiness. May be repeated three times.

**210 Fundamentals of Communications (3).** Mass communications media and visual teaching aids available to workers serving agriculture. Prerequisite: junior standing. f, w.

**220 Extension Education as Applied in Cooperative Extension Service (2-3).** Provides an overview of extension education and cooperative extension. Prerequisite: Rural Sociology 1 or equivalent. w.

**300 Problems (1-4).** Opportunity to apply journalism skills to agricultural or extension subject matter; opportunity to get integrated picture of communications process within single medium or across media. Prerequisites: 150, junior standing, and/or instructor's consent. f, w, s.

**306 Extension Communication Principles & Their Application (3).** Extension communication principles underlying successful work with people in educational settings.

**320 Agricultural Media (3).** Provides background, knowledge of trends and experience with agricultural media. Prerequisites: 6 hours journalism, including News 105; 12 hours agriculture; junior standing; and/or consent of instructor.

**400 Problems (cr. arr.)** Independent investigations of extension problems. cor.

**403 Program Development and Evaluation (3).** Program development principles, teaching plans, evaluation principles applied to extension program development. Prerequisite: instructor's consent. w. cor.

**405 Extension Organization and Administration (3).** Principles of administration and organization; their application to extension work. Prerequisite: instructor's consent. f.

**406 Fundamentals of Extension Teaching of Adults (3).** Recommended for students who have work experience in extension or another informal adult education agency in the United States. Prerequisite: instructor's consent. cor.

**408 Preparing Manuscripts for Scientific Journals (1).** Introduces students to methods of planning, selecting, preparing, presenting, and submitting articles for publication in scientific journals. Prerequisite: instructor's consent.

**410 Seminar (cr. arr.)** Presentation, discussion of extension studies, literature. f, w.

**411 Topics in Extension Education (cr. arr.)** Current and new developments in extension education. Prerequisite: departmental consent.

**450 Research (cr. arr.)** Independent investigations not leading to thesis, but terminating in research report.

# FAMILY AND COMMUNITY MEDICINE

**A Community Health Preceptorship (5).** Five-week assignment to a family physician in private practice.

**P Postgraduate Instruction (0).** Residency programs in general practice and preventive medicine are offered to qualified physicians.

**25 Community Health (2).** Overview of current personal, school and community health problems and issues. Emphasizes concepts of health and informed decision making. f, w. cor.

**300 Problems (1-3).** Directed exploration of community health problems. Prerequisite: instructor's consent.

**305 Introduction to Community Health Education (3).** Primary concepts, principles and methods of community health education and educational strategies applicable to public health and health care problems. Prerequisite: senior standing.

**315 Group Process in Community Health (2).** Concepts, principles, methods and application of group processes to the health field. Prerequisite: instructor's consent.

**317 Planning for Change in Community Health (3).** Individual, small group, organization, and community systems and change strategies; resistances to change and evaluation of change activities in these systems. Prerequisites: senior standing and instructor's consent.

**330 Statistical Aspects of Public Health (3).** Classification and summarization of data used in public health practice and research. Probability, sampling, hypothesis testing. Correct and incorrect use of statistics in the literature. Prerequisite: concurrent registration in 420 or instructor's consent. f.

**350 Special Readings (1-3).** Extensive reading and critical analysis of classical and current studies in selected areas of community health. Prerequisite: instructor's consent.

**400 Problems (1-3).** Intensive study of an area of community health. Prerequisites: graduate standing & instructor's consent.

**410 Principles of Community Health Education (3).** Various social, economic, psychological and cultural variables that motivate people toward health practices. Prerequisite: f. graduate standing; w. senior standing and instructor's consent.

**411 Methods in Community Health Education (3).** Study and practice in applying principles of administration, supervision, consultation, communication, and the change process in the professional practice of a health education specialist. Prerequisite: 410.

**412 Planning for Change I (2).** Small group, organizational, and community systems and strategies for initiating change activities within these systems. Emphasizes health systems. Prerequisites: graduate standing and instructor's consent.

**415 Health Aspects of the Environment (3).** Covers the environmental crisis (air pollution, water pollution), radiation, effects of pollutants, environmental sanitation, the occupational environment and effects of selected trace elements. Prerequisites: 330 & 420, or equivalent, or instructor's consent.

**420 Principles of Epidemiology (3).** Examines methods of study of disease frequency and distribution in populations. Utilizes small group discussions for understanding of current medical literature. Prerequisite: concurrent registration in 330 or equivalent, or instructor's consent. f.

**421 Advanced Epidemiology (3).** (same as Veterinary Microbiology 421). Advanced epidemiologic theory and methods in the study and control of infectious and noninfectious diseases. Prerequisite: 420 or instructor's consent.

**422 Research and Evaluation in Community Health Education (3).** Principles of designing community health research; techniques of community health education program evaluation. w.

**431 Statistical Epidemiology (3).** The application of statistics to epidemiology, including measures of disease incidence, association of epidemiologic variables with diseases, models for studying infectious and noninfectious diseases, and design of clinical trials. Prerequisites: 330 & 420, or instructor's consent.

**440 Public Health Administration (3).** Local public and community health administration and functions. Influences of state and federal program authorities and financing. Includes community assessment, program priorities, staffing and budgeting for a local health program. Prerequisites: 330 & 420, or instructor's consent. w.

**443 Public Health Social Work (2).** Role and functions performed by social workers in public health; methods used; the implications of public health concepts and structure for social work practice. Prerequisites: 330 & 420, or instructor's consent. w.

**450 Research (cr. arr.)** Original research in community health not leading to a thesis but requiring a formal research report.

**490 Research (cr. arr.)** Independent investigation of some problem in community health to be presented as a thesis.

**491 Field Experience in Community Health (cr. arr.)** Supervised field experience in approved agencies practicing health and preventive medicine. Opportunity for observation and service participation in various fields of public health. f, w, s.

**492 Field Experience in Community Health Education (cr. arr.)** Field practice in a selected community setting under faculty or other competent supervision. Restricted to students specializing in community health education. Prerequisite: consent of community health education faculty.

# FAMILY ECONOMICS AND MANAGEMENT

**72 Management in Family Living (2).** Principles of management of resources for effective personal and group living. Prerequisite: freshmen & sophomores only, or instructor's consent.

**73 Introduction to Rehabilitation (1).** Reading, discussion and field trips to provide an overview of the field of home economics rehabilitation. S/U grading system only.

**170 Work Simplification in Home Processes (2).** Limited to rehabilitation majors and handicapped students. Problems in simplifying work to conserve time and energy in home processes. Prerequisites: 72, 174, 370.

**171 Working With the Visually Limited (1).** Laboratory experiences designed to aid sighted students in techniques of teaching blind and visually limited adults in independent living activities. Limited to rehabilitation majors. Prerequisites: 73 and 174; Human Nutrition, Foods & Food Systems Management 121.

**172 Home Management Laboratory (2).** Laboratory experience with emphasis on application of the home management process, use of time and energy. Prerequisites: 72, 174, & Human Nutrition, Foods & Food Systems Management 21 or 121.

**173 Personal and Family Finance (3).** Individual and family finance, with particular emphasis on financial planning, savings, insurance, investments, taxes and use of credit. Prerequisite: junior standing.

**174 Selection of Home Equipment (3).** Fundamental principles of selection and operation of home equipment.

**175 The Consumer in Our Society (3).** The economic system and the marketplace from the consumer point of view; consumer problems, protection, representation. Prerequisites: sophomore or above standing and 3-5 hours economics.

**176 Personal Applications for Microcomputers (1).** (same as Housing and Interior Design 146). Introduction to the potential and limitations of personal computers through demonstrations and lectures. Household and graphic applications will be presented. Consideration will be given to family and societal implications. f, w, s.

**178 Community Agencies (1).** Study and evaluation of social, financial and consumer agencies that impact on the family and/or consumer.

**300 Problems (cr. arr.)** Supervised and independent work. Prerequisites: a 100- or 200-level course in field of problem & senior standing & instructor's consent.

**318 Topics (cr. arr.)** Selected current topics in field of interest.

**350 Readings (cr. arr.)** Prerequisite: 2-3 hours in subject.

**370 Housing the Family (3).** Planning housing for families with emphasis on family composition, interests, activities, socioeconomic status. Consideration of environment, plans and space requirements which promote efficient utilization of family resources for attainment of maximum satisfactions. Prerequisite: junior standing.

**372 Family Values and Resource Management (2).** Consideration of differing value systems of families, impact of values on family resource allocation, and resulting life styles. Effects of mass media and current social movements on values. Prerequisites: junior standing & 72; 173 recommended.

**373 Financial Problems of the Individual and Family (3).** Individual, family problems involving finances. Analysis of financial planning, saving and investment media, credit, taxes, insurance. (No credit for students who have completed 173.) Prerequisite: graduate standing.

**374 Use and Care of Home Equipment (3).** Experience in use and care of appliances for food preparation, laundering, cleaning. Prerequisites: 174 & a foods course. Recommended: a textiles course.

**375 The Consumer and the Market (3).** Economic systems and role of consumers; marketing practices; consumer behavior, problems, legislation. (No credit for students who have completed 175.) Prerequisites: graduate standing, introductory economics.

**376 Management of Financial Resources (3).** Analysis of elements and principles of family finance, with application to case problems, impact of general economic conditions on families; principles and processes of financial counseling. Prerequisites: 173 or 373 & an introductory economics course.

**377 Economics and the Consumer (3).** Consumption as an economic activity; theory of consumer choice; consumer implications of various market structures; economic policies affecting consumer interests. Prerequisite: 175 or 375.

**378 Effective Consumer Decision-Making (3).** Theory, concepts, principles underlying consumer decision-making, including rationality, uncertainty, optimal search, heuristics, interactive decisions; strategies for their application in the marketplace. Prerequisites: 175, Economics 51.

**390 Field Training (cr. arr.)** Prerequisites: junior standing & instructor's consent.

**400 Problems (cr. arr.)** Prerequisites: 300-level course in field of problem & instructor's consent.

**410 Seminar (1-4).** Reports and discussion of recent work in area of concentration.

**412 Research Methods in Family Economics (3).** Introduction to the scope, purpose and methods of research in family economics, with emphasis on economic survey methods. Prerequisite: graduate standing, an introductory course in statistics (Sociology 375 or Statistics 207).

**415 Readings (cr. arr.)** Readings (cr. arr.).

**419 Field Training (cr. arr.)** Internships and/or field experiences under supervision. Prerequisites: graduate standing & instructor's consent.

**450 Research (cr. arr.)** Independent research not leading to a thesis. Report required.

**473 Family in the Economy (3).** Analyzes the family as an economic unit. Standards, levels of living. Examines determinants, significance of family income and wealth. Policies and programs affecting family income. Prerequisites: graduate standing; 376 & 377; introductory economics.

**475 Human Resource Development and Allocation (3).** Economic analysis of conditions, programs and policies related to development and use of human resources, with special reference to impact on families and households. Prerequisites: introductory economics; 473 or instructor's consent.

**476 Social Policy and the Family Economy (3).** Economic analysis of public programs that directly affect well-being of families: income maintenance, goods transfers, employment, housing, health, transportation, taxes, etc.; consideration of underlying philosophies, policy alternatives. Prerequisite: 377 or instructor's consent.

**490 Research (cr. arr.)** Independent research leading to thesis or dissertation.

# FINANCE

**123 Principles of Finance (3).** Financing business, consumer, and government activity; stocks, bonds, real estate, and financial markets; risk; insurance; inflation; cash and income management; capital accumulation and appreciation. Students already admitted to B&PA cannot enroll. cor.

**203 Corporation Finance (3).** Methods, policy, institutions involved in financing the business corporation; financial analysis of corporations. Prerequisites: junior standing & Economics 41 or Economics 51 & 6 hours accounting Statistics 150.

**218 Risk and Insurance (3).** Understanding nature of risk and its business and personal effects on people. Management of losses, emphasizing nature of insurance. Future of insurance in risk handling and as financial institutions. Prerequisite: sophomore standing.

**300 Problems (cr. arr.)** Independent study, reports on selected topics.

**305 Topics in Finance (3).** Selected topics in finance, insurance or real estate. Offered on an experimental basis.

**313 Personal Insurance (3).** Principles of handling risk of income loss or extra expense from death, disability, or retirement with analysis of private individual arrangements available with commercial insurance organizations. Prerequisite: 218.

**317 Social Insurance (3).** (same as Economics 317).

**318 Property and Liability Insurance (3).** Principles of handling risk of property and liability losses from causes other than government or market forces with study of appropriate use of commercial insurance organizations. Prerequisite: 218.

**323 Financial Management (3).** Development, application of principles of business finance. Analysis of case materials illustrating problems encountered by firms of various sizes, operating characteristics. Prerequisite: 203.

**326 Financial Management Policy (3).** Application and synthesis of the concepts and tools of finance to realistic financial management problems in the areas of working capital management, capital budgeting analysis, and capital structure decisions. Prerequisite: 323.

**333 Investments (3).** The investment area, media, institutional aids, formulation of broad personal investment programs. Prerequisite: 203. cor.

**335 Securities Markets (3).** Primary and secondary securities markets; regulations relative to issue and trading of instruments; problems of investment bankers, security dealers, brokers, and exchanges in performing their functions. Prerequisite: 333 or instructor's consent.

**340 Principles of Real Estate (3).** Principal factors influencing land use, practices in real estate business. Prerequisite: Management 254 or senior standing.

**341 Real Estate Appraisal (3).** Procedures for valuing industrial, commercial, residential realty by market, income, replacement cost approaches. Case method, field investigations. Prerequisite: 340.

**342 Real Estate Finance and Investment (3).** Financing of residential, commercial, and industrial real estate and real estate development. Instruments, institutions, and markets; role of government agencies; investment qualities of real estate. Prerequisite: 340.

**343 Financial Intermediaries and Markets (3).** Functions of intermediaries in the aggregation and allocation of funds, creation and transfer of assets, and distribution of risks. Regulation of financial institutions; financial institutions as instruments of public policy. Prerequisites: 203 and Economics 229.

**353 Security Analysis (3).** Classifies and analyzes securities, markets, industries. Formulation of investment policy for institutions, aggressive personal investors. Prerequisite: 333 and Accountancy 236 or Accountancy 305.

**355 Portfolio Management (3).** Development and application of the principles of modern portfolio theory to financial assets. Analysis of the concepts of diversification, portfolio construction, portfolio revision, and use of types of financial assets in effective portfolio management. Prerequisite: 333.

**363 Management of Financial Institutions (3).** Operating principles of major financial intermediaries, including commercial banking, savings, insuring, lending and investing institutions. Analysis of cases; study of current problems. Prerequisite: 343.

**400 Problems (1-3).** For independent investigation and analysis, graduate students select topics suggested by the foregoing undergraduate courses.

**403 Seminar in Business Finance (3).** Readings, investigations, reports relating to current issues in private finance.

**405 Topics in Finance (3).** Selected topics in finance, insurance or real estate. Offered on experimental basis. Prerequisite: instructor's consent.

**423 Advanced Financial Management (3).** Organization, goals, tools of financial management. Examination of adjustment of financial policies of business to changing conditions. Prerequisite: Business Administration 344, or equivalent.

**424 Working Capital Management (3).** Financial planning and short-term financial management; integration of quantitative techniques, microeconomics, and financial decisions; analysis of decisions about profit planning, financial forecasting, accounts receivable, cash management, and financial short-term assets. Prerequisite: 423.

**425 Capital Budgeting (3).** Intensive examination of capital budgeting procedure; discounted cash flow approaches, buy or lease decisions, choice of rate of discount, cost of capital computations. Study of risk attitudes, utility measurement, diversification, pooling of risks. Prerequisite: 423 or equivalent.

**428 Seminar in Risk Management (3).** Application, evaluation of quantitative tools of analysis utilized in the risk management decision process. Emphasis on optimal control of pure risk in corporate enterprise. Selected cases and readings.

**429 Management of Insurance Enterprises (3).** Functional analysis of operations and problems of stock and mutual organizations in life, property and liability insurance industry. Emphasizes legal organization, administration, regulation, financial management of insurers. Prerequisite: instructor's consent.

**433 Security Markets and Investments (3).** Valuation of corporate securities for portfolios of individual investors: risk-return relationship of financial assets; techniques determining merits of specific companies and their securities for long-term investment decisions. Prerequisite: Business Administration 344 or equivalent.

**435 Seminar in Investment Analysis (3).** Develops integrated theory and analytic techniques for evaluating investment potential of financial instruments. Emphasizes corporate securities. Selected cases and readings.

**453 Investment Policy and Portfolio Management (3).** Intensive study of investment policies and procedures with emphasis on construction and management of portfolios of institutional investors. Application of programming techniques to selection and administration of securities.

**461 Financial Markets and Institutions (3).** Role and functions of financial intermediaries in accumulation and allocation of funds and distribution of risk; structure of financial markets and the financial

system. Prerequisites: Business Administration 344 and Economics 332.

**463 Commercial Bank Administration (3).** Study and analysis of policies, goals, practices, and techniques of commercial bank administration. Prerequisite: 461.

**490 Research (cr. arr.)** Thesis research for Ph.D. degree.

## FOOD SCIENCE AND NUTRITION

**20 Livestock and Meat Science (5).** (same as Animal Science 20). f.w.

**30 Food Science and Nutrition (5).** Basic concepts of processing, preservation, utilization, distribution, nutritive aspects of food for man. f.w.

**35 Livestock and Meat Science (5).** (same as Animal Science 35). f.w.

**40 Fundamentals of the Food Service and Lodging Industry (3).** A basic course in food service and lodging operations. Development of the industry, current trends, and an analysis of the various types of operations that make up the industry.

**75 Attributes of Food Quality (3).** Current and controversial issues relevant to food quality. Experiences in evaluation of quality of a variety of foods. Principles and characteristics of food quality as applied in production, processing, distribution and selection for consumption.

**121 Principles of Food Preparation (5).** (same as Human Nutrition, Foods & Food Systems Management 121).

**122 Food Buying and Meal Management (2-3).**

**131 Basic Concepts of World Nutrition (3).**

**135 Production Technology for Food Services (5).** Identifies and evaluates food production technologies required for all market forms of food products procured for the food service operation. Prerequisites: 30 & Chemistry 1 or Chemistry 11 or equivalent.

**145 Food and Beverage Management (3).** Practices used by food service and lodging industry pertaining to purchasing, receiving and issuing of food and beverage. Principles of food and beverage cost control, management methods in goal setting, forecasting and controlling the operation. f.w. cor.

**150 Food Service and Lodging Industry Operational Maintenance (3).** Basic course in food service and lodging maintenance and operating principles that emphasize maintenance, utilization, rehabilitation, equipment layout and cost considerations. Prerequisite: Mathematics 10. f.

**200 Problems (cr. arr.)** Supervised study in a specialized phase of food science and nutrition. cor.

**204 Advanced Meats (3).** (same as Animal Science 204). Carcass yields, cut out values, fabrication, boning, cutting, prepackaging, pricing. Wholesale, retail, institutional distribution. Includes field trip. Prerequisite: 20. w.

**214 Meat Classification, Grading, Judging (2).** (same as Animal Science 214). Factors affecting quality: classification, grading, judging of beef, pork, lamb. Field trip. Prerequisite: 20. f.

**224 Meat Selection and Identification (3).** (same as Human Nutrition, Foods & Food Systems Management 224). Meat with reference to selection, identification, utilization, wholesale/retail buying. Includes field trip. Prerequisite: Human Nutrition, Foods & Food Systems Management 121 or instructor's consent. f.

**228 Principles of Food Systems Management (3-4).** (same as Human Nutrition, Foods & Food Systems Management 228).

**240 Operational Management in Food Service (3).** Applies functions and tools of business management to the specialized operation of commercial food service establishments. Prerequisite: 121, and/or instructor's consent. f.

**250 Physical Principles for Food Processing (3).** (same as Agricultural Engineering 250).

**255 Management and Training of Food Service Personnel (3).** Recruitment, training, management of personnel required for operation of commercial food service establishments at all employment levels. Prerequisite: introductory course in psychology, sociology, food service management, and/or instructor's consent. w.

**275 Food, Lodging and Travel Services Marketing (3).** Marketing of hospitality services: human factors, consumer demand, planning, professional considerations. Promotional methods: advertising, direct mail, outside/"in-house" selling, merchandising, pricing, public relations, sales promotion. Prerequisite: Marketing 204, Agricultural Economics 220, or equivalent.

**300 Problems (cr. arr.)** Advanced problems in a selected field of food science and nutrition.

**301 Topics in Food Science and Nutrition (cr. arr.)** Instruction in specific subject matter areas in the field of food science and nutrition.

**304 Meat Technology (5).** Characteristics of meat, meat products related to processing operation, manufacture, marketing. Includes field trip to meat research laboratory. Prerequisites: Biochemistry 193 & Biochemistry 195 or equivalent. w.

**305 Food Analysis (3).** The quantitative determination of the constituents of food. Prerequisites: analytical chemistry & biochemistry. f.

**307 Egg Technology (3).** (same as Poultry Science 307). Science (bacteriology & biochemistry) of processing, preservation, quality control, utilization of shell, liquid, frozen, and dried egg products, including spray-drying. Prerequisite: one course each in biochemistry and microbiology. w.

**309 Food Chemistry I (5).** Structure, composition and chemical properties of food. Prerequisite: 12 hours chemistry, including biochemistry. f.

**327 Operations Analysis in Food Systems (2-4).** (same as Human Nutrition Foods & Foods Systems Management 327).

**330 Food Processing (5).** Applies science and technology to food processing. Prerequisites: 250 & one course each in biochemistry and microbiology.

**335 Dairy Technology I (3).** Fundamental physical, chemical and biological properties of milk; nutritive value of constituents; selecting, grading, testing, pricing and assembling milk; unit operations common to fluid milk processing.

**336 Dairy Technology II (3).** Applies chemical, microbiological, and physical principles in the manufacture of milk products and their analogs. Processing and characteristics of frozen desserts, cultured products, concentrated dry products, butter and margarine. Prerequisite: 335. f. odd yrs.

**340 Case Studies and Research in Food Service Management (3).** Applies business, economic, and social science principles to problem situations found in food service and lodging management. Prerequisite: 240, 255, or instructor's consent. w.

**345 Advanced Food Production Technology for Food Services (3).** Lecture course with project in food service laboratory; utilization of renewable and nonrenewable resources within food service operations; principles of effective food production technology emphasized. Prerequisite: 135, 240, or instructor's consent.

**360 Food Quality and Sanitation (3).** Interprets regulations concerned with protection of the nation's food supply. Applies protection and sanitary practices to insure consumers of wholesome and healthful foods. Prerequisite: general microbiology. w.

**372 Food Microbiology (3).** Study of bacteria, yeast and molds. Includes dominant flora, public health significance, characterization of organisms, examination of foods representative of major food groups, spoilage, preservation, food fermentations and physiological groups. Prerequisites: bacteriology & organic chemistry. w.

**373 Food Microbiology Laboratory (2).** Examination of foods for microorganisms and characterization of major species. Prerequisite: 372 or concurrently. w.

**374 The Bacterial Spore (2).** Sporulation, dormancy, activation, germination, synthesis of macromolecules, nucleic acid changes, chemical composition and resistance of spores. Significance of spore in food spoilage emphasized. Prerequisites: advanced microbiology and/or food microbiology & courses in biochemistry.

**375 Sensory Analysis of Food (3).** (same as Human Nutrition, Foods & Food Systems Management 375). Principles, theory, methodology of sensory analysis. Recommended: a statistics course.

**376 Microwave Heating of Food (2).** (same as Human Nutrition, Foods & Food Systems Management 376). Principles of microwave heating and experience in application of microwave heating to both model systems and food. Prerequisites: 30 or 121, & 250 and/or instructor's consent; upper-class or graduate standing. f.

**390 Internship in Food Science and Nutrition (1-6).** Combines study, observation and employment in an area of food science and nutrition. Written reports, faculty evaluation. Prerequisites: 90 hours including three courses in department and instructor's consent.

**400 Problems (cr. arr.)** Individual studies include a minor research problems.

**401 Topics in Food Science and Nutrition (cr. arr.)** Specialized topics in the area of food science and nutrition. Prerequisites: instructor's consent & graduate standing.

**404 Meat Investigations (3).** Discussion of literature, special reports, assigned readings, techniques, interpretation of results. Prerequisites: 304 & 309.

**405 Advanced Microbiology of Foods (4).** Principles of microbial physiology, taxonomy, analytical methods applied to study of microorganisms added to foods and those causing food spoilage or food-borne illness. Roles of microorganisms in manufacture/distribution of foods. Prerequisite: 372. f.

**409 Food Chemistry II (4).** Study of chemical content of food, emphasizing aspects that exist uniquely in food. Prerequisite: 309. w.

**410 Seminar (1).** Provides students with opportunities for development in depth of advanced aspects of food science through reviews of research in progress and of current scientific publications. f.w.

**417 Food and Industrial Fermentation (3).** Microbiological, physical and chemical aspects of the utilization of microbial cultures in controlled fermentations of foods and food constituents. Prerequisites: 6 hours microbiology & 5 hours organic chemistry or biological chemistry. alt. w. odd yrs.

**450 Research (cr. arr.)** Original investigations, usually in connection with one of the research projects of Agricultural Experiment Station. Written report required.

**470 Advanced Studies in the Science & Technology of Food Preservation (4).** Thermal processing of canned foods, fermentation, radiation and freeze-dehydration, food additives. Current literature, lectures, lab discussion. Prerequisite: 309, 330, 372 or instructor's consent. alt. w. even yrs.

**490 Research (cr. arr.)** Original investigation of advanced nature, leading to dissertation.

## FORESTRY, FISHERIES, AND WILDLIFE

**1 Forestry Orientation (1).** Orientation to the professional opportunities and issues in forestry and to the School of Forestry, Fisheries & Wildlife at UMC. No credit for majors with more than 30 hours or for

- juniors or seniors from any field. Graded S/U, f, w.  
**CAMP Forestry Summer Camp (0).**
- 60 Ecology of Wildlife and Man (3).** Ecology and management of wild animal populations as related to current environmental issues. No credit for fisheries and wildlife majors. w.
- 70 Ecology and Renewable Resource Management (3).** Introduction to ecological principles and their relationship to resource use and management. Introduces fisheries and wildlife management as a profession. Fisheries and wildlife majors only. f.
- 110 Small Woodlands Forestry (3).** Not open to majors in forestry. Management techniques to accomplish landowner objectives. Factors influencing tree growth, cutting practices, marketing products. Individual tree care. Woodlots as investments and sources of enjoyment. f.
- 120 Colloquium in Fisheries and Wildlife (1).** Case studies in the biology and management of fish and wildlife and their environments. Graded S/U. For F & W majors only. f.
- 140 Basic Forest Measurements (1).** Field studies of measurement of trees, logs and wood products. Elementary growth analysis. Prerequisite: a course in statistics or instructor's consent. s.
- 141 Forest Ecology and Silviculture (2).** Field studies of forest soils, vegetation, sites and types. Practice and application of intermediate and regeneration cutting methods to various types of stands. Prerequisite: 151. s.
- 143 Forest Utilization (1).** A field study of logging and milling of timber. s.
- 144 Forest Engineering (2).** Surveying, establishment of land boundary lines, topographic mapping, planning and construction of roads. Prerequisites: 154 & Civil Engineering 20. s.
- 150 Ornithology (3).** Structure, identification, habits, importance of regional birds. Field work, lectures, lab. Prerequisite: 5 hours biological sciences or instructor's consent. w.
- 151 Dendrology (4).** Taxonomy, silvical characteristics, geographic distribution and economic significance of forest trees. Emphasis on indigenous and exotic species of importance to North American forestry. Prerequisites: Biological Science 12 or 21 or equivalent and instructor's consent. f.
- 154 Forest Graphics (2).** Fundamentals of drafting as related to construction, interpretation and use of maps, charts and graphs commonly employed in forestry and closely allied fields. f, w.
- 160 American's Renewable Resources (3).** History, use and management of forests, range and cropland, wildlife, water, and fisheries as renewable resources. Not open to FFW majors. f.
- 195 Perspectives of Energy (3).** A comprehensive approach drawing on lectures from agriculture, arts and science, and engineering. Topics include energy in nature, resources and their use, and prospect for the future. w.
- 201 Topics in Forestry, Fisheries & Wildlife (cr. arr.)** Organized study of selected topics. Intended primarily for undergraduate FFW students. Subjects and earnable credit may vary from semester to semester. f, w, s.
- 203 Forest Inventory (2).** Sampling methods and measurements as applied to the timber resource. Correlation with aerial photographic interpretation to produce a timber inventory, data processing. Prerequisites: 140 & 306, concurrent with 201, or instructor's consent. f, w.
- 204 Wood Technology (3).** Structure and identification of commercial woods. Relation of growth to physical and chemical properties of wood. f.
- 206 Wood Engineering (3).** Mechanical properties of wood, including standard testing procedures, work stresses, and variation in the strength properties of wood. The application of strength data and design of structural elements. f.
- 207 Forest Fire Control and Use (2).** Fundamentals of all phases of fire protection. Objectives and techniques in use of fire. f, w.
- 210 Forest Entomology (3).** (same as Entomology 210).
- 211 Resource Measurements (3).** Sampling methods and principles of measurement as applied to a variety of natural resources and uses, including fisheries, range, recreation, timber, water and wildlife. Prerequisites: a course in statistics and instructor's consent. f, w.
- 245 Wood Science (5).** Basic physical and chemical properties of wood discussed in terms of wood structure. Prerequisites: 204 or Biological Sciences 12, and 5 hours each of chemistry and physics. alt. w, odd years.
- 253 Light Construction (3).** Planning, design, and control of residential and light construction projects. Proper use of materials and approved methods of construction. Estimating unit and total materials and labor requirements from blueprints and specifications. f.
- 254 Wood Processing (3).** Orthogonal cutting, peripheral milling and abrasive planning processes as used in the forest products industry. Use of adhesives and finishes in production sequences. Alt. w, odd yrs.
- 255 Wood Seasoning and Preservation (3).** Air seasoning and kiln drying of wood. Pressure and non-pressure methods of wood preservation. Agencies of wood deterioration and their control. alt. w, even yrs.
- 290 Urban Forestry (2).** The culture and management of trees in urban areas, including ownership patterns, species composition, growth environment, amenities provided and evaluation. One-day field trip required. Prerequisites: junior standing, FFW 151, or instructor's consent. Alt. w, even yrs.
- 295 Forest Products Utilization (3).** Raw material requirements, manufacturing processes, grades and standards of wood and wood-based products. Prerequisites: 143 or 204 or equivalent and instructor's consent. w.
- 300 Problems (cr. arr.)** Topics in forestry, fisheries and wildlife. f, w, s.
- 301 Topics in Forestry, Fisheries, & Wildlife (cr. arr.)** Organized study of selected topics. Intended for upper division and graduate students. Subjects and earnable credit may vary from semester to semester. f, w, s.
- 302 Silvics (3).** Relationships between site factors and growth, development, and reproduction of forest vegetation. Structure, dynamics, and productivity of forest ecosystems. Prerequisite: Geology 1 or 2, Chemistry 1 or 11, Agronomy 100, or instructor's consent.
- 303 Practice of Silviculture (3).** Applied ecological principles, cultural practices, tree improvement techniques and treatments to forest stands and other lands for systematic production of goods and services. Prerequisite: 302, f, w.
- 305 Introduction to Plant Pathology (3).** (same as Plant Pathology 305, Pest Management 305). w.
- 306 Forest Photogrammetry (2).** Introduces interpretation of aerial photographs as these may be used in evaluating or measuring a variety of forest land uses and products. Prerequisite: 154 or instructor's consent. f, w.
- 307 Mammalogy (3-4).** (same as Biological Sciences 309). (additional project required for 4 hrs. credit). Taxonomy, distribution, structure, habits, importance of mammals; emphasizes those of central United States. Prerequisite: junior standing or instructor's consent. f.
- 309 Watershed Management (3).** Principles of managing watersheds, including effect of vegetation on soil erosion, soil moisture, and stream flow. Prerequisite: 141 or instructor's consent. f, w.
- 311 Ichthyology (4).** (same as Biological Sciences 311). Taxonomy distribution, life history, ecology of fishes; emphasizes those found in Missouri. Prerequisite: 8 hrs. biology or equivalent. f.
- 312 Fish Husbandry (3).** Principles, practices and programs applied to the intensive and efficient production and utilization of hatchery fishes. Prerequisite: 311 or instructor's consent. f.
- 314 Timber Management (3).** Business management and silvicultural regulation of the forest for timber production. Timber taxation and the legalities of timberland ownership. Prerequisites: 303 and 318, or instructor's consent. f, w.
- 315 Natural Resources Management and Water Quality (3).** Problems arising from non-point sources associated with forest management and mining. Management techniques for controlling erosion, nutrient loss. Examines methodologies for predicting management impacts. Prerequisites: Agronomy 100; introductory organic chemistry or instructor's consent. w.
- 316 Waterfowl Biology (4).** Emphasis on ecology, behavior, population dynamics, physiology, and management of waterfowl. Prerequisite: 150, senior or graduate major, or instructor's consent. w.
- 317 Forest Valuation (3).** Valuation of standing trees, forest land, and nonmarket resources. Comparing alternative timber investments by several criteria. Prerequisites: 314 & Economics 51, or instructor's consent. f.
- 318 Forest Economics (3).** Economic principles applied to production/marketing of goods and services from forest land; emphasizes capital and land factors and investment alternatives related to time. Prerequisites: mathematics requirement completed; Agricultural Economics 50 or Economics 51.
- 319 Advanced Forest Management (3).** Forest management planning of public agencies and private industry, with emphasis on inventory control and allowable cut determination; effect of federal income taxes on management practices. w.
- 320 Recreation Land Management (3).** Defines and discusses outdoor recreation management within the framework of multiple use management of forest-type lands. Prerequisite: junior standing or instructor's consent. f, w.
- 321 Tree Genetics and Improvement (2).** Simple Mendelian, quantitative, and population genetic mechanisms and concepts as they apply to forest tree species, natural and artificial forest stands, and forest stand improvement. Prerequisites: 302 & 303 concurrently, or instructor's consent. f.
- 322 Range and Wildlife Habitat Management (3).** Range management practices in U.S. and their ecological implications. Management of wildlife habitat, particularly that which is forest related, to maintain desired species. Prerequisites: 302 & Biological Sciences 362, or instructor's consent. f.
- 323 Wildlife Management Techniques (3).** Methods of appraising and manipulating wildlife populations and their habitats. Prerequisites: 327 concurrently or equivalent and instructor's consent.
- 324 Limnology (3-4).** (same as Biological Sciences 324) (lecture/lab: 4 hrs.; lecture only: 3 hrs.) Ecology of inland waters with emphasis on productivity. Prerequisites: senior standing & Biological Sciences 362. f.
- 327 Principles of Wildlife Management (3).** Introduction to management principles for terrestrial vertebrate populations and habitats based on ecological concepts applied to current social, economic and legal conditions. Corequisite: Bio. Sci. 362. f.
- 328 Fisheries Management (3).** Introduction to the principles and techniques of fishery management. Integrates ecological principles with social, economic and legal considerations. Prerequisites: 311, 333, Bio. Sci. 362 or equivalent.
- 340 Advanced Recreation Land Management (3).** (same as Recreation & Park Administration 340). Advanced study of problems facing forest recreation managers. Topics include rivers recreation, wilderness management and citizen participation in decision making. Prerequisites: 320 or equivalent and instructor's consent. f.
- 350 Special Readings (cr. arr.)** Critical review of current literature and research in forestry, fisheries and wildlife, and methods of presenting research results. f, w, s.
- 353 Public Resource Policy (2).** National goals regarding natural resources. Principles of policy formation, implementation, review. Mission, organization, behavior of public agencies; response to change. Role of pressure groups; citizen organizations. Examines current issues. Prerequisite: senior standing or instructor's consent. f, w.
- 360 Management-Utilization Trip (1).** One-week field trip to study utilization and management practices of large operations. Prerequisite: senior standing or instructor's consent. Undergraduates graded S/U. A \$20 transportation fee required. w.
- 361 Recreational Forestry Trip (1).** One-week field trip to study recreational land management. Prerequisite: senior standing or instructor's consent. w.
- 370 Logging Systems: Operations and Analyses (3).** A systems approach to timber harvesting from acquisition through engineering to log transport. Regional aspects and influences will be considered. Prerequisites: 143, 144.
- 391 Land Use Planning (2).** Land use planning as applied to forest and related lands. Demographic, socioeconomic and legal factors affecting land use. Role of zoning, deed covenants, laws, and environmental impact requirements. Prerequisite: senior standing or instructor's consent. f, w.
- 392 Decision Making in Natural Resources Management (2).** Alternative decision-making processes, goals, values and choices. Systems analysis and decision models for allocating resources in management and planning. Quantitative methods and applications. Prerequisite: senior standing or instructor's consent. f, w.
- 401 Topics in Forestry, Fisheries and Wildlife (cr. arr.)** Organized study of selected topics. Subjects and earnable credit may vary from semester to semester. Prerequisite: instructor's consent. f, w, s.
- 403 Physiological Responses to Environment (3).** (same as Biological Sciences 403).
- 405 Forest Soils (3).** Physical, chemical and biological properties of forest soils in relation to tree growth. Prerequisite: 303 or instructor's consent. f.
- 407 Applied Silviculture (3).** Ecological and economic factors affecting application of silviculture in each of eighteen forest regions in United States. Prerequisite: 303. w.
- 408 Forest Hydrology (3).** Hydrology of forests and other wildlands. Effect of forest and range cover manipulation on the quantity, quality and timing of water yields. Hydrologic instrumentation, analysis and simulation in watershed management. Prerequisite: 309 or instructor's consent.
- 409 Remote Sensing (3).** Study of photographic and nonphotographic systems to evaluate earth resources. Includes infrared photography, color infrared, thermal sensors, radar and satellite imagery systems.
- 410 Seminar (1).** Discussions of current developments in forestry; fisheries and wildlife, and critical study of research programs. f, w.
- 412 Decision Making and Analysis in Natural Resources Management (3).** Alternative decision-making processes, goals, values and choices. Economic analysis, systems analysis and decision models for allocating resources in management and planning. Quantitative methods and applications. Prerequisites: 318 and instructor's consent. w.
- 417 Advanced Forest Mensuration (3).** Statistical approach to forest inventory and experimental designs. Growth estimates. Use of computers in forest inventory. Review of current literature on survey methods. Prerequisite: 203. w.
- 418 Advanced Fishery Management (3).** Theory and practice in present-day fishery management. Prerequisites: 311 & 324 alt. w, even yrs.
- 419 Wildlife Ecology (3).** Backgrounds of land use, ecological forces basic to wildlife management, and examination of literature. Prerequisites: 150 & 307 & 20 hours biology, including Biological Sciences 362; majors only, or instructor's consent. w.
- 420 Advanced Forest Photogrammetry (3).** Use of aerial photographs in forest inventory, forest management and topographic mapping. Introduction to remote sensing techniques. Review of current literature. Prerequisite: 306. w.
- 421 Plant Water Relations (3).** Absorption, translocation, utilization and loss of water by plants. Biophysics of water movement in the soil-plant-atmosphere continuum. Effects of water deficits on physiological processes. Prerequisite: Biological Science 313 or equivalent. alt. w.
- 422 Woody Plant Physiology (3).** Lectures and discussions on physiological processes of woody plants. Prerequisites: one course in general plant physiology & one course in organic chemistry. w.
- 423 Plant-Water Relations Laboratory (2).** Introduction to techniques and instrumentation used in studies of plant-water relations. Corequisite: 421. alt. w., odd yrs.
- 425 Tree Growth-Quality Relationships (3).** Response of tree growth (wood formation) to such environmental influences as fertilization, moisture, nutrient supply, wounding pruning, etc. Prerequisite: 204 and 303 or instructor's consent. Alt. w., odd yrs.
- 426 Quantitative Fishery Science (3).** Quantitative analysis, modeling of fish populations: recruitment, growth, natural mortality, exploitation, production, sampling. Method/theory relative to management goals. Prerequisite: introductory statistics or instructor's consent. alt. w, odd yrs.
- 427 Advanced Limnology (4).** Physical, chemical, and biological processes of lakes and streams emphasizing biological production, water quality and modern problems. Field, laboratory techniques in limnological research. Prerequisites: 324, Biological Sciences 362, Statistics 31.
- 428 Nutrient Cycling in Forested Watersheds (3).** Principles of nutrient cycling in forested ecosystems and relation to water quality. Comparison of nutrient cycles in diverse watershed systems and assessment of the impact of harvesting. Prerequisites: 302, Biological Sciences 362 or equivalent; Agronomy 312 and 319 desirable, and instructor's consent.
- 429 Wetland Ecology (3).** A survey of the wetlands of North America;

emphasis on nutrient dynamics, habitat structure, management, legislation and regulations, and man's impacts. Prerequisites: 324, Biological Sciences 362 and instructor's consent. f even years.

**430 Mammalian Ecology (2).** Study of the interrelationships between wild mammal populations and their environments. Readings and discussion of current scientific literature. Prerequisites: 307 or equivalent and Biological Sciences 362. w.

**431 Freshwater Invertebrate Ecology (3).** Examines the function of invertebrates in lentic and lotic ecosystems. Sampling, life history, distribution and abundance, bioenergetics, secondary production, role as environmental monitors, relationships with fish and waterfowl. Prerequisite: 324. f. odd years.

**432 Stream Ecology (3).** Ecological principles applied to flowing waters. Emphasis on ecological processes within algal, invertebrate and fish communities. The influence of geomorphic processes, hydrologic principles and physical-chemical factors on the biota. Prerequisite: 324. f. even years.

**433 Animal Population Dynamics (3).** A quantitative modeling approach to examining the principles and analysis techniques of fish and wildlife population dynamics. Emphasis on exploited species and integration of biological knowledge with quantitative principles. Prerequisite: Biological Sciences 362 or equivalent. f.

**450 Research (cr. arr.)** Original research not leading to preparation of dissertation. f, w, s.

**490 Research (cr. arr.)** Original investigation for presentation in a dissertation. f, w, s.

## FRENCH

**1 Elementary French I (5).** cor.

**2 Elementary French II (5).** Continuation of I. Prerequisite: grade of C or better in I or its equivalent. cor.

**3 Elementary French III (3).** A multi-skill course following II, centering on cultural/literary readings, and including a grammar review, practice in the spoken language, as well as some practice in written expression. Prerequisite: 2 or equivalent.

**103 French Reading (3).** Prerequisite: 2 or equivalent. cor.

**106 French Composition (3).** Prerequisite: 3 or equivalent.

**109 French Conversation (3).** Prerequisite: 3 or equivalent.

**110 French Civilization (3).** Open to any student interested. No knowledge of French required. Prerequisite: Sophomore standing.

**111 French Literature in Translation (3).** May not be included in area of concentration in French. Subject matter varies with instructor. Prerequisite: Sophomore standing.

**196 Honors Reading in French (1).** Directed readings in area of honors thesis. Prerequisite: admission to departmental Honors program.

**197 Honors Thesis in French (3).** Required of Honors candidates.

**201 Topics (cr. arr.)** Organized study of selected topics. Subjects and earnable credit may vary from semester to semester. Repeatable with departmental consent. Prerequisite: Sophomore standing.

**203 Masterpieces of French Literature (3).** Study of selected masterpieces of French literature from the Middle Ages to the present day. Prerequisite: 3 or equivalent.

**206 Advanced French Composition (3).** Prerequisite: 106 or equivalent.

**207 Intensive Beginning French (3).** Rapid acquisition of a reading knowledge of French. Cannot be taken to fulfill undergraduate language requirement. Prerequisite: Graduate standing or consent of instructor.

**208 Commercial French (3).** Business terminology and forms. Translate and compose business letters and documents for advertising and promotion, trade and commerce, imports and exports, money and banking. Prerequisite: 106 or equivalent.

**209 Advanced French Conversation (3).** Prerequisite: 109 or equivalent.

**211 Intensive Beginning French I (5).** Intense approach designed for rapid advancement in acquisition of multiskills of the language. Prerequisite: Sophomore standing or instructor consent.

**212 Intensive Beginning French II (5).** Intensive approach designed for rapid advancement in acquisition of multiskills of the language. Prerequisite: 211 or equivalent.

**256 Stylistics (3).** Technical study of French as a means of communication and of self-expression, involving levels of meaning, rhetorical structure, and textual analysis. Prerequisite: 206 or equivalent.

**301 Topics (cr. arr.)** Organized study of selected topics. Subjects and earnable credit may vary from semester to semester. Repeatable with departmental consent. Prerequisite: Junior standing.

**304 Phonetics (3).** Comparison of French and English phonetic features, with application to the teaching of pronunciation. Prerequisites: 106 & 109 or equivalent.

**311 History of the French Language (3).** (same as Linguistics 311). Required of M.A. candidates Prerequisite: 203.

**312 French Medieval Literature (3).** Prerequisite: 203 or equivalent.

**316 French Renaissance (3).** Prerequisite: 203 or equivalent.

**317 Seventeenth-Century French Literature (3).** Prerequisite: 203 or equivalent.

**318 Eighteenth-Century French Literature (3).** Prerequisite: 203 or equivalent.

**319 Nineteenth-Century French Literature (3).** Prerequisite: 203 or equivalent.

**320 Twentieth-Century French Novel (3).** Prerequisite: 203 or equivalent.

**321 Introduction to the Contemporary French Theatre (3).** Prerequisite: 203 or equivalent.

**323 Introduction to Contemporary French Poetry (3).** Prerequisite: 203 or equivalent.

**329 Nineteenth-Century French Novel (3).** Prerequisite: 203 or equivalent.

**350 Special Readings (1-3).** Undergraduates must have permission of department chairman. Independent study through readings, conferences, reports. Prerequisite: 203 or equivalent.

**353 Readings in French (2-3).** Subject varies according to instructor. Prerequisite: 203 or equivalent.

**378 Structure of Modern French (3).** (same as Linguistics 378). An introductory presentation of the phonological and syntactic systems of contemporary standard French. Prerequisite: 206 or equivalent or instructor's consent.

**400 Problems (cr. arr.)** Prerequisite: graduate standing.

**401 Bibliography and Methods (3).** Principles and aims of literary scholarship; systematic study of bibliographic resources for research. Prerequisite: Graduate standing.

**410 Seminar (2-3).** Subject varies according to instructor. Prerequisite: graduate standing.

**412 Studies in French Medieval Literature (3).** Prerequisite: 411.

**416 Studies in the French Renaissance (3).** Recommended: 316. Prerequisite: graduate standing.

**417 Studies in Seventeenth-Century French Literature (3).** Recommended: 317. Prerequisite: graduate standing.

**418 Studies in Eighteenth-Century French Literature (3).** Recommended: 318. Prerequisite: graduate standing.

**419 Studies in Nineteenth-Century French Literature (3).** Recommended: 319. Prerequisite: graduate standing.

**420 Studies in Twentieth-Century French Literature (3).** Recommended: 320, 321, or 323. Prerequisite: graduate standing.

**480 Readings (3-6).** Independent readings in preparation for the Ph.D. comprehensive examination in French. Prerequisite: graduate standing.

**490 Research (cr. arr.)** Prerequisite: graduate standing.

## GENERAL HONORS

**25GH Independent Readings (2).** Independent summer reading of prescribed list of approximately 12 books, selected for their significance to a liberal arts education. Final examination at close of summer. Prerequisite: B average. s.

**35GH Honors Discussion Group (1).** Informal discussion group in which students and faculty discuss problems of mutual interest. Prerequisite: B average.

**50GH Honors Seminar (2-5).** Freshman-sophomore seminar offering a small group opportunity to write about and discuss basic works chosen by instructor. Prerequisite: B average or Honors College freshman. f, w.

**100GH Interdepartmental Colloquium (2-3).** Content seminar at junior-senior Honors level involving material from discipline. Subject matter differs from semester to semester. Prerequisites: B average & junior standing or instructor's consent. f, w.

**101 Humanities (3).** (same as General Honors 101GH).

**101GH Humanities (3).** (same as Humanities 101). Four-semester sequence providing unified introduction to literature, philosophy, visual arts, religion. Selected masterpieces in these fields, from Homer to present day, studied for intrinsic values and significance in development of Western civilization. Students who take at least three of the four courses are regarded as having fulfilled the general education requirement of an upper-class course in humanistic studies. It is strongly urged, though not required, that the entire four-course sequence be taken, and in order. f.

**102 Humanities (3).** (same as General Honors 102GH).

**102GH Humanities (3).** (same as Humanities 102). Four-semester sequence, providing unified introduction to literature, philosophy, visual arts, religion. Selected masterpieces in these fields, from Homer to present day, studied for intrinsic values and significance in development of Western civilization. Students who take at least three of the four courses are regarded as having fulfilled the general studies. It is strongly urged, though not required, that the entire four-course sequence be taken, and in order. w.

**103 Humanities (3).** (same as General Honors 103GH).

**103GH Humanities (3).** (same as Humanities 103). Four-semester sequence, providing unified introduction to literature, philosophy, visual arts, religion. Selected masterpieces in these fields, from Homer to present day, studied for intrinsic values and significance in development of Western civilization. Students who take at least three of the four courses are regarded as having fulfilled the general studies. It is strongly urged, though not required, that the entire four-course sequence be taken, and in order. f.

**104 Humanities (3).** (same as General Honors 104GH).

**104GH Humanities (3).** (same as Humanities 104). Four-semester sequence, providing unified introduction to literature, philosophy, visual arts, religion. Selected masterpieces in these fields, from Homer to present day, studied for intrinsic values and significance in development of Western civilization. Students who take at least three of the four courses are regarded as having fulfilled the general studies. It is strongly urged, though not required, that the entire four-course sequence be taken and in order. w.

**110 Popular Culture in Twentieth Century America (3).** Introduces popular literature, music, film and television in twentieth-century America.

**125GH Honors Independent Study (1-3).** Independent study under the supervision of a regular faculty member. Prerequisite: written proposal with professor's approval submitted in advance to Director of the Honors College for approval.

**150GH Honors Preceptorship (2-3).** Active participation in a professor's research for up to six hours a week. Prerequisite: written

description of the work with professor's approval submitted in advance to Director of the Honors College for approval.

## GENERAL STUDIES

**101 Topics in General Studies (cr. arr.)** Experimental and/or interdisciplinary course open to students both in and outside of the College of General Studies. Subjects and earnable credit may vary from semester to semester.

**125 Independent Study (1-3).** With adviser's approval, student works with a faculty member on a project; nature of project/evaluation determined by student and faculty member. Total credit may not exceed 12 hours toward B.G.S. degree. Prerequisite: departmental consent.

**175 Special Project (1-6).** With adviser's approval, student works with a faculty member on a major reading, research, or creative project, usually of interdisciplinary nature. Total credit may not exceed 12 hours toward B.G.S. degree. Prerequisite: departmental consent.

## GEOGRAPHY

**1 Regions and Nations of the World I (3).** Introductory analysis for general education. Regional character, spatial relationships, major problems of Europe, Angloamerica (United States and Canada), Latin America. Organized around basic concepts in field of geography. f, s., cor.

**2 Regions and Nations of the World II (3).** Introductory analysis for general education. Regional character, spatial relationships, major problems of Soviet Union, Middle east, Orient, Africa, Pacific World. Organized around basic concepts in field of geography. w., cor.

**50 Introductory Meteorology (3).** (same as Atmospheric Science 50).

**100 Economic Geography (3).** Introduction to location and spatial organization of economic activity. Prerequisite: Mathematics 10 or equivalent. w.

**101 Topics in Geography (1-3).** Organized study of selected topics. Subjects and earnable credit may vary from semester to semester. Repeatable upon departmental consent. Prerequisite: sophomore standing.

**105 Cultural Geography (3).** Examines human culture as a geographical element; cultural aspects of man's relationship to the land are emphasized. f.

**111 Physical Geography I (3).** Introductory study of man's physical environment: maps landforms and water. Man's effect on natural environmental systems. cor. Prerequisite: sophomore standing.

**112 Physical Geography II (3).** Introductory study of man's physical environment: elements of climate, climatic types, soils, vegetation. May be taken independently of course 111. Prerequisite: Sophomore standing. cor.

**116 United States and Canada (3).** Intensive examination of selected areas and distributions. Regional systems, problems and planning. Prerequisite: Sophomore standing.

**117 Geography of Europe (3).** Survey of Europe's lands and peoples; emphasis on historical area relationships as reflected in Europe's changing economic and political organization. Prerequisite: Sophomore standing.

**125 Geography of Missouri (3).** Physical, human, economic, and political geography of Missouri; regions of the state; geography applied to current state issues. Prerequisite: Sophomore standing.

**137 Map Interpretation and Remote Sensing (1-3).** Introduction to methods of map interpretation and remote sensing. Primary emphasis on acquiring and analyzing maps and remote sensing products imagery. Laboratory work. f.

**150GH Historical and Literary Geography of Britain (3).** The changing geography of Britain since prehistoric times, emphasizing the transformation of the landscape by man, evolution of distinctive regions, and relationships between geography and literature. No previous training in geography assumed.

**152 Themes in the Geography of Africa (2).** Major concepts of African geography in current and historical perspective. Case studies of major African countries. Prerequisite: sophomore standing or one introductory course in geography.

**171 Geography of Asia (3).** (same as South Asian Studies 171). An introductory survey of the geography of Asia from India through Southeast Asia to China and Japan, emphasizing factors contributing to cultural similarities and variations, conflicts of interest, and current development. Sophomore standing or one introductory course in geography.

**180 World Political Geography (3).** Geographic factors and patterns in relation to selected aspects of world politics.

**196 Honors (3).** Special work for Honors candidates in geography. f.

**197 Honors (3).** Special work for Honors candidates in geography. w.

**201 Topics in Geography (1-3).** Organized study of selected topics. Subjects and earnable credit may vary from semester to semester. Repeatable upon departmental consent. Prerequisite: Sophomore standing.

**205 Settlement and Architectural Geography (3).** Settlement patterns, as ways by which people have adapted to landscapes, are viewed from different perspectives and scales. Aspects of primitive and vernacular architecture. Emphasis on North America. Includes practical applications. w.

**300 Special Problems (1-3).** Independent investigation leading to a paper or project. May be repeated to a maximum of 6 hours. Prerequisite: instructor's consent.

**301 Topics in Geography (cr. arr.)** Organized study of selected topics. Subjects and earnable credit may vary from semester to semester. Repeatable upon consent of department. Prerequisites: junior

standing & instructor's consent.

**303 Meteorology of the Biosphere (3).** (same as Atmospheric Science 303).

**305 Advanced Cultural Geography (3).** Man-land relationships, particularly their visible expressions in landscapes, are dealt with in both their historical and areal expressions. The basic methodological-theoretical framework which is developed is intended to promote research. Prerequisite: 105 or equivalent.

**311 Advanced Physical Geography (3).** Study of natural regions of the United States by integrating topics from landforms, geology, climate, soils, vegetation, resources, and land use. Prerequisite: 111 or instructor's consent. w.

**317 Historical Geography of North America (2).** Analysis of selected geographical patterns and themes in the continent's past. Focus is explicitly geographical, stressing extensive use of maps and recent scholarly work by historical geographers. Prerequisite: Junior standing.

**337 Cartography (3).** Principles and methods of map-design and construction. Introduction to map projections. f.

**338 Statistical Mapping (1).** Mapping statistical data: problems, techniques, symbolization, map comparisons. Prerequisite: upper-class or graduate standing. w.

**339 Map Design (1).** Principles, problems and techniques of designing maps for data display and communication of geographical ideas. Practical work by students is stressed. Prerequisites: junior standing and 337 or instructor's consent. w.

**340 Mexico and the Caribbean (3).** Physical environment and culture in the regional development of Mexico, Central America, and the Caribbean. Prerequisite: one course in geography or instructor's consent.

**341 South America (3).** Physical environment and culture in the regional development of South America. Prerequisite: one course in geography or instructor's consent.

**346 Geography and Planning (1-3).** Emphasis on geographic techniques for gathering and generating environmental information for planners. Principles of land use planning will be applied to selected regions. Prerequisite: 137 or instructor's consent. w.

**350 Special Readings (1-3).** Independent readings selected in consultation with supervisory faculty member. May be repeated to a maximum of 6 hours. Prerequisite: instructor's consent.

**366 Climates of the World (3).** (same as Atmospheric Science 366).

**371 Southeast Asia (3).** (same as South Asia Studies 371). Physical, cultural, historical and regional geography of Southeast Asia, with an introduction to East Asian geography. Emphasizes the problems of tradition and development. Prerequisite: Junior standing or Geography 171.

**372 Geography of South Asia (3).** (same as South Asia Studies 372). Topical and regional analysis of India, Pakistan, Sri Lanka. Historical development of distinctive cultural regions. Relations with neighboring areas. Impact of westernization on economic activities, settlements, population. Prerequisite: Junior standing.

**396 The Soviet Union (2).** Analyses of major geographical regions, patterns, relationship and trends, with emphasis on resources and environmental questions. Prerequisite: junior standing and one course in geography a major in Russian Area Studies or instructor's consent. w.

**399 Internship in Applied Geography and Cartography (1-3).** Regularized individual work experience with local, regional, state or national agencies, with guidance and readings supplied by faculty coordinator. May repeat to maximum of 6 hours. Prerequisites: upper-class or graduate standing in geography, cartographic training, and departmental consent.

**400 Special Investigations (1-3).** Advanced studies to meet the needs of the individual student. May be repeated to a maximum of 6 hours. Prerequisite: instructor's consent.

**401 Topics in Geography (cr. arr.)** Organized study of selected topics. Subjects and earnable credit may vary from semester to semester. Repeatable upon consent of department. Prerequisite: instructor's consent.

**402 Field Geography (3).** Techniques of geographical investigation in the field. w.

**403 Bibliographical Techniques (1).** Use of library materials for geographical teaching and research. f.

**404 Quantitative Procedures (3).** Analysis of quantitative procedures in geographic research. Lectures, discussions, problems. Prerequisites: graduate standing & Statistics 207 or equivalent (may be taken concurrently).

**405 Research Methods (3).** Application of scientific methods in geographic research. Critical evaluation of current geographical methodology.

**406 Seminar in World Regional Geography I (1).** Problems in the teaching of world regional geography on college level. f.

**407 Seminar in World Regional Geography II (1).** Continuation of course 406. w.

**408 American Approaches to Geography (1).** Directions and stages in the development of American geographic thought. Course is built around landmark writings by American geographers. Prerequisite: graduate standing in geography or instructor's consent.

**410 Seminar (1-3).** May be repeated to a maximum of 6 hours. Prerequisite: departmental consent.

**416 Seminar in the Geography of Anglo-America (1-3).** Readings and research on problems in the geography of the United States and Canada.

**425 Advanced Economic Geography (3).** Examination of location theory and regional planning/development, with special reference to the British, German and Swedish schools of geography. Prerequisite:

Graduate standing.

**437 Advanced Cartography (3).** Advanced aspects of map construction and analysis techniques, including computer cartography, geographic remote sensing, computer graphics and air-photo interpretation. Prerequisite: 337 or equivalent.

**439 Digital Image Processing for Resource Management (3).** Describes types of digital images available and techniques for their processing; practical experience in processing digital images for resource management. Prerequisites: 437, Forestry 306 or instructor's consent. w.

**450 Research (1-6).** Research not leading to thesis. May be repeated to a maximum of 6 hours. Prerequisite: instructor's consent.

**480 Political Geography (3).** Basic writings, core ideas, terminology, bibliography, research methods.

**490 Research (1-8).** Research leading to a thesis. May be repeated to a maximum of 8 hours. Prerequisite: instructor's consent.

**495 Urban Geography (3).** Study of cities: origin, development, distribution, social and economic importance. Considers modern theories of urban functional structure, hierarchy, economic base, "social physics," land use planning.

## GEOLOGY

**1 Principles of Geology (5).** Earth materials, geologic processes, earth history. f, w, s.

**2 Physical Geology (3).** Similar to 1, but omits earth history. Should not be taken by one who has had a college course in beginning geology. f, w. cor.

**127 Surficial Earth Processes and Products (4).** Semiquantitative analysis of geologic processes that shape the earth's surface. Includes topics in sedimentation and geomorphology. Prerequisites: 1 or 2 and at least a unit each of high school algebra and trigonometry. w.

**128 Internal Earth Processes and Products (4).** Study of the internal structure of the earth, plate tectonics, and igneous and metamorphic processes. Prerequisites: 1 or 2 and at least a unit each of high school algebra, trigonometry, chemistry and physics. f.

**190 Honors Proseminar in Geology (3).** Prerequisite: admission to department Honors program. f, w.

**220 Geology of Missouri (3).** Minerals, rocks, fossils, and surface features of Missouri. Prerequisite: 1 or 2 or equivalent. w.

**224 Historical Geology (3-4).** Methods, principles of historical geology. Interpretation of physical history of North America. Laboratory (one hour credit) optional for non-geology majors. Prerequisite: 1 or 2. w, s.

**225 Spring Field Trip (1).** Field trip of at least four days duration to localities of exceptional geologic interest. Prerequisites: Sophomore standing.

**234 Mineralogy (4).** Introduction to crystallography. Systematic study of mineral groups. Includes identification of minerals by physical and chemical properties. Prerequisite: Chemistry 11 or concurrently. f.

**300 Problems (1-5).** Prerequisite: permission of staff. f, w.

**301 Topics (cr. arr.)** Organized study of selected topics. Subject and earnable credit may vary from semester to semester. May be repeated upon departmental consent. Prerequisites: junior standing or higher and instructor's consent.

**303 Exploration Geophysics (3).** Theory and techniques of conducting and interpreting results of seismic refraction and reflection, gravity and magnetic survey. Prerequisites: 128, 307, Mathematics 80, & an introductory course in physics. f.

**305 Introduction to Geochemical Processes (3).** Application of geochemistry to fundamental problems and concepts of geology, with particular reference to geochemical cycles, chemical segregation within the earth, nucleosynthesis, and geochronology. Prerequisite: 8-10 hours of inorganic chemistry.

**307 Structural Geology (4).** Analysis of the geometry of deformed rock. Mechanical behavior of earth materials under various geologic conditions. Evaluation of processes responsible for tectonism. Prerequisites: 128 & Mathematics 80 or instructor's consent. w.

**308 Sedimentology (4).** Genesis of sediments and sedimentary rocks with emphasis on physical and chemical processes in environments of deposition. Prerequisites: 127 & college-level chemistry course. f.

**323 Optical Mineralogy (3).** Identification of minerals by determination of their optical constants; principles underlying determinative methods. Prerequisite: 234. Students from other departments who have not taken 234 admitted by special consent. f.

**324 Introduction to Petrology (4).** Rock-forming processes, mineral associations in important rock types. Hand specimen and microscopic study of principal rock types. Prerequisites: 128 and 234 Chemistry 12 (may be taken concurrently).

**325 Hydrogeology (3).** Analysis of geologic factors related to occurrence, distribution, recovery, use of ground water. Prerequisites: 127 & Mathematics 80 or instructor's consent. w.

**331 Introduction to Paleontology (5).** Introduction to principles of paleontology and most important invertebrate and vertebrate fossil groups. Prerequisites: 1 and upper-class standing or instructor's consent. f.

**332 Introduction to Micropaleontology (3).** Introductory work on microfossils. Prerequisite: 331. f.

**333 Advanced Paleontology (3).** Principles of taxonomy, biostratigraphy, functional morphology and paleoecology are illustrated by individual projects that combine field collecting, laboratory examination and literature research. Prerequisite: 331 or instructor's consent. w.

**336 Field Course (8).** Offered at Camp Branson, Lander, Wyoming. Prerequisites: 20 semester hours of geology including C or higher in

307 and permission of staff. s.

**342 Introduction to Low-Temperature Geochemistry (4).** Introduction to the chemical alteration of rock-forming minerals in weathering environments and to factors controlling the chemical composition of subsurface water. Prerequisite: Chemistry 12.

**351 Organic Geochemistry (3).** Organic chemical groups; their carbon isotope distributions in sedimentary materials; their relation to origin of petroleum and early history of earth's atmosphere and hydrosphere. Prebiotic synthesis of organic precursors of biological molecules. Prerequisite: 305 or instructor's consent.

**360 Engineering Geology (3-4).** Effects of lithology, weathering, fractures, earth stresses, ground water on engineering projects. Origin, exploration, description, analysis of geologic factors illustrated with case histories. Three- or four-day field trip an integral part of course. Prerequisite: 127 or instructor's consent.

**390 X-ray Mineralogy (3).** Introduction to X-ray crystallography and the theory and application of X-ray diffraction in the study of minerals and other solids. Emphasis on determination of compositional variation in mineral groups. Prerequisite: 234.

**400 Problems (1-8).** Prerequisites: graduate standing & instructor's consent. f, w, s.

**401 Topics (cr. arr.)** Organized study of selected topics. Subjects and earnable credit may vary from semester to semester. May be repeated with departmental consent. Prerequisite: instructor's consent.

**402 Geotectonics (3).** Analysis of regional structures; mechanisms of mountain building. Prerequisite: 307. f.

**403 Plate Tectonics (3).** Motions and interactions of plates, with emphasis on tectonic, igneous and metamorphic effects, whole-earth structure and possible driving mechanisms. Prerequisite: 307, 324, or instructor's consent. w.

**404 Advanced Structural Geology (3).** Advanced analysis of folding and fracturing of rocks. Styles of folding, strain markers associated with folding, metamorphic structures, fault mechanics. Prerequisite: 307.

**407 Precambrian Geology (3).** Examination of the petrology, structural geology, and geochemistry of the Precambrian rock record. Emphasis on the tectonic and historical evolution of continental crust. Examples from shield areas of the world. Prerequisites: 307, 324. f.

**411 Advanced Sedimentology (3).** Discussion and analysis of current and future research thrusts in sedimentary geology. Prerequisites: 308 & instructor's consent. w.

**413 Seminar in Solid-Earth Geophysics (2).** Prerequisite: 303 or equivalent & instructor's consent.

**418 Sediment Transportation Mechanics (3).** Movement of sediment by water and wind. Emphasis on understanding the results of laboratory and alluvial stream studies. Prerequisites: Mathematics 175 & instructor's consent.

**419 Carbonate Petrology (3).** Petrography and petrology of ancient carbonates in the light of recent analogues. Prerequisite: graduate standing in geology. f.

**420 Sandstone Petrology (3).** Texture, composition and petrogenesis of sandstones. Quantitative analysis of petrographic data. Lecture and lab equally stressed. Prerequisite: 308. w.

**421 Advanced Petrology (3).** Study of igneous and metamorphic rocks with reference to physical-chemical processes, and modern experimental data and theory. Emphasis on the history of formation of rock suites. Prerequisite: 323, 324.

**423 Electron Microprobe Analysis (3).** Principles and practice of qualitative and quantitative analysis with the electron microprobe. Prerequisite: instructor's consent. f, w.

**424 Stratigraphy (3).** Principles, methods, and nomenclature. Regional studies of sediments. Prerequisites: 224, upper-class or graduate standing. w.

**426 Metamorphic Petrology (3).** Petrography and petrology of metamorphic rocks. Emphasis on textures, mineral assemblages, and mineral chemistry in order to determine the physico-chemical condition of metamorphism. Prerequisites: 323, 324.

**427 Igneous Petrology (3).** Petrography and petrology of igneous rocks. Studies of the origin and evolution of magmas with use of phase equilibria, trace element geochemistry, and isotope systematics. Prerequisites: 323, 324.

**440 Economic Geology (4).** Geochemistry of ore deposits. Prerequisites: 323 & 324.

**442 Chemistry of Diagenetic Reactions in Sedimentary Rocks (3).** Discussion and quantitative analysis of physical, chemical processes involved in the early, late stage diagenesis of sediments, such as sedimentation, compaction, cementation, mineral-solution reactions, authigenesis, diffusion, etc. Prerequisites: 305 or instructor's consent. f.

**445 Clay Mineralogy (3).** Mineralogy of clays. Includes identification. Prerequisite: 323. w.

**450 Research (1-8).** Does not lead to dissertation.

**451 Advanced Hydrogeology (1-2).** Evaluation of recent studies in hydrogeology and related sciences. Individual student problems in selected areas of the subject. Prerequisite: 325 or instructor's consent.

**490 Research (cr. arr.)** Preparation of dissertation. Prerequisite: successful completion of department's qualifying examination.

## GERMANIC AND SLAVIC LANGUAGES

**1 Elementary German I (3).**

**2 Elementary German II (3).** Prerequisite: C or better in German I or equivalent.

**3 Elementary German III (3).** Prerequisite: 2 or equivalent.

**4 Elementary German IV (3).** Practice in the spoken and written language, as well as reading and grammatical review. Prerequisite: 3 or equivalent.

**21GH Honors German I (4).** Accelerated course for students without previous knowledge of German.

**22GH Honors German II (4).** Prerequisite: 21GH or departmental consent.

**23GH Honors German III (4).** Prerequisite: 22GH or departmental consent.

**106 German Conversation and Composition I (3).** Prerequisite: German 4 or equivalent.

**107 Business German (3).** Conversation and composition based on terminology used in business situations. Prerequisite: 106 or equivalent.

**110 German Civilization: Beginning to 1850 (3).** Major historical, social, artistic, literary themes from beginnings to end of Revolution of 1848. Films and recordings. Films and recordings. May be taken independently of 111. No foreign language credit. Fall.

**111 German Civilization: 1850 to Present (3).** Second Empire, Weimar Republic, Nazi era, two Germanies after 1949. Historical, social, artistic, literary themes. Films and recordings. May be taken independently of 110. No foreign language credit. W.

**119 History of the German Film (3).** Introduction to the development of the German film. Old and recent films are viewed and discussed in terms of techniques, artistry, psychology and social impact. English dubbing or subtitles. No foreign language credit. Prerequisite: Sophomore standing or instructor's consent.

**195 Honors Proseminar (1-3).** Special topics in German literature or linguistics. Prerequisite: admission to departmental Honors program.

**196 Honors in German (1-3).** Special problems in Germanic literature or linguistics. Prerequisite: consent of departmental Honors director.

**201 Topics (cr. arr.)** Organized study of selected topics. Subjects and earnable credit may vary from semester to semester. May be repeated to a maximum of 6 hours with departmental consent. Prerequisites: sophomore standing & instructor's consent.

**203 Advanced German Reading (3).** Prerequisite: German 103 or equivalent.

**206 German Conversation and Composition II (3).** Prerequisite: German 106 or equivalent.

**207 Intensive Beginning German (3).** Designed to lead to a reading knowledge of German. Cannot be taken to fulfill undergraduate language requirement. Prerequisite: graduate standing or instructor's consent.

**211 Intensive Beginning German (3).** Intense approach designed for rapid acquisition of language skills. 8-week summer session. Prerequisite: Sophomore standing or instructor's consent.

**212 Intensive Beginning German (3).** Intense approach designed for rapid acquisition of language skills. 8-week summer session. Prerequisite: German 211 or equivalent.

**213 Intensive Beginning German (3).** Intense approach designed for rapid acquisition of language skills. 8-week summer session. Prerequisite: German 212 or equivalent.

**275 German Classics (3).** Reading and discussion of selected works by major German writers. Prerequisite: German 203 or equivalent.

**301 Topics in German (cr. arr.)** Organized study of selected topics. Subjects and earnable credit may vary from semester to semester. May be repeated to a maximum of six hours with departmental consent. Prerequisites: junior standing and consent of instructor's required.

**306 German Conversation and Composition III (3).** Prerequisite: German 206 or equivalent.

**312 German Drama of the Nineteenth Century (3).** Prerequisite: German 275 or equivalent.

**313 The German Novelle (3).** Prerequisite: German 275 or equivalent.

**315 Faust (3).** Prerequisite: German 275 or equivalent.

**333 German Drama I (3).** Study of one drama by Lessing, one by Goethe, two by Schiller, two by Kleist. Prerequisite: 275 or equivalent.

**334 German Drama II (3).** Study of one drama by Buechner, one by Hebbel, one by Brecht, one by Durrenmatt, one by Hauptmann and two of the instructor's choosing. Prerequisite: 275 or equivalent.

**336 German Prose (3).** Study of prose works by Goethe, Tieck, Eichendorff, Stifter, Keller, Kleist and two works of the instructor's choosing. Prerequisite: 275 or equivalent.

**338 German Poetry (3).** Specific selections will be made by the instructor, but will be representative of the development of German poetry. Prerequisite: 275 or equivalent.

**350 Special Readings (1-3).** Independent study through readings, conferences, and reports. Prerequisite: Junior standing and chairman's consent.

**351 German Romanticism (3).** Prerequisite: German 275 or equivalent.

**360 Recent German Literature (3).** Prerequisite: German 275 or equivalent.

**375 Medieval German Literature 1170-1210 (3).** Analysis of major narrative and lyric poetry of the Age of Chivalry. Prerequisite: German 275 or equivalent.

**380 Study in the Techniques of Teaching German (3).** (same as Curriculum & Instruction T380). Objectives, methods, and problems related to the instruction of German. Prerequisites: 18 hours, or the equivalent, in German & chairman's consent.

**381 Advanced Grammar, Syntax and Stylistics (3).** Considers complicated grammatical and syntactical structures. Prerequisite: senior or graduate standing, or instructor's consent.

**383 Internship in German (3).** Supervised introduction to the methodology of the teaching of elementary German; conducted in a

classroom environment. Prerequisite: junior standing, 275 or instructor's consent.

**400 Problems (cr. arr.)** Prerequisite: Graduate standing and chairman's consent.

**401 Topics in German (cr. arr.)** Organized study of selected topics. Subjects and earnable credit may vary from semester to semester. May be repeated to a maximum of six hours with departmental consent.

**402 Bibliography and Methods (1).** Designed to acquaint students of bibliographical aids basic to research in German studies. Prerequisite: graduate standing or instructor's consent.

**410 Seminar (3).** Course content varies. Prerequisite: graduate standing or instructor's consent.

**460 History of the German Language (3).** (same as Linguistics 460). Prerequisite: graduate standing or instructor's consent.

**461 Middle High German (3).** (same as Linguistics 461). Prerequisite: graduate standing or instructor's consent.

**490 Research (cr. arr.)** Prerequisite: chairman's consent.

## GREEK

**1 Elementary Ancient Greek I (5).** Study of forms, grammar, syntax. Early attention to reading in simple Attic prose. Offered only in the Fall.

**2 Elementary Ancient Greek II (5).** Continuation of Greek I. Readings in Attic prose. Prerequisite: Greek I or equivalent.

**3 Greek Reading (3).** Selected works of Greek literature. Prerequisite: Greek 2 or equivalent.

**207 Intensive Beginning Greek I (3).** Intensive study of forms, grammar, syntax; early attention to readings in simple prose. Course meets five hours weekly for 3 hours credit. Prerequisite: graduate standing.

**208 Intensive Beginning Greek II (3).** Continuation of 207. Attention to ability to read rapidly and accurately. Course meets five hours weekly for three hours credit. Prerequisite: graduate standing.

**209 Intensive Greek Reading (2).**

**210 Intermediate Readings (3).** Selected advanced readings in prose and poetry. Introduction to Homer. Prerequisite: Greek 3 or equivalent.

**300 Problems (cr. arr.)** Independent study and reports on selected topics. Prerequisite: instructor's consent.

**303 Greek Stylistics (1-3).** Study and practice of general Greek prose tendencies, with special consideration to basic problems: abstract expression, word order, sentence structure and use of common rhetorical devices.

**304 Greek Tragedy (3).** Selected works of Aeschylus, Sophocles, Euripides, with special attention to language, style, ideas, and dramatic techniques. Prerequisite: two years Classical Greek or equivalent.

**305 Greek Comedy (3).** Selected plays of Aristophanes and Menander, with special attention to cultural contexts. Prerequisite: two years Classical Greek or equivalent.

**306 Greek Lyric Poetry (3).** Selected readings from lyric poets, with attention to verse, forms, and dialects. Prerequisite: two years Classical Greek or equivalent.

**308 Greek Philosophers (3).** (same as Philosophy 308). Emphasis on readings and analysis of selected texts of major Greek philosophers. Prerequisite: two years Classical Greek or equivalent.

**310 Greek Historians (3).** Reading and analysis of selected texts of major Greek historians. Prerequisite: two year Classical Greek or equivalent.

**315 Homer (3).** Reading, discussion, and literary analysis of Iliad and Odyssey. Prerequisite: two years Classical Greek or equivalent.

**325 Greek Epigraphy (3).** Introduction to study of Greek inscriptions and their contribution to the understanding of other aspects of ancient culture. Prerequisite: Greek 103.

**327 Papyrology (3).** Introduction to study of Greek papyri and their contribution to the understanding of other aspects of ancient culture. Prerequisite: two years Classical Greek or equivalent.

**350 Special Readings (1-3).** Readings in authors and texts not covered in other courses. Prerequisites: departmental consent, two years Classical Greek or equivalent.

**399 Survey of Greek Literature (3).** Greek literature from origins to end of Roman period; emphasis on authors not covered in other courses, to provide general view of styles and genres. Prerequisite: two years Classical Greek or equivalent.

**425 Seminar in Greek Drama (3).** May be repeated to a maximum of 6 hours.

**470 Seminar in Greek Epic Poetry (3).**

**475 Seminar on the Age of Pericles (3-6).** Study of Greek culture of mid-fifth century B.C. law, religion, art, philosophy, science, and other aspects of the culture, to give students an integrated view of life of the period.

**480 Seminar in Special Fields (3).**

## HEALTH SERVICES MANAGEMENT

**101 Topics in Health Services Management (1-3).** Organized study of health services management topics on an undergraduate level. Subjects vary from semester to semester. Repeatable upon consent of department.

**201 Topics in Health Services Management (1-3).** Organized study of selected health services management topics for undergraduates and non-health services management graduate students. Subjects vary from semester to semester. Repeatable upon consent of department.

**202HM Portfolio Assessment (1).** Course will assist students in

applying for advanced standing based on professional and personal experiences. Credit for non-formal educational activities may be granted for learning acquired in job-related experiences, training experiences or personal experiences.

**210HM The American Health Care System (3).** Student is provided with a basic understanding of the major components (financing, planning, and regulating) of the American health care system. Emphasis is placed on current issues and their impact on the delivery system. cor.

**215 Principles of Health Care Management (3).** The course introduces the fundamental principles of management, emphasizing the practical application of these principles in a health care environment.

**220HM Organization and Management of Health Care Institutions (3).** Course is designed to analyze modern health care institution from internal point of view. Institutional influences upon delivery of patient care and role of health professionals and personnel are studied. Prerequisite: 210HM.

**230HM Human Resources Development (3).** Course provides student with an understanding of personnel management in health services industry and focuses on job analysis, recruitment and performance assessment. Prerequisite: instructor's consent.

**250HM Health Planning Principles (3).** Overview of health planning. Introduction to the theories, concepts and principles upon which the practice of planning is based and the context in which health planning is practiced in the United States.

**270HM Principles of Health Care Finance (3).** Student gains knowledge of the basic principles of financial management and application. Basic financial tools used in planning and controlling health care institution activities and financial management techniques are presented. Prerequisite: 3 hours of accounting.

**289HM Practicum (3-6).** Supervised field experience in an approved health agency, institution or organization. Opportunity for observation and participation under guidance of a qualified preceptor. S/U.

**300 Problems (1-3).** Directed exploration of health services management problems. Prerequisite: instructor's consent. cor.

**310 The Health Care System (3).** Overview of health care system and relationship between its components. Focuses on changing nature of the system and issues confronting the future health care system. Prerequisite: senior standing. f.

**330 Risk Management System in a Health Care Institution (3).** Course provides the student with an understanding of the basic functions and components of a risk management system. Prerequisite: instructor's consent.

**340HM Economics of Health Care (3).** Application of basic economic principles and concepts to the health care delivery system and to the analysis of public policies in health care. Prerequisite: Economics 51 or equivalent.

**400 Problems (1-3).** Intensive study of an area of health services management. Prerequisites: graduate standing & instructor's consent.

**401 Topics in Health Services Management (3).** Organized study of selected topics. Subjects will vary from semester to semester. Repeatable upon consent of department.

**424 Public Health and Medical Care Economics (3).** (same as Economics 424).

**442 Labor Relations in the Health Industry (3).** To identify role of organized labor in the health industry in its efforts to represent employees. Review history and legal status under appropriate federal and state law. Prerequisites: graduate standing & instructor's consent.

**450 Research (1-99).** Original research in health services management not leading to a thesis but requiring a formal research report. Prerequisites: graduate standing & instructor's consent.

**460 Administration of Health Care Organizations (3).** Analyzes health care organizations, emphasizing management structure, board of trustees, medical staff. Attention focused on delivery of institutional patient care, role of professionals, departmental interrelatedness. Prerequisites: 310, Business Administration 301 & instructor's consent. w.

**461 Design of Health and Human Service Systems (3).** Interorganizational and intra-organizational aspects of structure in relationship to those forces outside the organization to which organizational decision makers must respond. Prerequisite: 460 or instructor's consent.

**470 Community and Institutional Health Planning (3).** Analysis of health planning processes and strategies in the community and in the institution. Examination of techniques used for community and institutional planning. Prerequisites: 310, Business Administration 301, and instructor's consent. w.

**471 Application of Management Science to the Health Care System (3).** Applies principles/techniques of computer-based management science (systems theory, operations research, etc.) to complex health care system problems. Prerequisites: 460, Computer Science 201, Statistics 207, & instructor's consent. f.

**472 Financial Management for Health Care Organizations (3).** Application of concepts, tools and techniques of financial management and their interrelationships as they apply to current and future operation of health care organizations. Prerequisites: 460, Business Administration 34 & instructor's consent. w.

**473 Decision Making for Health Care Organizations (3).** Applies decision-making models to health care organizations demonstrated through the use of case studies, role-playing exercises, simulations and games. Prerequisite: 470 & 471. w.

**474 Health Care Law and Ethics (3).** Course provides students with background in the analysis of ethical problems and gives basic information on the function and methods of law as applied to health service delivery. Prerequisites: 460 and instructor's consent.

**475 Advanced Community Health Planning (3).** Advanced analysis of topics in health planning, resources development, and agency management. Prerequisites: 470 & instructor's consent. w.



- 476 Health Facilities Program Planning Design and Evaluation (3).** An advanced investigation of organizing for hospital planning; approaches to the planning process; architecture and engineering for health facilities; institutional construction; financial and legal requirements. Prerequisite: instructor's consent.
- 478 Organization and Management for Mental Care (3).** Organizational, management and economic aspects of mental hospitals and mental health programs, administration. Emphasizes differences between mental hospitals and general hospitals. Prerequisite: 310 or 460. w.
- 489 Field Experience in Health Services Management (cr. arr.)** Supervised field experience in approved health agencies and institutions. Opportunity for observation and service participation in various fields of health. Prerequisites: graduate standing & instructor's consent.

## HEALTH RELATED PROFESSIONS

- 22 Introduction to the Health Related Professions (1).** Acquaints students with information about program requirements, relationship of individual interests, aptitudes and abilities to various careers; and assists with career planning and selection of appropriate preparation programs. S/U.
- 225 Special Readings (1-3).** Directed study of literature and research reports in the health-related professions. Prerequisite: instructor's consent.
- 301 Topics (1-3).** Organized study of selected topics. Subjects will vary from semester to semester.

## HIGHER AND ADULT EDUCATION

- K260 Topics in Higher and Adult Education (cr. arr.)** Lectures, discussions, and field experiences of special interest to students enrolled in all undergraduate divisions; not a professional course for preparation of college teachers. May be repeated for credit. Graded S/U.
- K301 Foundations of Adult Education (3).** Provides a conceptual and historical base for the field of adult education; presents European origins of adult education and the development of adult education in the United States; introduces basic concepts of adult development and learning.
- K377 Women and Minorities in Higher Education (3).** Historical survey of women and blacks in higher education in the United States; comparative study of the forces which generated change and of the affirmative results and backlash.
- K400 Problems in Higher Education (cr. arr.)** Prerequisite: departmental consent.
- K410 Seminar in Higher Education (cr. arr.)**
- K411 Seminar in Adult Education (1-3).**
- K420 Administration and Supervision of Adult Education (2-3).** Principles and problems of the administration of adult education programs in the following settings: agencies, other nonschool organizations, private and public schools, including community colleges. f.s.
- K440 Improvement in Instruction in Adult Education (2-3).** Processes and procedures utilized in planning, conducting and evaluating various teaching techniques in adult education.
- K441 Curriculum Development in Adult Education (3).** Provides opportunity to gain information on the use of reliable methods of building an adult curriculum. Much emphasis is placed on the "curricular setting" and its impact on securing and holding adult learners.
- K460 Topics in Higher and Adult Education (cr. arr.)**
- K462 Foundations of Student Affairs Administration (3).** (same as Counseling and Personnel Services G462).
- K463 Student Affairs Administration: Methods & Programs (3).** (same as Counseling and Personnel Services G463).
- K465 The Junior College (2).** Survey course dealing with problems of the junior college.
- K468 College Teaching (2-3).** Primarily for students who expect to teach in junior or senior colleges. Principles and practical issues in college teaching are considered.
- K475 College Administration (2-3).** Considers problems of organization and administration in institutions of higher education.
- K480 Internship in Higher Education (cr. arr.)** Internship experience under supervision in institutions of higher education. Prerequisite: departmental consent.
- K490 Research in Higher Education (cr. arr.)** Prerequisite: departmental consent.
- HISTORY**
- 1 Foundations of Western Civilization (4).** Development of characteristic ideas and institutions of Western cultural tradition, from origin of civilization in ancient Near East to beginning of rapid social, political, intellectual transformation of Europe in 18th century. f.w. cor.
- 3 Survey of American History to 1865 (3).** Introduction to U.S. history through the Civil War, surveying political, economic, social and cultural development of the American people. cor.
- 4 Survey of American History Since 1865 (3).** Introduction to U.S.

- history since 1865, surveying political, economic, social, and cultural development of the American people. cor.
- 11 Themes in American History (3).** Selected major themes in American history from colonial period to present. Attention focused on social, cultural, and economic changes; meaning of significant political events; role of United States in world affairs.
- 20 American History (5).** Broad survey of political, economic, social, intellectual, diplomatic and constitutional development of American people from first English settlements to present day; emphasizes evolution of American culture and institutions. f.w.
- 100 History of Modern Europe (3-4).** (same as Peace Studies 100). Selected major themes in European history from French Revolution to recent times. Breakdown of traditional institutions, ideas; political, social revolution; industrialization; nationalism; imperialism; world wars; democratic, totalitarian ideologies, movements; quest for international order, European unity.
- 101 Undergraduate Topics in History (1-3).** Organized study of selected topics. Subjects and credits may vary from semester to semester. May be repeated with consent of department.
- 102 The Ancient World (3).** Survey of institutional and cultural development of ancient Near East, Greece and Rome.
- 103 Ireland: Revolution and Nationalism, 1780-1976 (3).** Investigates Ireland as an early example of the kind of colonial revolt later typical of the third world. Emphasizes growth of nationalism, republicanism and the failure to create one Ireland.
- 105 England Before the Glorious Revolution (3).** Survey of English institutions, culture and politics from the Roman invasion to the Revolution of 1688.
- 106 Britain 1688 to the Present (3).** Surveys British history from 1688 to present. Emphasizes social and economic change.
- 110 Civilization of India (3).** (same as Anthropology 110, South Asia Studies 110).
- 111 The World of the Middle Ages (3).** (same as Peace Studies 111). Survey of European development from the fall of Rome to the 16th century.
- 112 Astrological Thought (1).** History of the development of astrological thought in Babylonia, Greece, Rome, Western Europe, Middle East, India and China. Covers topics such as astronomical background to astrology, medieval astrology and popular astrology.
- 115 Yankees in the Orient (1).** Examines a small but remarkable group of Westerners—soldiers, doctors, adventurers, missionaries, engineers and diplomats—who constituted a significant source of contact between America and China in recent times.
- 116 History of Christianity (3).** (same as Religious Studies 102). Origin, diffusion and development of Christianity, with special attention to its influence on western civilization. Major emphasis on period up to French Revolution.
- 118 Gandhi: The Man and His Ideas (1).** (same as Peace Studies 118). Mahatma Gandhi in historical perspective; Indian nationalism, applicability of ideas to contemporary society.
- 119 Readings on Nonviolence and Gandhi (2).** Select readings on non-violence as a political and religious tradition, both western and South Asian. Prerequisite: 118 or 181 or 182 or instructor's consent.
- 120 Social Outlaws in America From Jesse James to the Present (1).** Explores bases of popular support for individuals and movements that have resisted legal order since 1865. Topics: social banditry, vigilantism, political outlawry, resistance to economic development, civil disobedience, Vietnam.
- 121 Atomic Diplomacy (1).** Focuses on the building of the atomic bomb, the diplomatic and military implications of its use against Japan and the postwar significance of atomic weaponry for foreign policy.
- 122 America as a Post-Industrial Society: 1939 to the Present (3).** Designed for majors in engineering, sciences, professional schools and A&S. Explores the social, economic, demographic, political factors which have created contemporary America. Prerequisites: Sophomore standing.
- 130 Afro-American History (3).** Survey of social, political and economic development of the black people in American life from 1619 to present.
- 138 Foundations of Russian History (3).** A survey of the Kievan and Muscovite period to the end of the 17th century.
- 139 Russia in Modern Times (3).** (same as Peace Studies 139). Survey of Russian history from Peter the Great to present.
- 141 Imperial China (3).** (same as Peace Studies 141). A survey of China under the Manchu Ch'ing dynasty. Within framework of the dynastic cycle, examines imperial rule, Chinese society, culture, art, internal rebellion, Western intrusion and modernization.
- 142 Twentieth-Century China (3).** History of China from Nationalist Revolution of 1911 to present. A problem-oriented course; special emphasis on Mao and Maoist ideology. Social, literary and cultural history also receive attention.
- 143 Japan in the Age of the Samurai (3).** An exploration of basic patterns of Japanese culture, religion and rule from early times until the beginning of modernization in the 19th century.
- 145 Modern Japan and China—a Comparative Survey (3).** A structured, comparative examination of the histories and cultures of Japan and China, from the mid-19th century to the present. Orientation towards broad social, intellectual and political developments.
- 150 Film and Society in the Modern World (3).** A coherent and structured examination of major themes in American, European and Japanese film, amplified by the literatures of those societies, emphasizing differences in the experience and interpretation of "modernity."
- 167 Colonial Latin America (3).** Survey of Latin America, 1492-1825; Exploration and conquest; European settlement; colonial government and institutions; economy and society; cultural and intellectual life independence movements.

- 168 Latin America Since Independence (3).** Political, social and economic developments; nationalism; revolutionary movements; U.S. influence.
- 170 The Origins of Scientific Thought (3).** Survey of the development of scientific ideas from Babylonia and Egypt to the age of Newton. Emphasis on the development of science as a part of intellectual history.
- 171 Scientific Thought in the Modern World (3).** Continuation of 170 from the age of Newton to the modern period.
- 173 Age of Ascendancy: American Foreign Policy Since World War II (3).** Surveys the Cold War in Europe and Asia, the Vietnam War, Middle East policy, and the nuclear arms race. Not for advanced students in history. Prerequisite: sophomore standing.
- 181 Asian Civilizations (3).** (same as South Asia Studies 181, Political Science 181).
- 182 History of British India (3).** Introduction to traditional India; the Muslim experience; European rivalry and British hegemony; problems of Crown rule: social and political reforms in the making of modern India.
- 185 History Colloquium (1).** Introduction to scope of historical study, with attention to research and teaching currently in progress within the Department of History. Required of undergraduate history majors. Graded S/U only. Prerequisite: formal declaration of status as history major.
- 186 Undergraduate Seminar in European History (3).** Readings in selected problems in European history; reports and discussion on selected topics. Course subject depends on instructor. May be repeated.
- 187 Undergraduate Seminar in American History (3).** Readings in selected problems in American history; reports and discussion on selected topics. Course subject depends on instructor. May be repeated.
- 188 Undergraduate Thesis (3).** Individually directed research leading to a senior thesis.
- 189 Undergraduate Thesis (3).** Continuation of 188.
- 197 Honors Thesis (3).** Research and completion of the thesis required for graduation with Honors in History. f.
- 198 Honors Thesis (3).** Continuation of 197. w.
- 201 Topics (cr. arr.)** Organized study of selected topics. Subjects and earnable credit may vary from semester to semester. Repeatable upon consent of department.
- 202 America's Environmental Experience (1-8).** Team-taught analysis of American thought and action on physical environment during 19th-20th centuries. Relation between politics, economics, technological change, environmental quality; roles of science, law, regulatory agencies, grassroots action. Topical satellite courses offered concurrently.
- 205 The Greek World (3).** Political and social institutions, intellectual life of Greek city-states to time of Alexander.
- 206 The Roman World (3).** Origin and development of Roman institutions, Rome's expansion and culture through reign of Marcus Aurelius.
- 208 The Development of Greek Democracy (3).** Study of Athenian democratic institutions from Solon to 404 B.C. Prerequisite: sophomore standing or instructor's consent.
- 209 Alexander the Great and the Hellenistic World (3).** Alexander's conquest of the East to 323 B.C.; political, social, economic development of Hellenistic kingdoms from his death to 31 B.C.
- 210 History of Missouri (3).** Survey of Missouri's development from the beginning of settlement to present.
- 215 American Feminism (3).** (same as Women Studies 215).
- 221 Europe in the Nineteenth Century (3).** Political, social, economic, and cultural development of Europe from French Revolution to outbreak of World War I.
- 231 Contemporary Europe (3).** Political, social, and economic development of Europe from 1900 to the present, with emphasis on the period between the two world wars. cor.
- 251 Twentieth Century America (3).** Survey of American development from 1900 to present. For students who have not taken advanced courses in American history, especially 356, 357, or 358.
- 252 America in the 1960's (3).** Examines the political and cultural main currents of the 1960s. Emphasizes the challenges mounted by protest groups and the responses of America's political leadership to the ferment of the period. Prerequisite: sophomore standing.
- 262 The Military and Wars in American Society (3).** (same as Military Science 262). Study of how wars and service in the military by citizen volunteers or conscripts affected the subsequent course of United States history.
- 300 Special Problems (cr. arr.)** Independent investigation leading to a paper or project.
- 301 Topics (cr. arr.)** Organized study of selected topics. Subjects and earnable credit may vary from semester to semester. Repeatable upon consent of department.
- 307 The Roman Revolution (3).** Analysis of the dissolution of Republican institutions and the origins of autocracy, from the Gracchi to the death of Nero in A.D. 68.
- 310 The Roman Empire (3).** Acquisition and development of Empire by the Romans; administration of the Empire; Romanization of the West; cultural interaction between Rome and the provinces.
- 311 The Later Roman Empire (3).** Political, social, economic, and cultural life in the Roman Empire, especially in the West, from Diocletian to the rise of the barbarian kingdom.
- 317 History of Socialist Thought (3).** Survey of European socialist thought from 18th century to present. Topics include utopian socialism, Marx, and contemporary democratic socialism.
- 318 Medieval Culture (3).** (same as Peace Studies 318). Development of medieval culture covering a broad range of topics such as university life, scholasticism, technology, social change, and the lives of artisans, merchants, women and peasants.

**319 Intellectual History of Europe, 17th and 18th Centuries (3).** The Enlightenment's attack on traditional Christian thought and values.

**320 Intellectual History of Europe, 19th and 20th Centuries (3).** Topics include: Romanticism, Darwin, Marx and Freud.

**321 Tudor England (3).** Treatment of period covering social, political, religious, imperial development.

**322 Stuart England (3).** Treatment of period covering social, political, religious, imperial development.

**323 English Legal and Constitutional History (3).** Development of English institutions; chief emphasis on their relation to general social, economic backgrounds.

**326 Modern England (3).** Surveys British history in the 18th and 19th centuries. Emphasizes social and economic change.

**327 The Age of the Renaissance (3).** Major changes in European economic, social, political, religious, and intellectual life between 1250-1500. Humanism and Renaissance. The "Renaissance problem."

**328 The Age of the Reformation (3).** State of Europe about 1500. Political, diplomatic, social, and intellectual changes to 1648. Humanistic reform movements. Protestant-Catholic Reformation. Development of the modern state and international relations.

**333 Germany in the Nineteenth Century (3).** Cultural, social and political history of Central Europe from 1800 to 1914. A case study in incomplete modernization, focused on industrialization, unification, cultural crisis and imperialism.

**334 Germany in the Twentieth Century (3).** Cultural, social and political history from 1914 to present day. Focus on world wars, national socialism, the holocaust, the cold war and the emergence of East and West Germany.

**338 Medieval Russian Culture (3).** A close look at the cultural legacy of the Kievan and Muscovite periods, from the 9th to 17th centuries.

**339 Imperial Russia, 1682-1825 (3).** Russia in the 18th and early 19th centuries, with special emphasis on the reigns of Peter I, Catherine II, and Alexander I.

**340 The Russian Revolution (3).** Analyzes the transformation of Russian society that produced the collapse of autocracy, efforts to create a parliamentary government, the Bolshevik seizure of power in 1917, and the civil war that followed. f.

**341 Sino-Soviet Conflict (3).** (same as Peace Studies 341). Survey of relations between Soviet Union and Communist China, 1917 to present.

**342 Age of Jefferson (3).** Political, constitutional, cultural, and economic developments in United States during formative period of Republic, 1787-1828. Special attention to Constitutional Convention, formation of national political institutions.

**343 Age of Jackson (3).** The development of the United States from the election of Jackson in 1828 to 1850; attention is given to the nature of Jacksonian democracy, economic changes, the beginnings of abolitionism and social reform movements.

**344 American Constitutional History to 1860 (3).** Historical analysis of origins of American constitutional system to eve of Civil War.

**345 American Constitutional History Since 1860 (3).** Historical analysis of American constitutional system from eve of Civil War to present.

**349 American Social History Since 1865 (3).** Continuation of 348, from the Civil War to the present.

**350 Special Readings (cr. arr.)** Individual work, with conferences adjusted to needs of student.

**351 American Cultural and Intellectual History to 1865 (3).** Origins and growth of American values and ideas considered in their social context. Topics include: the work ethic, republican politics, revivalism, form movements, sexual attitudes, literature in the marketplace, Afro-American and slaveholding subcultures.

**352 American Cultural and Intellectual History Since 1865 (3).** Tensions and transformations in American culture to the present. Topics include: spiritual crisis in Christianity; rise of welfare state liberalism; socialist and feminist alternatives; literature and the arts.

**353 American Urban History (3).** Growth, development and implications of the city in American history; historical analysis of urban problems.

**356 Origins of Modern America, 1877-1918 (3).** Political, social, economic, and intellectual evolution of America into a modern society, 1877-1918.

**357 Recent United States History 1918-1945 (3).** Detailed examination of American history from end of World War I to end of World War II.

**358 Our Times: United States Since 1945 (3).** Detailed examination of American history from end of World War II to the present.

**359 History of the Old South (3).** Study of the South to 1860. cor.

**360 History of the New South (3).** Study of the South since 1860.

**361 The Great West in American History (3).** Historical development of major regions, with emphasis on response to environment, public land policy, role of government in economic and resource development, citizen action, and cultural pluralism.

**362 The Ordeal of the Union, 1848-1877 (3).** All major aspects of the period considered; rivalry between nationalizing and sectionalizing forces emphasized.

**363 American Colonial History to 1760 (3).** Study of colonial America; special emphasis on creation of a native American culture prior to 1760.

**364 The Period of the American Revolution, 1760-1789 (3).** Analysis of the Revolution, its causes and consequences, through establishment of the new government in 1789. cor.

**365 History of the American Environment (3).** A reading and discussion course exploring diverse responses to the changing American environment from early man to the present, including ecological,

institutional, and philosophical aspects.

**366 Westward Expansion in American History (3).** Lecture course dealing with process of expansion: American response to the challenge of abundant land and resources, and the impact on American institutions and attitudes.

**367 American Legal History to 1870 (3).** Development of American law from its English beginnings. Covers reception of the common law, codification movements, law of slavery, frontier legal systems and beginnings of formalism.

**369 History of Caribbean America (3).** Comparative regional study of insular and mainland Caribbean nations. Emphasis on modern period. Independence; abolition of slavery; U.S. hegemony; economic, social, and political upheaval.

**370 American Foreign Policy from Colonial Times to 1898 (3).** (same as Peace Studies 371).

**373 History of United States Foreign Relations, 1898 to the Present (3).** (same as Peace Studies 373). History of American foreign policy from the development of an insular empire to the present.

**375 History from Cortes to present day.**

**378 Social Revolution in Latin America (3).** Twentieth century social revolutions in selected Latin American countries.

**384 Religion and Politics in Modern India, 1857-1947 (3).** (same as South Asia Studies 384). Attention to religious revival and reform as important elements in the development of regional and national political patterns.

**391 Afro-Americans in the Twentieth Century (3).** Survey of political, social, economic and intellectual development of the Negro in America since 19th century.

**399 Quantitative Methods in Historical Study (3).** Introduces quantitative approaches to the study of history. Emphasizes opportunities, limitations, and dangers involved in several common forms of quantitative study.

**400 Problems (cr. arr.)** (same as South Asia Studies 400). Individual work not leading to dissertation. Prerequisite: instructor's consent.

**401 Topics (cr. arr.)** Organized study of selected topics. Subjects and earnable credit may vary from semester to semester. Repeatable upon consent of department. Prerequisite: instructor's consent.

**403 Readings in South Asian History (3).** (same as South Asia Studies 403). Readings in the modern history of India and Pakistan, with particular emphasis upon historiography and sources. May be repeated to a maximum of 6 hours.

**404 Seminar in South Asian History (3).** (same as South Asia Studies 404). Directed studies in Indian historical literature and problems, 1600 to 1947. Reading knowledge of a modern Indian language is desirable but not required. May be repeated to a maximum of 6 hours.

**406 Seminar in Ancient History (3).** Readings and research on selected problems in ancient history. May be repeated to a maximum of 12 hours.

**407 Readings in Ancient History (3).** Reading of standard works and recent scholarship on selected problems in ancient history. May be repeated a maximum of 12 hours.

**410 Introduction to Historical Research (3).** Introduction to historical methods, source problems, bibliographical aids, source criticism, use of related techniques. Required of graduate students in history.

**411 Readings in Russian History (3).** Reading standard works and current scholarship on selected problems in Russian history. Reading knowledge of Russian, French, or German helpful but required only of students specializing in Russian history. May be repeated to a maximum of 6 hours.

**412 Historiography (3).** Acquaint graduate students with examples of modern historical thought and practice by examining various conceptual approaches to the study of history. Consent of department required.

**420 Independent Readings for History Ph.D. Comprehensive Examination (cr. arr.)** Independent readings for Ph.D. Comprehensives. Open only to graduate students formally admitted to candidacy for Ph.D. in history.

**421 Seminar in British History (3).** Investigation of social, intellectual problems of modern Britain. May be repeated to a maximum of 6 hours.

**423 Readings in English History (3).** Readings in historical literature covering period since 1660; particular reference to new interpretations of political, social developments. May be repeated to a maximum of 6 hours.

**425 Seminar in Medieval Culture (3).** Investigates cultural developments in the medieval period. May be repeated to a maximum of 6 hours.

**427 Seminar in the Renaissance and Reformation (3).** Analyzes problems of the period 1300-1600; emphasizes intellectual history. May be repeated to a maximum of 6 hours.

**428 Readings in Early Modern European History (3).** Readings in historical classics and current scholarship on Renaissance, Reformation, Baroque, and Enlightenment periods. Problem of modernity. May be repeated to a maximum of 6 hours.

**431 Readings in Modern European History (3).** Readings in recent research material on selected topics. May be repeated to a maximum of 6 hours.

**432 Seminar in Modern European History (3).** Investigation of problems of modern Europe. May be repeated to a maximum of 6 hours.

**436 Readings in American Colonial History (3).** Readings in American history from beginning of English settlements to adoption of the Constitution. May be repeated to a maximum of 6 hours.

**437 Seminar in the History of Colonial America (3).** Directed research in the colonial and revolutionary period of American history. May be repeated to a maximum of 6 hours.

**438 Readings in Afro-American History (3).** Readings on selected topics in Negro history from 1619 to the present, with emphasis on conflicting interpretations. May be repeated to a maximum of 6 hours.

**439 Seminar in Afro-American History (3).** Directed research in selected topics in Afro-American history. May be repeated to a maximum of 6 hours.

**441 Seminar in the National Period of United States History (3).** Directed research in the period 1787-1861. May be repeated to a maximum of 6 hours.

**442 Readings in the Age of the Federalists and the Jeffersonians (3).** Directed readings in American history from the Constitution to the election of Jackson; class periods devoted to critical evaluation. May be repeated to a maximum of 6 hours.

**443 Readings in the Age of Jackson 1824-1850 (3).** Continuation of 442, from election of Jackson to Civil War. May be repeated to a maximum of 6 hours.

**444 Readings in American Urban History (3).** Class meetings devoted to critical evaluation of writings in the field. May be repeated to a maximum of 6 hours.

**447 Readings in Sectional Controversy, Civil War and Reconstruction (3).** Directed readings and discussions of major issues in the period of national unification of the United States, from 1850 through 1877. May be repeated to a maximum of 6 hours.

**449 Seminar in American Social History (3).** Introduction to research in field of social history.

**450 Research (cr. arr.)** Work equal to research done for a dissertation, but not leading to thesis. Written consent of instructor required for enrollment.

**451 Seminar in American Cultural and Intellectual History (1-12).** Directed research and writing in American cultural and intellectual history. May be repeated to maximum of 12 hours.

**452 Readings in American Cultural and Intellectual History (3).** Reading and discussion designed to promote critical understanding of theoretical and historiographical problems in American cultural and intellectual history. May be repeated to maximum of 6 hours.

**453 Seminar in United States Sectionalism, Civil War & Reconstruction (3-12).** Directed original research on political and related topics of the period 1848-1877. May repeat to 6 hours maximum.

**454 Readings in American Western and Environmental History (3).** Readings, class discussion, and written analysis on topics in American Western and environmental history from early settlement to the present. May be repeated to a maximum of 6 hours.

**455 Seminar in American Western and Environmental History (3-6).** Directed research in problems in American Western and environmental history. May be repeated to maximum of 6 hours.

**460 Readings in the History of the South (3).** Group readings and appraisal of controversial interpretations in Southern history. May be repeated to a maximum of 6 hours.

**461 Seminar in the History of the South (3).** Directed research in the history of the American South.

**464 Readings in the Origins of Modern America (3).** Selected studies of major issues in American history, 1877-1929. May be repeated to a maximum of 6 hours.

**465 Readings in Recent United States History (3).** Critical evaluation of writing in American history in period 1929-present. May be repeated to a maximum of 6 hours.

**467 Seminar in the Origins of Modern America (3).** Selected topics and studies in American political and social history since the Civil War. May be repeated to a maximum of 6 hours.

**468 Seminar in Recent United States History (1-12).** Advanced seminar in American history from 1929 to present. May be repeated to a maximum of 6 hours.

**470 Readings in Latin American History (1-6).** Readings in standard and recent historical literature, with critical discussion of reports on special topics. May be repeated to a maximum of 6 hours.

**480 Readings in the History of American Diplomacy (3).** Readings in evolution of American diplomacy from the Revolution to present. May be repeated to a maximum of 6 hours.

**490 Research (cr. arr.)** f.w.

**491 Seminar in European Intellectual History (3).** Research on selected problems in the intellectual history of Europe in 18th, 19th and 20th centuries. Reading knowledge of one of following required: French, German, Italian, Russian. May be repeated to a maximum of 6 hours.

## HOME ECONOMICS

**10 Introduction to Home Economics (1-2).** Lecture-discussion of professional opportunities and their relationship to contemporary issues. Elective for freshmen and transfers. Graded S/U.

**110 Demonstration Techniques (2).** Open to all subject matter fields. Fundamental principles of demonstration. Professional and student demonstrations. Not open to freshmen. Prerequisite: 6 hours in major field.

**355 Recent Trends in Home Economics (1-3).** Selective review of current issues and related research in home economics and its specializations, emphasizing the integrative nature of the field. Relevant theories and principles will be reviewed. Prerequisite: instructor's consent.

# HOME ECONOMICS COMMUNICATION

**115 Media Techniques (3).** One extra credit hour may be arranged as lab. Survey of mass media techniques and methods of combining them effectively to disseminate home economics information. Includes projects and field trips. Prerequisite: sophomore standing, English 60, or equivalent.

**300 Problems (cr. arr.)** Library or laboratory problems selected for study by student, with guidance of staff member. Report required. Prerequisites: 200-level course in field of problem & senior standing & instructor's consent.

**350 Readings (cr. arr.)** Prerequisites: 200-level course in field of subject & instructor's consent.

**355 Recent Trends (1-2).** Prerequisite: at least one course in specific subject matter area or instructor's consent.

**390 Field Training (4).** Prerequisites: senior standing & instructor's consent.

**400 Problems (cr. arr.)** For students emphasizing home economics communications. Independent investigation. Prerequisites: senior standing & instructor's consent.

**410 Seminar (1-4).** Reports and discussion of recent work in area of concentration.

**415 Readings (cr. arr.)** For graduate students emphasizing home economics communications. Readings in current research and other publications. Prerequisites: 300-level courses in field of problem & instructor's consent.

**418 Topics (cr. arr.)** Selected current topics in field of interest.

**450 Research (cr. arr.)** Independent research not leading to thesis. Report required.

# HORTICULTURE

**10 Landscape Appreciation (3).** Open to all students. An inquiry into the quality of natural and man-planned landscapes. f, w.

**20 Basic Home Horticulture (3).** Discussions and scientific rationale of the current cultural practices for the growing of home horticultural plants. f, w.

**30 Plant Science (5).** (same as Agronomy 30).

**60 Flower Arranging (2).** Flower care, arrangements. Applies design principles to floral decorations for all occasions; interior decoration with plants. f, w.

**144 Vegetable Gardening (3).** Fundamentals and practices in growing, harvesting and storing vegetables for the family food supply. Prerequisite: Botany 12 or Agronomy 30. w.

**150 Micro-Environmental Design (3).** Interprets natural environments into the design, construction and maintenance of miniature landscapes. f, w.

**151 Plants for Interior Design (2).** Plants adaptable to or capable of becoming acclimated to interior environments. f.

**160 Garden Flowers (3).** Annuals, biennials, perennials, bulbs, house plants, water plants; their identification, nomenclature classification, culture, uses. w.

**195 Grapes and Wines of the World (1).** Reviews historical development of the wine industry and associated development of the grape industry, the winemaking process, the various types of wine produced, wine-producing regions of the world, various classification schemes and quality components. w.

**201 Ornamental Woody Plants I (3).** Identifies and evaluates trees and coniferous evergreens for landscape use. Prerequisite: 30 or Biological Sciences 1, 12 or 21. f.

**202 Ornamental Woody Plants II (3).** Identifies and evaluates shrubs, vines and ground covers for landscape use. Prerequisite: 30 or Biological Sciences 1, 12 or 21. w.

**203 Plant Propagation (3).** Principles, practices of propagation of horticultural plants. Prerequisite: 30 or Biological Sciences 12. f, w.

**204 Plant Environments (3).** Effects of water, light, temperature, and gases upon growth and physiology of plants; their control in plant production.

**205 Plant Nutrition (3).** Nutrient element requirements of horticultural crops. Detection of deficiencies; correction through management, fertilizer practices. Prerequisites: Agronomy 30 & Chemistry 1, 5 or 11. w.

**206 Plant Protection (3).** Control measures for diseases, insects, weeds and other pests of horticultural crops. Prerequisites: 30 & Entomology 101, or instructor's consent. w.

**207 Plant Origin and Development (3).** Traces development of horticultural plants by civilization from centers of origin to present, continuing improvement by modern methods of plant breeding. Prerequisite: 30 or Biological Sciences 12. w.

**250 Landscape Graphics (3).** Techniques of perspective and tools for man-inhabited spatial design. f, w.

**252 Planting Design I (3).** The art and science of plant selection based on aesthetic and environmental determinants, functional and visual requirements and expected maintenance. Prerequisites: 201, 202 & 250. w.

**254 Landscape Design (3).** Historical overview of the human and environmental relationships with respect to design on the land. Prerequisite: sophomore standing. f, w.

**255 Landforms (3).** Basic site engineering correlating design and technical aspects of site development and suitability. Prerequisite: Geology 1 or 2. f.

**257 Construction Materials (3).** Physical and aesthetic properties of inanimate materials and structural designs commonly used to organize landscape spaces. Prerequisites: 250 & Mechanical & Aerospace Engineering 20. f.

**266 Plant Forcing Structures (3).** Practical investigation of historical development, architectural styles, location, structural parts, climate control, interior equipment and maintenance of structures used for the production of flower and vegetable crops. alt. f. odd yrs.

**268 Floral Design (3).** Commercial floristry. Principles and practices in commercial floral designing of corsages, gift arrangements, memorial tributes, wedding and party decorations. Prerequisites: 60 & Art 2 or Art 455, or instructor's consent. f. even yrs.

**269 Flower Store Management (3).** Organization, store layout, policies and application of principles of marketing and business management to the operation of a retail flower shop. Prerequisites: 268 & Marketing 204. w.

**272 Planting Design II (3).** Spatial arrangement, understanding, compatibility, aesthetics and perceptual qualities of planting design. Prerequisites: 250 & 252. f.

**300 Problems (cr. arr.)** Prerequisite: consent card required.

**301 Post-Harvest Physiology (3).** Physiological processes occurring after harvest in flowers, fruits, vegetables, nursery stock; control of preservation of quality. Prerequisite: 204. f. even yrs.

**323 Diseases of Ornamentals and Turf (2).** (same as Plant Pathology 323).

**330 Fruit Production (5).** Advanced study of fruit industry; emphasizes production, management of deciduous tree, small fruit enterprises. Prerequisites: 203, 204, 205, or instructor's consent. f. odd yrs.

**344 Commercial Vegetable and Truck Crop Growing (5).** Advanced study of commercial vegetable enterprises including growing areas, management, production problems, practices. Prerequisites: 204 & 205 & 206, or instructor's consent. f.

**345 Vegetable Forcing (3).** Specific problems encountered, practices employed in production of lettuce, tomatoes, mushrooms in forcing structures. Prerequisites: 204 & 205 & 206, or instructor's consent. w. odd yrs.

**350 Landscape Graphics Communication (3).** Experimentation with various techniques and media of graphics. Prerequisites: 254 and 272; instructor's consent. w.

**352 Planting Design III (4).** Project-oriented planting design studio providing plans for projects. Prerequisites: 250, 254 & 272. w.

**354 Advanced Landscape Design (4).** Development of project presentation techniques by analysis of the social, cultural, historical and ecological aspects of landscape design. Prerequisites: 352 & instructor's consent. f.

**355 Turf (3).** Characteristics of turf materials, principles of establishment and maintenance. Prerequisites: 204 & 205 or instructor's consent. w.

**356 Arboriculture (3).** The establishment and cultivation of outdoor ornamental plants.

**357 Nursery Crop Production and Management (4).** Operations, methods used by wholesale, retail, landscape nurseries. Field problems, observational trips. Prerequisites: 203 & 204. f.

**361 Fall Greenhouse Crops (4).** Business management problems of a commercial greenhouse range; culture of commercial cut flowers and potted plant crops. Prerequisites: 203 & 204 & 205 or instructor's consent. f.

**362 Spring Greenhouse Crops (4).** Continuation of 361. Production management problems and commercial culture of spring cut flowers and potted plants. w.

**390 Horticulture Internship (3).** Through practical work experience, under the direct supervision of an academic adviser and a horticulture business manager, a student develops and applies knowledge of horticulture. A student should consult an academic adviser for internship details. Prerequisites: junior standing, advisor's consent. f, w, s.

**402 Topics in Horticulture (cr. arr.)** Discusses highly specialized topics in the field of horticulture. Prerequisites: graduate standing & consent card required.

**406 Plant Growth Regulating Substances (3).** Chemistry, physiology and practical applications of plant growth regulating substances in development of plants. Prerequisites: Biological Sciences 313 & 6 hours organic chemistry. w.

**407 Breeding of Horticultural Plants (cr. arr.)** Literature and original investigations on breeding, selection of horticultural plants. Prerequisites: graduate standing; Agronomy 179 or Biological Sciences 202 & 341, & instructor's consent. f, w.

**408 Nutrition of Horticultural Plants (3).** Important nutrient elements; their absorption, utilization. Prerequisite: 205 or equivalent. f. odd yrs.

**410 Seminar (1).** Recent investigations in horticulture and related fields. f, w.

**415 Methods of Horticultural Research (3).** Methods of procedure in investigations, outlining problems; assembling and analyzing data; presenting results. alt. f. even yrs.

**444 Advanced Olericulture (3).** Physiological factors affecting growth, harvesting, storage of vegetable crops. Survey of fundamental literature. Prerequisites: graduate standing, 344, 345. w.

**450 Non-Thesis Research (cr. arr.)** Prerequisite: consent card required.

**490 Research (cr. arr.)**

# HOUSING AND INTERIOR DESIGN

**40 Principles of Environmental Design (3).** Lecture. Basic principles, elements, physical properties, and history of design as they relate to interiors, housing, and the community.

**41 Design I (3).** Studio experience. Two-dimensional aspects of visual composition: space, line, form, texture; emphasizes properties of color. Prerequisite or corequisite: 40 or equivalent.

**42 Design II (3).** Studio experience in three-dimensional concepts. Construction in paper, wood, plastics, light metals, plaster, and other materials to promote understanding of space and form. Prerequisite: 40, 41, or equivalent.

**140 Residential Design I (3).** Interior space planning, furniture arrangement and selection, with emphasis on color, fabrics, and accessories. Floor plans, elevations and/or models. Prerequisite: 40, 41 or equivalent (Mechanical & Aerospace Engineering 20 for majors).

**141 Architectural Design I (3).** Man's intimate environment and shelter with emphasis on life style patterns. Investigates components, materials, and space enclosures relative to human scale and habitability. Prerequisite: 140, 142.

**142 Construction Techniques for Interior Components (3).** Lab study of the techniques and technology in housing design and construction. Prerequisites: 40, 41, & Mechanical & Aerospace Engineering 20.

**146 Personal Applications for Microcomputers (1).** (same as Family Economics and Managements 176).

**147 Presentation Graphics (3).** Interior perspectives and presentation techniques. Prerequisites: 40, Mechanical & Aerospace Engineering 20.

**148 Design III (3).** Advanced studio experience in interior perspective and presentation techniques. Prerequisite: 147.

**149 Contract Design I (3).** Introduces the profession of interior design, business principles and practices; resources, materials, furnishings, and lighting for the commercial interior. Prerequisite: HID 140.

**300 Problems (cr. arr.)** Supervised independent work. Prerequisites: 200-level course in field of problem & junior or senior standing & instructor's consent.

**318 Topics (cr. arr.)** Selected current topics in field of interest.

**340 History of the House and Its Furnishings (3).** Historic residential architecture, interior treatment, and furnishings. Prerequisites: Art History & Archaeology 10 & junior or senior standing.

**341 Computer-Graphic Applications to Design (3).** Introduces applications of computer graphics to design and art; includes previsualization, drafting and creative development. Using a variety of program packages for graphic output, pure and applied design will be generated. Prerequisite: junior standing.

**342 Residential Design II (3).** An in-depth interior design experience involving residential clients, with emphasis on business procedures and resources, including consultation, design solutions and presentations. Prerequisite: 141, 147 and 149.

**343 Contemporary Designers (3).** Historical survey of contemporary designers and craftsmen. Interviews, studio visits, discussion with practicing designers and craftsmen. Prerequisites: Art History & Archaeology 10 & junior or senior standing.

**344 Architectural Design II (3).** Design of architectural projects influenced by form and function within the dictates of zoning and codes. Critique of projects by architects or by other professionals. Prerequisite: 141, 147 and 149.

**346 Contract Design II (3).** Contract design and specification procedures relative to multiple spaces, public environment. Advanced problem solving on specific projects related to business and the community. Advanced graphic and presentation procedures, team projects. Prerequisite: 149, 147, 141.

**347 Design Techniques for Environmental Components I (3).** Studio experience in designing environmental art for specific locations. Prerequisite: 141.

**348 Design Techniques for Environmental Components II (3).** Studio experience in the design of components for environmental spaces with emphasis on fabrics, floor coverings and wall coverings. Prerequisites: 141, 148.

**349 Housing Fundamentals (3).** Documentary film study of U.S. housing and the social and technological factors that influence housing design. Housing viewed as an accommodation for human life. Prerequisite: junior standing.

**350 Readings (cr. arr.)** Readings in recent research materials. Prerequisite: graduate standing.

**390 Field Training (cr. arr.)** Field experience in design under professional and educational supervision. Prerequisites: advanced standing & instructor's consent.

**400 Problems (cr. arr.)** Prerequisites: 300-level course in field of problem & instructor's consent.

**410 Seminar (1-4).** Reports, discussion of recent work in area of concentration.

**412 Research Methods in Housing & Interior Design (3).** A comparative case study of classic and current studies in housing and design, with emphasis on research results and methodologies employed. Lectures and seminar discussions. Prerequisite: 12 hours advanced design.

**415 Readings (cr. arr.)** Readings in recent research materials. Prerequisite: graduate standing, 350.

**441 Advanced Interior Design (4).** Design of modern functional interiors; modern adaptations of historic material; design for residential

and professional establishments. Prerequisites: 342, 346, & instructor's consent.

**446 History of Accessories in Interior Design (3).** Historic study of decorative arts (pottery, china, glass, metal-work, etc.). Prerequisites: 340 or equivalent; 345 & 6 hours art history.

**450 Research (cr. arr.)** Independent research not leading to a thesis. Research project and report required.

**490 Research (cr. arr.)** Independent research leading to thesis or dissertation.

# HUMAN NUTRITION, FOODS, & FOOD SYSTEMS MANAGEMENT

**21 Elementary Food Preparation (2).** Emphasizes principles of selection, preparation, combination of foods. Lecture and Laboratory. Not for HNFSSM majors. No credit if taken after HNFSSM 121.

**34 Nutrition, Current Concepts and Controversies (3).** Basic nutrition principles and current controversies are presented. Emphasis on role of nutrition in maintaining health as well as exploring the scientific validity of popular nutrition beliefs. No credit if taken after 234.

**38 Introduction to Dietics (1).** Introduction to concepts of the roles of a dietician and various settings in which these roles are performed.

**121 Principles of Food Preparation (5).** (same as Food Science & Nutrition 121). Scientific principles underlying selection and preparation of food. Lecture & lab. Prerequisite: Chemistry 1 or Chemistry 11 or equivalent.

**122 Food Buying and Meal Management (2-3).** Factors affecting cost of food. Applies principles of food buying and food preparation to menu planning, meal preparation and service. Prerequisite: 21 or 121.

**131 Basic Concepts of World Nutrition (3).** Transdisciplinary approach to nutrition, considering anthropological, physiological, geographical, socioeconomic and psychological elements in world nutrition.

**221 Science of Food Preparation (3).** Principles of food preparation as related to chemical and physical properties of foodstuff. Prerequisites: 121; organic chemistry.

**224 Meat Selection and Identification (3).** (same as Food Science & Nutrition 224).

**228 Principles of Food Systems Management (3-4).** (same as Food Science & Nutrition 228). Organizational structure and relationships; policy making and implementation; budgeting and cost control; menu as a management tool; sanitation and safety; food preparation; and food delivery systems. Prerequisite: 121, Biological Sciences 212 or Microbiology 205.

**234 Human Nutrition I (3).** Basic concepts of normal nutrition related to physiological/chemical processes; changing nutrient needs during human life cycle, emphasis on adult; some social/psychological influences on dietary habits. Prerequisites: organic chemistry and physiology, or instructor's consent.

**235 Nutrition Education (3-5).** Concepts and techniques used in nutrition education. Five hours include guided experience for medical dietetic students in application, analysis, and evaluation of knowledge in the professional environment. Prerequisite: 234, sociology, psychology or instructor's consent.

**236 Evaluation of Nutritional Status (3).** Application of methods of evaluating nutritional status and development of nutritional care plans for hospitalized patients. Prerequisite: 235.

**238 Diet Therapy for Health Professionals (3-4).** Disease processes and principles underlying diet therapy. Guided experience in planning, delivering, and evaluating dietetic care. Prerequisite: 234.

**300 Problems (cr. arr.)** Library or lab; problems selected for study by student with guidance of staff member. Prerequisites: 200 level course in field of problem & senior standing & instructor's consent.

**318 Topics (cr. arr.)** Selected current topics in field of interest. Prerequisite: Junior standing.

**320 Cultural Food Patterns (2).** World food patterns including their nutritional significance. Applies scientific principles to preparation of these foods. Lecture and lab. Prerequisite: 21 or 121.

**321 Experimental Foods (3).** Introduces scientific method of problem solving with food. Group and individual research. Prerequisite: 221 or instructor's consent.

**322 Food Experiences for Children (3).** (same as Curriculum & Instruction T322). A combination of food and nutrition concepts with laboratory experiences for teaching the child, followed by planning and developing materials activities for teaching these concepts to children. Prerequisite: junior standing.

**323 Modern Methods of Food Preservation (3).** Survey of literature and lab work on improvements in traditional methods and new methods of home food preservation. Prerequisites: 121 & organic chemistry.

**324 Food Production in Foodservice Systems (5).** A lecture/lab/practicum designed to expose students to concepts of quality food production, evaluation of product and resources, and food microbiology application in lab/practicum. Prerequisite: 221, 228 and instructor's consent.

**325 Food Procurement and Fiscal Management (6).** Lecture/prac-

ticum course meeting entry level management competencies for quantity food purchasing, practicum course meeting entry level management competencies for quantity food purchasing, nutritional and quality attributes, personnel administration, materials management, fiscal control. Prerequisites: 324. (only FSM CUP students enroll for 6 hours)

**326 Development, Utilization and Maintenance of Physical Resources (2-4).** (same as Food Science & Nutrition 326). Systems approach to planning and team approach to layout of facilities; preparation of specifications for equipment. Prerequisite: 325.

**327 Operations Analysis in Food Systems (3-4).** (same as Food Science & Nutrition 327). Application of concepts of quantitative methods of management science to optimize decisions concerning policies, design and procedure for control and evaluation of food systems. Prerequisite: 228, Computer Science 104 or Computer Science 203.

**328 Management of Food Systems (1-8).** Principles of organization/management in various facilities; staff responsibility experiences; independent study; bimonthly joint conference with medical dietetic majors, emphasizing mutual concerns. Prerequisites: 325, 327; senior standing. FMS CUP majors only take 8 hours.

**330 Child Nutrition (3).** (same as Child & Family Development 330). Applies nutrition principles to feeding of children from infancy through adolescence. Prerequisite: a course in nutrition.

**333 Human Nutrition II Laboratory (1).** A techniques course in nutrition, usually taken concurrently with 334. Prerequisites: 234, biochemistry, & instructor's consent.

**334 Human Nutrition II Lecture (3).** Physiological and biochemical aspects of nutrition; functions of methods of measuring nutritional status; various aspects of applied nutrition. Prerequisite: 234, biochemistry, or instructor's consent. Continuation of 234.

**335 Nutrition During the Life Cycle (3).** (same as Nutrition 335). Nutritional, physiological and environmental influences on the aging process of man from conception through senescence. Prerequisite: 334 or equivalent.

**338 Diet Therapy (3-6).** Physiological and biochemical anomalies of disease and the principles underlying diet therapy. Six hours include guided experience for medical dietetic majors in nutritional care of selected patients. Prerequisite: 334 or instructor's consent.

**339 Medical Dietetics (3-12).** (same as Nutrition 339). Applies concepts of sciences, humanistic studies, and dietetics to planning, evaluating, and administering the nutritional care of people. Prerequisite: 338 or instructor's consent. Only medical dietetics majors may take 12 hours.

**350 Readings (cr. arr.)** Prerequisites: 8 hours of course work in field of subject & instructor's consent.

**355 Recent Trends (1-2).** For upper-class and graduate students who wish additional knowledge and understanding in specific subject matter areas.

**375 Sensory Analysis of Food (3).** (same as Food Science & Nutrition 375).

**376 Microwave Heating of Food (2).** (same as Food Science & Nutrition 376).

**390 Field Training (cr. arr.)** Prerequisites: junior or senior standing & instructor's consent.

**400 Problems (cr. arr.)** Prerequisite: instructor's consent.

**410 Seminar (1-4).** Reports and discussion of recent work in area of concentration.

**412 Research Methodologies for Food Systems Management (2).** An overview of research methodologies for food systems management, with emphasis on the logistics of performing graduate research. Prerequisite: graduate standing in food systems management or instructor's consent.

**415 Readings (cr. arr.)** Prerequisites: 15 hours course work in field of subject and instructor's consent.

**419 Field Training (cr. arr.)** Internships and/or field experiences under supervision. Prerequisites: graduate standing & instructor's consent.

**421 Advanced Experimental Foods (3).** Further development of the concepts and experience in planning, conducting, interpreting, and reporting food preparation research. Prerequisites: 321 & statistics at 200 level.

**428 Advanced Food Systems Management (3).** An intensive study of the application of current management concepts and management science techniques to financial and professional accountability in food systems. Prerequisite: graduate student in food systems management or instructor's consent.

**431 Nutritional Perspectives (3).** Surveys various factors relating to man's food habits and nutritional status; emphasis on national and international nutrition problems. Prerequisite: a course in nutrition.

**432 Nutritional Integration of Metabolism (3).** Discusses mammalian metabolism emphasizing relationships between nutrient intake and biochemical and physiological events occurring in cell, organ, and whole organism. Prerequisites: 334 & advanced biochemistry.

**436 Advanced Nutrition (3).** Lecture-discussion of current and classical literature, emphasis on normal nutrition. Prerequisite: 334 or instructor's consent.

**450 Research (cr. arr.)** Independent research not leading to a thesis. Report required

**490 Research (cr. arr.)** Independent research leading to thesis or dissertation.

# INDUSTRIAL ENGINEERING

**17 Experimental Course (cr. arr.)** For freshman-level students. Content and credit hours to be listed in Schedule of Courses.

**300 Problems (1-4).** Supervised investigation in industrial engineering presented in form of engineering report.

**301 Topics in Industrial Engineering (3).** Current and new technical developments in industrial engineering.

**307 Operations Research Methods (3).** Study of quantitative methods necessary for analysis, modeling and design of optimal industrial systems. Prerequisite: Mathematics 175.

**337 Reliability I (3).** Use of Boolean algebra in design and analysis of complex engineering systems. Reliability of system in terms of component reliabilities. Poisson process as basic failure model. Life testing techniques. Maintainability. Reliability demonstration procedures. Prerequisite: 339 or equivalent.

**339 Evaluation of Engineering Data (3).** Use of statistical methods to aid in analysis and interpretation of simple engineering experiments and surveys. Sampling procedures, estimation, testing of hypotheses. Linear and nonlinear relationships. Introduction to multivariate situations. Prerequisite: Mathematics 175.

**340 Experimental Design (3).** Principles and procedures of design and analysis of engineering experiments and sampling surveys. Prerequisite: 339.

**349 Engineering Quality Control (3).** Analysis of quality in manufacturing; design of quality control systems using statistical and other engineering methods. Prerequisite: 339 or equivalent.

**351 Plant Layout and Materials Handling (3).** Facilities arrangement and economic selection of materials-handling equipment in a plant or office. Emphasizes optimization of materials and information flow. Prerequisite: 358, 361, 385.

**358 Economic Studies in Engineering (3).** Engineering economy models for evaluating alternatives in design, selection, use of system components.

**360 Measurement of Human Work (3).** Methods of measuring human performance in work systems. Emphasis on techniques used in developing standard allowed times. Introduction to measuring physiological parameters in work systems. Prerequisite: Engineering 132 or equivalent.

**361 Introduction to Human Factors Engineering (3).** Examines problems and processes involved in designing man-machine systems considering capabilities and limitations of human component. Prerequisite: 360.

**371 Applied Robotics in Production (3).** (same as Mechanical and Aerospace Engineering 371). Robot structures and arm geometry, drive systems and effectors, work station design, reliability, management aspects, economic factors, applications in various industries and flexible manufacturing systems.

**372 Integrated Production Systems (3).** (same as Mechanical and Aerospace Engineering 372). Applications and standard program files of NC, DNC, CNC machines and industrial robots; CAD/CAM and automated inspections; computer integrated production and support systems.

**381 Industrial Systems Design II (4).** Series of industrial systems design problems, each structured to integrate material presented in several theory or methods courses. Prerequisites: senior standing and 361.

**382 Industrial Engineering Seminar (1).** Selected topics in industrial engineering. Oral presentations and engineering reports. Prerequisite: junior standing in department.

**383 Management Information Systems Design (3).** Review of management and organizational structure and theory, concepts of information and data structures, transaction processing, computer hardware, software, and telecommunications considerations. Prerequisite: senior standing.

**385 Manufacturing Systems Design (3).** Design project involving development, analysis and comparison of alternate methods of manufacturing a product. Extensive survey of a variety of manufacturing methods is included.

**387 Linear Programming (3).** Theory and application of linear programming. Prerequisite: Mathematics 80.

**388 Industrial Systems Simulation (3).** Construction of simulation models: methods of generation of stochastic variates, time incrementation, verification. Design of simulation experiments; use of special purpose simulation language. Prerequisites: 339; 397, Engineering 5.

**397 Operations Research Models (3).** Formulates mathematical models and determines optimal policies for inventory, replacement, competitive and queueing systems. Introduces dynamic programming. Prerequisites: Engineering 132, Mathematics 304.

**398 Scheduling Systems (3).** Quantitative methods for forecasting, scheduling, and controlling production in complex manufacturing systems. Prerequisite: Engineering 132; corequisite: 387.

**400 Problems (cr. arr.)** Supervised investigation in industrial engineering to be presented in the form of an engineering report.

**401 Advanced Topics in Industrial Engineering (3).** Current and new technical developments in industrial engineering.

**404 Industrial Engineering Graduate Seminar (1).** Selected topics in industrial engineering. Oral presentations and engineering reports.

**405 Research Methods in Industrial Engineering (1).** Development of research approach. Selection of topic area including techniques of literature search with special emphasis on problem definition. Topics pertinent to planning, organizing and carrying out industrial engineering research or design project.

**408 Management of the Engineering Function (3).** Design of procedures for the planning, evaluation and control of the engineering function. Analysis of alternative management styles and operational policies. Prerequisite: 411.

**411 Scientific Management (3).** Theory and basic principles of scientific management in engineering. Writings of Taylor, the Gilbreths, Gantt and other pioneers of scientific management. Growth of modern industrial management from principles of scientific management.

**415 Advanced Economic Studies in Engineering (3).** Theoretical basis for engineering economy methods, problems of parameter estimation, depreciation, and replacement studies. Prerequisite: 358.

**431 Stochastic Service Systems (3).** Development and application of stochastic models in the design of service systems in which either demands for service or services supplied, or both, have a probabilistic nature. Prerequisite: Statistics 325.

**432 Advanced Stochastic Service Systems (3).** Operating characteristics of the simple models and development and application of more complex models with special reference to group arrivals, batch service and priority disciplines. Prerequisite: 431.

**437 Reliability II (3).** Development and application of quantitative models for planning and evaluation of the performance of engineering systems. Prerequisite: 337.

**439 Quality Control Systems (3).** Design of acceptance sampling plans and quality control tests based upon the power function criterion and the Bayesian minimum cost criterion. Prerequisite: 349.

**440 Advanced Evaluation of Engineering Data (3).** Application of advanced statistical methods for the analysis of engineering design and experimental problems. Prerequisite: 339.

**460 Design and Measurement of Work Systems (3).** Process of work system design, principles of alternative development and evaluation, testing and implementation of work systems, and measurement of system performance. Prerequisite: 339 or a course in introductory statistics.

**461 Health Care Systems Design I (3).** Health care systems design principles and major problems, basic organization within health care system, alternative system design strategies, factors affecting design process success. Prerequisite: Health Services Management 310 concurrently or instructor's consent.

**462 Health Care Systems Design II (3).** Solutions to specific health care systems design problems utilizing field work/case studies. Study areas, based on significance/existence of established methodologies, include nurse staffing, patient scheduling, procedure costing, blood banking, technology evaluation. Prerequisite: 461.

**463 Disease Diagnosis and Treatment (3).** Methods used/resources required in diagnosis/treatment across disease spectrum. Information for health care system designers on delivery system capabilities relative to health professionals/patients' needs. Prerequisite: 461 or Health Services Management 310.

**465 Human Work Performance (3).** Develops human performance theory, subjective and objective measurement of performance and their problems; effect of psychological and physiological factors on performance degradation. Prerequisite: 360.

**468 Human Factors (3).** Human factors inputs, outputs and environment and their influence on design and evaluation of man and machine systems. Prerequisite: 361.

**470 Operations Research Applications (3).** Applications of operations research methods including queuing, inventory, sequencing, competitive strategies, replacement, and networks. Prerequisite: 339 or a course in introductory statistics.

**471 Advanced Methods of Operations Research (3).** Theory, computational methods and application to operations research models of continuous and discrete variable optimization. Prerequisite: 470.

**472 Nonlinear Optimization (3).** Introduces computational nonlinear mathematical programming procedures; their use in solving complex industrial systems design problems. Prerequisite: 387.

**475 Inventory Control Systems (3).** Design of optimal inventory control systems. Includes selection of operating doctrine, development of several deterministic, stochastic, static and dynamic models and methods of collecting appropriate demand and cost data. Prerequisites: 339 and 387.

**480 Linear Programming Applications (3).** Theory and computational method of the simplex algorithm. Application of linear programming in solution of transportation problems, competitive games, scheduling problems, and product mix problems.

**483 Advanced Management Information Systems Design (3).** Develops requirements for management information, staffing, cost estimating, evaluation, and the design of management communication systems. Includes case studies. Prerequisite: 383.

**484 Dynamic Programming (3).** Introduces theory and computational aspects of dynamic programming; its application to sequential decision problems. Prerequisites: 339 & 387.

**487 Advanced Linear Programming (3).** Advanced study of linear programming including revised simplex, duality, primal-dual methods, capacitated transportation problem, decomposition principle, introduction to quadratic programming. Prerequisite: 387.

**488 Integer Programming (3).** Comprehensive appraisal of integer programming problem and current solution procedures. Prerequisite: 387.

**490 Research (cr. arr.)** Independent investigation in field of industrial engineering to be presented as a thesis.

## INFORMATION SCIENCE

**101 Computers in Library and Information Science (3).** Introduces use of computers in bibliographical problems; thorough coverage of PL/I; emphasizes character string manipulation and logical operations, including Boolean operators. Course utilizes computer in an interactive mode. Prerequisite: junior standing. f.s.

**301 Introduction to Information Science (3).** Introductory survey to information science. Includes topics in the information transfer chain, spatial transfer of information, temporal transfer of information and information systems. w.

**302 Information Systems I (3).** Objectives, components, organization, and performance of systems for transfer of information. Prerequisite or concurrent: 101 or equivalent. f. alt. s.

**350 Special Readings (cr. arr.)** (same as Library Science 350).

**400 Problems (cr. arr.)** Special problems in information system design and evaluation, for individual directed study. Prerequisites: graduate standing & departmental consent. f.w.s.

**401 Library Information Systems (5).** (same as Library Science 401). Introduces the use of computers in bibliographic environments through coverage of PL/I, with emphasis on character string manipulation in an interactive mode, and evaluation of current commercial library automation packages. f.w.s.

**402 Information Systems II (3).** Continuation of 302. Study of information center management and planning; tools for decision making; measures for evaluation; client/information considerations. Prerequisites: 302 & graduate standing, or departmental consent. w.

**410 Seminar in Information Science (1-3).** Discussion and critical study of current developments in information science. Prerequisite: departmental consent. f.w.

**412 Information Storage and Retrieval (3).** Introduces student to those techniques and models which are currently topics of research in information science. Emphasizes techniques useful in an automated environment. Automatic indexing, automatic classification and bibliometrics included. Prerequisite: departmental consent. w. alt. s.

**413 Abstracting and Indexing (3).** (same as Library Science 413). Representational components of information systems presented in context; emphasizes creation of abstracts, and characteristics and use of post-coordinate indexing languages. Practical experience in use and evaluation of indexing systems stressed. Prerequisite: departmental consent. f. alt. s.

**424 Micrographics and Libraries (3).** (same as Library Science 424).

**432 Automated Reference Services (3).** (same as Library Science 432). General summary of available systems and their characteristics; particular emphasis on those available to the general library community. Machine searching experience with major brokers provided. Prerequisites: 101, 413, Library Science 332 & departmental consent.

**441 Information Systems Resource Management (3).** (same as Library Science 441). Use of bibliometric techniques for management decisions in effective utilization of resources of information systems. Intensive study of selected topics related to library and information center management. Prerequisites: Library Science 341 & departmental consent. w. alt. s.

## ITALIAN

**1 Elementary Italian I (5).**

**2 Elementary Italian II (5).** Continuation of 1. Prerequisite: grade of C or better in 1 or its equivalent.

**106 Italian Composition (3).** Prerequisite: 3 or equivalent.

**109 Italian Conversation (3).** Prerequisite: 3 or equivalent.

**110 Italian Civilization (3).** Open to any student interested. No knowledge of Italian required. Prerequisite: Sophomore standing.

**111 Italian Literature in Translation (3).** May not be included in area of concentration in Italian. Subject varies with instructor. Prerequisite: Sophomore standing.

**197 Honors Thesis in Italian (3).** Required of Honors candidates. Prerequisite: major in Italian.

**201 Topics (cr. arr.)** Organized study of selected topics. Subjects and earnable credit may vary from semester to semester. Repeatable with departmental consent.

**206 Advanced Italian Composition (3).** Prerequisite: 106 or equivalent.

**207 Intensive Beginning Italian (3).** Designed for rapid acquisition of a reading knowledge of Italian. Cannot be taken to fulfill undergraduate language requirement. Prerequisite: Graduate standing or instructor's consent.

**209 Advanced Italian Conversation (3).** Prerequisite: 109 or equivalent.

**301 Topics (cr. arr.)** Organized study of selected topics. Subjects and earnable credit may vary from semester to semester. Repeatable with departmental consent. Prerequisite: Junior standing.

**311 Survey of Italian Literature I (3).** From 1200 to 1600. Prerequisite: 3, 207 or equivalent.

**312 Survey of Italian Literature II (3).** From 1700 to present. Prerequisite: 3, 207 or equivalent.

**319 Nineteenth-Century Italian Literature (3).** Prerequisite: 3 or equivalent.

**321 Dante (3).** Prerequisite: 3 or equivalent.

**350 Special Readings (1-3).** Independent study through readings, conferences, reports. Prerequisite: 3 or equivalent. f.w.

**400 Problems (cr. arr.)** Prerequisite: Graduate standing.

## JOURNALISM

**101 Introduction to Broadcast News (3).** Introduction to broadcast news; the use of audio and video tape equipment, film cameras, film editing; and the ethics and responsibilities of broadcasting. Prerequisite: instructor's consent. f.w.s.

**102 Intercession Colloquium (0).** Lecture portion of any course the student plans to take later during an intercession, with the exception of courses 112, 323, 400, 490 and 499. Prerequisite: dean's consent. f.w.s.

**104 News Practicum (3).** Instruction in fundamentals of newswriting for students entering the graduate program without an undergraduate degree in journalism. f.w.s.

**105 News (3).** Typing skill of 35-40 words a minute is essential. Introduction to fundamentals of newswriting. Lectures, discussions and laboratory work provide training under deadline pressure in writing basic news stories. Students cover several "live" assignments. f.w.s.

**109 Editing Practicum (3).** Instruction in fundamentals of editing for students entering the graduate program without an undergraduate degree in journalism. f.w.s.

**110 Editing (3).** Prepare local and wire service articles and photographs for newspaper publication; headlines and cutlines; introduces newspaper design, and experience with video display terminals. Prerequisite: 105. f.w.s.

**112 Communications Practice (1-2).** Special laboratory instruction for seniors in various departments of the school's media. Enrollment must be completed in office of the dean, with permission of instructor. f.w.s.ss.

**113 Internship (2).** Credit for approved employment in journalism. Specifications for this course appear in the Undergraduate Catalog. f.w.s.

**119 Promotional Writing (3).** Basic principles of English, news writing and editing applied to areas of promotion, advertising, publicity and public relations. Practical writing and editing exercises for all media. f.w.s.s.

**120 Advertising Principles and Practice (3).** Prerequisite to all other advertising courses. Advertising fundamentals in relation to modern business activities. Two hours lab weekly. f.w.s.

**140 Basic Press Photography (3).** Introduction to news photography. Basic camera and darkroom techniques, placing emphasis on the development of sensitivity to people, circumstances and events. Prerequisite: instructor's consent. f.w.s.

**144 Intermediate Press Photography (2).** Advanced techniques and problems in visual communication. Lighting (existing, studio, electronic flash), special lenses and cameras, macrophotography, copying, formal and informal portraiture, composition, illustration, sequences. Prerequisite: 140. f.w.s.

**189 Journalism Careers (0).** A required course for all candidates for the B.J. A survey of opportunities and problems of the young professional journalist. Should be taken the second semester before graduation. Graded S/U only. f.w.s.

**199 Problems (1-3).** For undergraduates only. Individual research under direction of a faculty member. Project must be set up with instructor before registration. Approval of department chairperson required. f.w.s.ss.

**231 Economic Analysis for Journalists (3).** (same as Economics 231).

**300 Mass Media and Society (2).** (same as Peace Studies 300). Introductory course designed to acquaint student with concepts and functions of journalism in American society. Stresses the basic issues and problems facing journalists and the mass media. f.w.s.

**301 Topics in Journalism (1-3).** Selected current topics in journalism. Specific topics to be announced at time of registration. f.w.s.ss.

**302 The Foreign Press (2).** Major press systems of the world; emphasis on the print media and differing journalistic concepts. Leading newspapers and magazines of the principal nations, with some consideration given to news agencies and broadcasting. f.s.

**303 International Journalism (2).** (same as Peace Studies 302). News facilities around the world, barriers in international communications, press problems of developed and especially of developing nations, and friction and understanding created by the press. w.

**304 Communications Law (3).** Legal limitations and privileges affecting publishing, advertising, broadcasting. Consideration of legal philosophy bearing on media of communication. Prerequisite: 104 or 105. f.w.

**305 Critical Reviewing (2).** Book, movie, theatre and television reviewing. Reviews published in Vibrations. Prerequisites: 104 or 105 & instructor's consent. f.w.s.

**306 Reporting (3).** Assignments on a daily city newspaper covering community news, city, county and state affairs, sports, women's interest news. Experience in gathering and writing news, rewrite under day/night deadline situations. Prerequisite: 104 or 105. f.w.s.ss.

**307 Advanced Reporting (3).** Assignments to more difficult beat areas, team reporting, and some investigative reporting for community newspaper. Individual conferences and weekly class sessions on contemporary reporting problems. Prerequisite: 306.

**308 Law and the Courts (2).** Lectures, readings, discussions, writing assignments relating to justice system reporting from the view of attorneys, prosecutors, judges, correction and probation officers, with the cooperation of the Missouri Bar. Prerequisite: 104 or 105. f.w.

**309 History and Principles of Journalism (3).** History of the mass media in America, tracing the development from the colonial press through the complex mass media of today. f.w. cor.

**310 Newspaper Editing (3).** Laboratory work on the Columbia Missourian plus lectures on page makeup and news evaluation. Prerequisite: 110. f.w.s.ss.

**311 Advanced Newspaper Editing (3).** Continuation of desk editing plus the opportunity for qualified students to design pages for the Columbia Missourian. Seminars led by faculty supervisors. Prerequisite: 310. f, w, s, ss.

**314 Basic Issues in the News (3).** Current issues of American society discussed. Thorough research emphasized in articles written for editorial page with emphasis on quality of writing. Prerequisite: 306 or 353. f, w.

**315 Reporting of Public Affairs (3).** Designed to acquaint reporter with public issues. Each reporter writes three special papers and five news stories. Students meet weekly with instructor for editorial suggestions. Prerequisite: 307. f, w.

**316 Science Writing (3).** Reporting in field of science, including medicine and environment. Prerequisites: 307 or 360 & basic science courses or instructor's consent. f, w.

**317 Reporting Local Government (2).** Examines local government with the aid of local officials. Readings, lectures, discussions with city and county officials and with experts in such areas as welfare, criminal justice, education, medical care. f, w.

**318 Introduction to Selling for the Mass Media (3).** Function of media sales in society. Sales techniques including psychology of selling, use of research, cooperative advertising and client service. Students are sales assistants for the Missourian. Prerequisite: 120 or 320. f, w, ss.

**320 Dynamics of Advertising (2-3).** A survey of factors influencing advertising. Emphasis on the basic values, functions, procedures, evaluation, and organization of advertising. Term paper. Prerequisite: instructor's consent. f, w, s.

**321 Advertising Copy, Layout and Production (3).** Application of product and market research to specific creative problems in advertising. Prerequisites: 120 or 320, 105 or 119, and 336 or 336 concurrently.

**322 Psychology in Advertising (2).** Application of psychological principles, learning, perception, motivation, attitudes to advertising. Emphasis on the increasing use of psychographics (the "life style" factor) to understand consumer wants and buying behavior. Prerequisite: 120 or 320. f, w.

**323 Advertising Salesmanship (3).** Professional sales techniques, account service, advertising production, cooperative advertising, offset techniques, market data. Students assigned retail and classified accounts for which they will prepare, service and sell advertising. Prerequisites 318, 321. f, w, s, ss.

**324 Advertising and Public Relations Campaigns (2).** Marketing-oriented approach to the total campaign. Interrelates managerial, creative and technical skills with emphasis on problem-solving and marketing communication. Prerequisites: 321 and instructor's consent. w.

**325 Media Promotion (2).** Use of promotional tools and methods in relation to specialized promotion of media. Prerequisites: 104 or 105 & 120 or 320. f, w, s.

**326 Broadcast Advertising (3).** Broadcast advertising, and its business and creative functions. Emphasis on research, creative strategies, script/storyboard preparation and presentation, and commercial analysis. Familiarization with procedures, techniques, and facilities used in production. Prerequisite: 321 or instructor's consent. f, w.

**327 Direct and Mail Order Advertising (2).** Direct mail advertising and mail order promotion, retail and national; mailing lists, copy, production, postal regulations, strategy. Prerequisite: 321. f.

**328 Retail Advertising (2).** Basic concepts of marketing, advertising, merchandising, and salesmanship, as they apply specifically to the retail firm, the advertising agency handling retail clients, and media retail advertising departments. Prerequisite: 120 or 320. f, w, s.

**329 Creative Strategy and Tactics (2).** Advanced course in creation of broadcast, print advertising. Emphasis on strategic planning, developing creative concepts, producing and polishing copy and visuals, execution of finished product, and refining presentation skills. Prerequisite: 321. f, w.

**330 Advertising Markets and Media (2).** National manufacturers' advertising procedures and policies, markets, media, organizations of the advertising functions, with heavy emphasis on the part of the advertising agency. Prerequisite: 120 or 320. f, w, s.

**331 Advertising Management (2).** Methods for gathering, evaluating and organizing material pertinent to the solution of advertising problems. Uses case studies. Recommended to precede 324. f.

**332 Public Relations (3).** Current methods of dissemination of public information as practiced by business, industrial, educational and social organizations. Strong emphasis on what the public relations practitioner actually does, and why. Prerequisites: 104 or 105, 120 or 320. f, w.

**333 Research in Advertising (2).** Introduction to techniques, practice of advertising research. Emphasis on understanding research techniques and use of research results. Consumer analysis, attitude measurement, print and broadcast copytesting, evaluation of externally supplied research. Prerequisite: 120 or 320. f.

**334 International Advertising (2).** Background for planning and executing advertising campaigns in foreign markets and relating them to economic, cultural and political environments. Prerequisites: 120 and Marketing 204 or equivalent. w.

**335 Sales Promotion (3).** Study of the various techniques and methods of using sales promotion as part of the promotional mix. Students will examine its synergistic relationship with advertising and sales. Project required. Prerequisite: 120. f, ss.

**336 The Graphics of Journalism (2).** Introduction to the tools and practices involved in editing, designing and specifying graphic elements for print media. The origins, personalities and specifications of type; methods of composition and layout for newspapers and magazines. Prerequisite: instructor's consent. f, w.

**338 Business and Economics Reporting (3).** (same as Finance 338,

Management 338, Marketing 338). An advanced writing course concentrating on business, financial and regulatory news. Each student "invests" in the market, meets weekly with the instructor for editorial suggestions and attends evening seminars. Prerequisite: 306. f, w, s.

**340 Visual Communications (3).** How to communicate through pictures. Topics: visual perception, vocabulary, the role of words, picture editing, design and layout, engravers and printers, taste and judgment, camera mechanics. For journalism students who are not photographers. w.

**341 Staff Photography (3).** A laboratory course in news, feature and advertising photography for publication in the Columbia Missourian. Enterprise pictures are required in addition to assigned photo coverage. Prerequisite: 144. f, w, s, ss.

**342 Photojournalism (4).** Production of picture stories/essays for newspapers and magazines: research, photography, text, layout and camera-ready mechanicals. Study of past and present in photojournalism with emphasis on contemporary publications, photographers, editors and designers. Prerequisite: 341. f, w, s.

**345 General Semantics in Journalism (2).** The everyday usefulness of science methodology as applied to the journalist's personal professional problems. The course deals with general effect of language habits on journalists and on their readers-listeners. f, w.

**351 Television News Photography (2).** Application of videotape recorders, sound and silent film cameras, and electronic and film editing equipment in preparation of television news stories for KOMU-TV. Prerequisites: 358 and instructor's consent. f, w, s.

**352 Editorial Writing (3).** Emphasizes writing and thinking. Discussion of current problems. Correct and effective use of English language. Mission, obligations and history of editorial pages. Students write editorials for the Columbia Missourian. Prerequisite: 306. f, w, s.

**353 Broadcast Reporting (3).** Instruction in principles, ethics and techniques of gathering information writing, and using film, videotape and audiotape in reporting news for radio and television. Prerequisite: 101. f, w, s.

**354 Editorial Page Direction (2).** Emphasis on quality and conscience, and assuming responsibility. Policy, art, letters to editor, columns, cartoons, relations with newsroom. Laboratory work on the Columbia Missourian. Prerequisite: 352 or instructor's consent. f, w, s, ss.

**355 Radio Reporting and Editing (3).** Writing, reporting and editing newscasts. News beat and general assignment reporting; writing, producing and broadcasting news programs on KBIA; discussion of principles and techniques of radio news. Prerequisite: 353. f, w, s, ss.

**356 Television News Production (3).** Instruction in techniques of television newscast preparation and the work of the director and production crew in its presentation. Emphasizes role of television news producer. Prerequisites: 358 and instructor's consent. f, w, s.

**357 Issues in Broadcast Management (2-3).** Broadcast administration sales, programming, network relationships, community involvement, labor, FCC procedures, cable TV and new technologies. Lab work in non-news areas at KBIA, KOMU-TV and other area stations. Prerequisite: instructor's consent.

**358 Television Reporting and Editing (3).** Study of problems in reporting and editing news stories for television broadcasts on KOMU-TV. Emphasis on use of electronic new gathering equipment, film cameras, writing and editing news stories. Work at KOMU-TV prerequisite: 353. f, w, s, ss.

**359 Seminar in Radio-TV News (3).** Seminar in network and local news process, in coverage of major issues and social problems, in relationships of radio-TV news and government institutions. Not for students who have taken 459. Prerequisite: instructor's consent.

**360 Intermediate Writing (3).** Writing techniques for students who already have mastered news reporting and writing skills. Students research and write articles for Vibrations and the Missourian. Prerequisites: 306 or equivalent and instructor's consent. f, w, s.

**361 Advanced Writing (3).** For those who wish to emphasize writing as a career. In addition to writing assignments, students discuss writings of well-known magazine and book authors. Prerequisites: 306, 360 and instructor's consent. w.

**362 Magazine Design (3).** Introduction to typography of magazines from manuscript markup through layout to page proof. Extensions and limitations of typography are considered in light of current practice and economic possibility. Prerequisite: 336. f, w, s.

**363 Magazine Editing (3).** Review of grammar, punctuation, style rules: measuring articles copyfitting: writing captions, titles; editing, proofreading, condensing, rewriting magazine articles. Prerequisites: 110, 306. f, w, s.

**364 Organization Communication in Public Relations (2).** The role public relations plays in business communications. Press relations, news releases, employee publications and internal communications, shareholder relations, financial public relations, public affairs and corporate social responsibility. Prerequisite: 332. f, w.

**365 Magazine Production (3).** Editing, copyreading, outline/headline writing, decisions on articles, etc., on Vibrations or other magazine projects. Prerequisites: 360, 363 and instructor's consent. f, w, s, ss.

**366 Advanced Magazine Design (2).** Continuation of 362. Class critiques of spreads, sequences, and magazines are implemented by students who make typographic specifications and lay out individual spreads, and complete magazines for actual printed production. f, w, s.

**367 American Magazine History (2).** Review of American magazines with the major emphasis on contemporary publications. Project papers present analysis of today's magazines. w.

**368 Magazine Publishing (2).** The audience, economics, job opportunities and content of the American magazine. Deals with general audience and specialized magazines, business and institutional magazines, news magazines, etc. Case histories of individual magazines, guest lecturers from various fields. w.

**373 The Community Newspaper (3).** The role of the newspaper in the community. Handling of news categories especially applicable to smaller newspaper. Field trips giving students experience in publishing newspapers in the state. Prerequisites: 104 or 105 & instructor's consent. w.

**374 The Suburban Press (2).** Examines the operation, management, and news practices of America's suburban press. Emphasizes unique qualities, problems and advantages of suburban newspapers and the communities and governments they serve. Prerequisite: 104 or 105. f, w.

**375 Newspaper Management (2).** Organization, accounting methods, personnel, rate structures, equipment, production, laws and regulations of concern to newspaper management. Prerequisite: 120 or 320.

**376 Newspaper Circulation and Marketing (2).** The role of circulation in developing and maintaining newspaper readers. Marketing concepts, sales promotion, readership research. Laboratory work in the circulation department of the Columbia Missourian. Prerequisite: 120 or 320 & instructor's consent. f, w.

**380 High School Journalism (2).** Stresses the topics to be taught at secondary school level and how to teach them. Analysis of problems facing scholastic journalism, resources and aids available to the teacher. s. cor.

**382 Broadcast Public Affairs (3).** Investigative, in-depth reporting through radio and television. Emphasis on research, writing, interviewing, and effective use of audiotape, film and videotape and other techniques, for presentation on KOMU-TV and KBIA. Prerequisites: 355 or 358 & instructor's consent. f, w, s.

**386 Economics of the Media (2).** Examination of economic environment of mass media. Course looks at mass media as they are affected by marketing, advertisers, competition, stockholders, financial institutions, labor, government and influence groups. Prerequisites: 3 hours of economics and instructor's consent. f, w.

**387 Journalism as Communication (2).** (same as 487). Journalism from a scientific standpoint. Introduces to scientific method, philosophy of science, with applications to the study of journalism and communication. Basics of quantitative research and theorizing about journalism and communication. f, w, s.

**390 History of Mass Media (3).** Impact of the past as it affects today's media. Includes study of ethics, personnel, events, technological developments in newspapers, radio, television, photography, magazines. Project paper. Open to graduate students. Prerequisite: for undergraduates, instructor's consent. f.

**395 Area Seminar (3).** Special lectures, readings, discussions relating to the urban journalism, state government reporting or local public affairs reporting programs. f, w, s.

**399 Management in Media (2-3).** Supervisory aspects of media organizations. Personnel management, organizational structure, budgeting, labor relations, leadership, group dynamics. Prerequisites: 306 and 310, or 321 and 328, or 355 or 358, or 361 and 363 and instructor's consent. f, w.

**400 Problems (1-4).** Individual work on chosen and specified problems not associated with thesis or project. Topic must be arranged with supervising teacher prior to registration. f, w, s, ss.

**401 Seminar in History and Principles of Journalism (3).** Analyzes of historical material involving the mass media. Project papers appraise leaders, media, trends, innovations, and legal problems. w, s.

**402 Theory of Mass Communication (3).** Major communication theories and theorists. Intrapersonal theories are included as they relate to mass communication. f, w.

**403 The Literature of Journalism (2).** Reading of ten basic books about journalism. Several books are assigned to everyone; several are assigned on an individual basis, and several are electives. Oral reports, short papers, and class discussion. f, w.

**404 Theory of International Communications (2).** Broad theories associated with flow of communication intranationally and internationally. Each student develops an original hypothesis and defends it in a term paper. f.

**406 Advanced Seminar, Theory of Communication (2).** In-depth investigation of communication theory, with emphasis on problems of theory building in communication. Prerequisite: 402 or 404 or instructor's consent. f, w.

**407 Information Theory (3).** Concepts and functions; information storage, retrieval, indexing via electronic computer. w.

**410 Philosophy of Journalism (2).** Seminar deals with wide assortment of philosophical questions in journalism, but concentrates on epistemology, political press theory, and ethics. Such questions as "objectivity" in journalism, press responsibility, professionalism. f.

**420 Readings in Journalism (1-5).** Directed readings for doctoral candidates. Designed to supplement work in other courses, and to broaden student's knowledge of trends, interpretations, and developments in the media. f, w, s.

**422 Mass Media Seminar (3).** Concepts, functions and major problems of print and electronic media in the United States. Two hours lecture and one hour of discussion lab each week. f, w.

**424 Controls of Information (3).** A detail of actions by society and by the communications media calculated to limit or alter the content of information in the United States. f.

**425 Controls of Information (3).** A detail of actions by government, largely the federal government, calculated to limit or alter the content of information in the United States. w, s.

**428 Seminar in Communications Law (2).** Discusses contemporary issues in press-bar relationships. Discussions led by law students and journalism graduate students, with occasional guests from each area. Prerequisite: 304 or instructor's consent. f, w.

**459 Seminar in Radio/TV News (3).** Seminar in network and local news process, in coverage of major issues and social problems, in

relationships of radio-TV news and government institutions. Prerequisite: instructor's consent.

**487 Journalism as Communication (2).** (same as 387). Journalism from a scientific standpoint. Introduces scientific method, philosophy of science, with applications to the study of journalism and communication. Basics of quantitative research and theorizing about journalism and communication. f, w, s.

**488 Research Methods in Journalism (3).** Research methods of utility in journalism; philosophy of science. Emphasis on survey research, sampling procedures, questionnaire construction, and interviewing techniques. Prerequisite: 6 hours of journalism or instructor's consent. f, w, s.

**489 Advanced Research Methods (3).** Experimental design, factor analysis, semantic differential and Q methodology as tools for the researcher in journalism/communication. Prerequisite: 488. f, w.

**490 Research (1-8).** Guidance for graduate students engaged in plan A for the M.A. degree and for all doctoral candidates engaged in investigations looking toward production of theses. f, w, s, ss.

**491 Graduate Assembly (0).** Required of all graduate students in their first semester in the journalism graduate program. Graded satisfactory/unsatisfactory only. f, w.

**495 Area Seminar (3).** Seminar designed to accompany 499. Area Problem. Through readings and discussions the Plan B student examines the special area related to the project. f, w, s.

**499 Area Problem (4-8).** Work project enabling Plan B student to demonstrate professional competence; may be one offered in a graduate reporting program or a creative project designed to meet a particular interest of student. f, w, s, ss.

## LABORATORY ANIMAL MEDICINE

**358 Laboratory Animals in Research & Teaching (3).** Concepts and applications of laboratory animal resources management; methods used in laboratory animal experimentation including basic procedures; control of variables both animal related and environmentally induced. Prerequisites: graduate standing and instructor's consent. f.

**400 Problems (cr. arr.)** Advanced studies not expected to terminate in a thesis. f, w, s.

**410 Seminar (1).** Discussion of current research in laboratory animal medicine. f, w, s.

**437 Pathology of Laboratory Animals (3).** (same as Veterinary Pathology 437).

**438 Primatology (3).** (same as Veterinary Pathology 438).

**444 Diseases of Laboratory Animals (3).** (same as Veterinary Microbiology 444).

**450 Research (cr. arr.)** Research not expected to terminate in a thesis. f, w, s.

**468 Laboratory Animal Biology (3).** Reproduction, genetics, nutrition, epidemiology and husbandry of the eight common lab animals (cat, dog, guinea pig, hamster, monkey, mouse, rabbit, rat). Prerequisite: departmental consent. alt. f. even yrs.

**469 Laboratory Animal Colony Management (3).** Procurement, conditioning, control of use of laboratory animals. Cost accounting and record maintenance. Facility design and construction, environmental requirements and design. Prerequisite: departmental consent. alt. f. odd yrs.

**475 Methodology of Animal Experimentation (1).** Application of specific species or strains of animals and techniques to various types of medical investigation. Prerequisite: departmental consent. alt. w. odd yrs.

**490 Research (cr. arr.)** Research expected to terminate in a thesis. f, w, s.

## LATIN

**1 Elementary Latin I (5).** Forms, grammar, syntax.

**2 Elementary Latin II (5).** Continuation of I. Readings in Latin prose. Prerequisite: a grade of C or higher in Latin I.

**3 Latin Reading (3).** Readings in Latin prose and poetry. Prerequisite: Latin 2 or equivalent.

**207 Intensive Beginning Latin I (3).** Intensive study of morphology, grammar, syntax; early attention to readings in simple prose. Course meets five hours weekly for 3 hours credit. Prerequisite: graduate standing.

**208 Intensive Beginning Latin II (3).** Continuation of 207. Readings in Latin prose. Prerequisites: graduate standing.

**209 Intensive Latin Reading (2).**

**210 Latin Poetry (3).** Readings in selections from the Latin poets. Prerequisite: Latin 3 or equivalent.

**300 Problems (cr. arr.)** Independent study and reports on selected topics. Prerequisite: instructor's consent.

**303 Latin Stylistics (1-3).** Study and writing of connected prose compositions.

**305 Age of the Scipios (3-6).** Critical readings in and integrated analyses of the culture of the second century B.C. Prerequisite: two years Classical Latin or equivalent.

**310 Age of Cicero (3-6).** Critical readings in and integrated analyses of the culture of the last decades of the Roman Republic. Prerequisite: two years Classical Latin or equivalent.

**315 Vergil (3).** Readings, discussion, and literary analysis of Vergil's Aeneid. Prerequisite: two years of Classical Latin or equivalent.

**320 Augustan Literature (3-6).** Critical readings in and integrated

analyses of the culture of Augustan Rome. Prerequisite: two years Classical Latin or equivalent.

**335 Neronian Literature (3-6).** Critical readings in and integrated analysis of culture of the age of Nero. Prerequisite: two years Classical Latin or equivalent.

**340 Age of Pliny and Tacitus (3-6).** Critical readings in and integrated analyses of the ages of Domitian and Trajan. Prerequisite: two years Classical Latin or equivalent.

**350 Special Readings (1-3).** Readings in authors and texts not covered in other courses. Prerequisites: classics/classical civilization--departmental consent; Latin--two years Classical Latin or equivalent.

**376 Medieval Latin (3).** Selected texts of Middle Ages and Renaissance. For students with primary interest in history, literature, philosophy, religion. Romance philology, or the classical tradition, experience with Latin sources in their field. Prerequisite: instructor's consent.

**399 Survey of Latin Literature (3).** Latin literature from origins to end of Roman Empire; emphasis on authors not covered in other courses, to provide general view of styles and genres. Prerequisite: two years Classical Latin or equivalent.

**410 Seminar in Roman Comedy (3).**

**420 Seminar in Latin Lyric and Elegiac Poetry (3).**

**430 Seminar in Neronian Literature (3).**

**450 Seminar in Roman Historians (3).**

**470 Seminar in Latin Epic Poetry (cr. arr.)**

**480 Seminar in Special Fields (3).**

## LAW

**101L Contracts I (3).** Agreement process and interpretation; consideration and its equivalents; restitution; unconscionable bargains. f.

**102L Contracts II (3).** Interpretation, performance and discharge of contracts, damages, remedies; third party beneficiaries; assignment and delegation. w.

**103L Torts I (3).** Principles and practices governing recovery of damages for injuries to person or property. f.

**104L Torts II (3).** Defamation, invasion of privacy, dignity wrongs, products liability, fraud liability insurance, immunities, and a survey of various "no fault" proposals. w.

**105L Civil Procedure I (3).** Fundamental and recurrent problems in civil actions in federal and state courts. Survey of litigation; pleading; discovery; trial; jurisdiction; former adjudication; parties. f.

**106L Civil Procedure II (3).** Continuation of 105L. w.

**107L Property I (3).** Classification of property; personal property; possession, bailment, lien, gift, bona fide purchase; land conveyancing at common law under statute of uses; freehold estates in land; concurrent estates in land; and introduction to future interests. f.

**108L Property II (3).** Landlord and tenant; easements, profits, and licenses; support; introduction to water rights, nuisance, covenants running with the land, equitable servitudes, zoning, and modern conveyances.

**111L Criminal Law I (2).** Procedure in criminal cases with emphasis on constitutional limitations in the criminal process. f.

**115L Criminal Law II (3).** The purposes of criminal law; nature of criminal responsibility; characteristics of particular crimes. (Criminal law I and II are continuation courses and the order of subject matter may be altered from year to year.)

**116L Legal Research and Writing (1).** Introduction to the techniques and materials of legal research; legal bibliography; legal writing exercises; introduction to computer-assisted legal research. f.

**117L Advocacy and Research (1).** Study of legal research methods and their application to problem solving, preparation of briefs and oral argument of appellate cases; further implications of computer-assisted legal research. w.

**220L Constitutional Law (4).** Study of federal judicial review and limitations; sources of federal legislative power; commerce, taxing, spending, treaty, presidential, military powers; power of states to regulate, to tax interstate commerce; intergovernmental immunities; due process; equal protection, and first amendment rights.

**221L Evidence (4).** The basic law of evidence; use in trials, relevancy, circumstantial proof and real proof; use of witnesses, methods of examination; presumptions and burden of proof; functions of judge and jury.

**223L Legal Accounting (2).** Use of accounting in management of capital, and control of business enterprise, bookkeeping and accounting fundamentals; interrelationship of accounting principles and rules of law; analysis and interpretation of accounting and financial data. f.

**224L Remedies (3).** History of equity; coverage of various equitable remedies and their adequacy, practicability, defenses, procedural problems, enforcement of decrees, merger of law and equity, contempt.

**225L Business Organizations (4).** Examination of common types of business organizations including partnerships and corporations. Study of formation and purposes of the corporate entity; internal structure of corporation; responsibilities of shareholders, directors, officers; introduction to corporate securities, common and preferred stock, corporate bonds, hybrid securities.

**227L Basic Federal Income Taxation (4).** Federal income tax problems of individual taxpayers: nature of income; when and to whom income is taxable; exclusions from tax base, deductions, credits; tax effects of exchange or other disposition of capital assets.

**228L Estates and Trusts I (3).** Intestate succession; family protection, restrictions on testation; execution, revocation, revival of wills; integration, incorporation by reference, events of independent significance; will construction; elements/creation of trusts; modification/termination of trusts; beneficial interests under trusts.

**232L Appellate Advocacy (1).** Analysis and issue determination of

transcripts on appeal. Familiarization with rules of procedure in regard to appellate courts, argument and pleading before appellate tribunals. Offers training for moot court competition.

**300L Administrative Law (3).** Principles, factors and statutory provisions which govern availability of relief (both judicial and administrative) to persons or entities aggrieved by the actions or inactions of governmental officials or agencies.

**301L Admiralty Law (2-3).** Definition of navigable waters, locational and subject matter jurisdiction, federal jurisdiction, jurisdiction in rem, attachment, substantive admiralty law, maritime lien, carriage of goods, salvage, general average, collision, torts, industrial accidents, limitations on liability.

**302L Advanced Business Organizations (2-3).** Advanced study of corporation law emphasizing formation of corporations; tax principles; mergers and reorganizations, share-holder rights; trading limitations; non-profit and professional corporations. Prerequisite: 225L.

**303L Partnership Law and Taxation (2-3).** Substantive and tax aspects of partnership; comparing general corporations, small business corporations. Discussion of liabilities and responsibilities of partners, tax shelters, general accounting and tax; problems faced by professional corporations. Prerequisites 225L, 227L.

**304L Advanced Criminal Procedure (2).** Problems of procedure in criminal cases; indictments and informations, discovery, motions, instructions, role of prosecutor and defense attorney.

**305L Advanced Torts (2).** Consideration of "business torts" (unfair competition, interference with contract, trade secrets, product disparagement), "relational torts" (wrongful death, survival, consortium, alienation of affections), and the public law implications of defamation and privacy actions beyond the basic torts course.

**307L Antitrust Law (3).** Introduces antitrust and economic analysis and the role of competition, with emphasis on price fixing, horizontal and vertical restraints of trade, monopoly and merger problems. Attention is also given to price discrimination and patent problems.

**308L Arbitration and Labor Problems (3).** Covers labor arbitration, establishment and operation of a contractual grievance, the arbitration process, judicial enforcement of agreements, strikes and miscellaneous labor law topics not covered by the National Labor Relations Act.

**309L Advanced Antitrust Law (2-3).** Expanded coverage of Section 5 of Federal Trade Commission Act; Robinson-Patman Act problems; mergers; patents and restricted licenses; shared monopoly; procedural and litigation aspects of antitrust cases. Prerequisite: 307L or instructor's consent.

**310L Bankruptcy (2-3).** Concentration on straight bankruptcy proceedings, some introduction to wage-earner plans and chapter proceedings for businesses. Jurisdiction, property in the estate, dischargeability of unpaid debts, trustee's avoiding powers, proof of claims and distribution of available assets.

**311L Basic Commercial Law (4).** Commercial transactions, including sale of goods, security devices, and commercial paper, with special reference to the Uniform Commercial Code. Taking this course precludes taking Commercial Transactions I or II, 326L or 327L.

**313L Business Planning (2).** Common business transactions, emphasizing the closely held corporation. Corporate taxation principles in connection with formation and sale of corporations; allocation of stock and control; issuance of securities and capital structure; valuation; dividends; reduction of capital.

**314L Client Interviewing and Counseling (2).** Basic interviewing techniques, psychological factors affecting the interviewing process, facilitating and structuring the interview, clarification of statements and ascertaining legal issues, client resistance and hostility, the nature and conduct of counseling process. Graded S/U.

**316L Clinical Placement (1-3).** Supervised training through experience in civil and criminal problems. Various placements are available in legal aid settings, prosecutor and defender offices and state offices and courts. Problems in Practice is required for some placements. Credit hours are flexible. Graded S/U.

**317L Commercial Paper and Banking Transactions (2-3).** A concentrated study of Articles 3 and 4 of the Uniform Commercial Code, exploring the rights and liabilities of the various parties to negotiable instruments. Also covered are federal and state statutes governing the practices of the banking industry.

**319L Comparative Law (2-3).** Foreign legal systems and the comparative method in analysis and solution of legal problems, based on the legal systems of modern France and Germany. Major groupings of historically and structurally related legal systems.

**320L Conflict of Laws (2-3).** Study of jurisdiction and various choice of law methods in cases having extraterritorial contacts; recognition and application of foreign law in state and federal courts; effect of the federal constitution.

**321L Conveyances and Title Examination (2).** Original land titles; common law and statutory dedication; adverse possession; modern conveyances, including formalities, delivery, boundaries, reservations and exceptions, implied easements, covenants for title, and estoppel by deed; priorities, including recording systems; title examination and title insurance; and clearing title defects.

**322L Federal Protection of Civil Rights and Liberties (2-3).** Advanced analysis of protections of civil liberties that derive from the United States Constitution and from federal statutes. The federal statutes which will be covered most extensively include 42 U.S.C. sections 1981-1988 and the Civil Rights Acts of 1964 (except Title 7 thereof), 1965 and 1968.

**323L Creditor's Remedies (3).** Rights of unsecured creditors and debtors under law; individual and collective creditor and debtor state actions; law of fraudulent conveyances; prejudgment remedies and postjudgment procedures; receiverships and debtor's rights in exempt property.

**325L Criminal Law Administration (2).** Seminar on current problems with administration of criminal law and current developments in criminal law.

**326L Commercial Transactions I (3).** Rights of secured creditors and debtors under the Uniform Commercial Code; rights outside bankruptcy; creditors with special rights; law of fraudulent conveyances, pre-judgment and post-judgment remedies and debtors exemption rights. Prerequisite: taking Basic Commercial Law.

**327L Commercial Transactions II (3).** Rights and liabilities of parties to negotiable instruments under the Uniform Commercial Code; study of statutes and regulations governing the banking industry; study of the law governing the sale of goods.

**328L Drafting of Legal Instruments (2).** Problems frequently encountered in general office practice (land transfers, mortgages, leases, contracts, wills, business organizations, etc.), with drafting of the related instruments. Use and adaptation of legal forms. Graded S/U.

**329L Employment Discrimination (2-3).** Examination of laws prohibiting discriminatory practices in employment and the administrative and judicial processes available for dealing with them; affirmative action requirements and litigation problems in civil rights cases.

**330L Environmental Law (2-3).** National Environmental Policy Act; environmental impact statements; Endangered Species Act and wildlife protection; other limitations on federal resource activities; state environmental protection acts; federal and state regulation of water quality, air quality, noise, solid and hazardous waste disposal, surface mining, radioactive facilities and emissions, pesticides and herbicides; management of public lands; common law doctrines and defenses; public trust doctrine. f, w, s.

**331L Estate and Gift Taxation (3).** Study of the basic provisions of the federal estate and gift tax laws. Basic coverage of taxation of decedent's estates and trusts.

**332L Estate Planning (2).** The process of selecting particular arrangements for the devolution of wealth, with emphasis on federal estate and gift tax laws. Prerequisites: 331L and 227L.

**334L Estate and Trust II (3).** Types of future interests in real and personal property; problems of construction; powers of appointment and discretionary trusts; rules against perpetuities; charitable trusts; fiduciary duties and liabilities.

**335L Family Law (3).** Marriage, annulment, dissolution, maintenance and separation agreements, custody, support obligations, illegitimacy, adoption, abortion, and selected issues relating to domestic law.

**337L Federal Courts (3).** Jurisdiction of United States courts; their role in the federal system. Topics covered: federal question and diversity jurisdiction, the jurisdictional amount, removal, and the relation of state and federal courts.

**338L Federal Income Taxation of Business Enterprises (3-4).** Tax aspects of establishing corporations; of selling or liquidating or dividing corporations, of transferring or receiving assets, reincorporations; tax free acquisitions.

**340L Future Interests (3).** Types of future interests in real and personal property and their characteristic problems; construction of limitations, rule against perpetuities, powers of appointment and associated rules.

**341L Government Regulation of Business (3).** Legal, economic and political aspects of direct public regulation of business, emphasizing questions of economic planning, policy choices involved in deciding whether and how to regulate. Regulation of entry, rate regulation, regulation of quality of service. Prerequisite: Antitrust Law 307L or consent of instructor.

**343L Insurance Law (2-3).** Creation of contract; warranties, misrepresentations; excepted risks; waivers and estoppel; insurable interest; facts maturing the policy, construction of various clauses; subrogation.

**344L Intellectual Property (2-3).** Patents: conditions for validity, subject matter patentability, Patent Office procedures, amendment and correction, interferences, infringement, assignment, licensing, litigation, patent claim drafting; copyright: subject matter copyrightability, common law and statutory protection, property rights, infringement, fair use doctrine, non-written material copyrightability; trademarks: common law and statutory protection, generic use.

**346L International Business Transactions (2-3).** A survey of legal problems and institutional arrangements involved in international trade and investment: private law of international trade, governmental regulation of international trade and investment, international regulation of international trade and investment.

**347L International Law (3).** Introduction to the international legal system, with emphasis on relations between nation-states or international entities. Topics include statehood and recognition, legislative and judicial jurisdiction, human rights and the status of the individual, treaties and international organizations.

**349L International Transactions (3).** Special legal problems presented to persons and enterprises whose activities cross national boundaries including citizenship, immigration, sources of international law, international tribunals, transnational reach of national laws and sovereign immunity.

**350L Jurisprudence (2).** The nature of law; classical and contemporary theories of juristic thought, their development and comparison.

**352L Juvenile Law (2-3).** Study of the philosophy underlying juvenile law as well as specific provisions of the Juvenile Code and pertinent court decisions in areas such as delinquency, neglect, custody disputes and termination of parental rights and related court services.

**353L Labor Law (3).** The regulation of relations between employers and labor unions at common law and under federal and state legislation; primary emphasis on the National Labor Relations Act, as amended.

**355L Land Use Controls (3).** Private controls: nuisance, covenants

running with the land, equitable servitudes; public controls: master plans and official maps, subdivision zoning, planned unit developments, building and housing codes, urban redevelopment, open space and historic preservation, development rights.

**356L Law and Medicine (2).** Selected medicolegal topics involving the law and the practice of medicine, particularly relationships between patient, physician and hospital; medicine and the practice of law, including medical proof and law and psychiatry.

**358L Legal History (2-3).** Development of the roman legal system from 753 B.C. and its reception in Europe, Asia, Africa and America; development of the English legal system from 519 A.C.; development of the American legal systems from colonial times.

**360L Legislation (3).** The legislative process; principles of statutory construction; techniques of bill drafting.

**362L Local Government Law (2-3).** Structure and powers of local government units; state-local relations, including "home rule"; local government finance, including taxation and indebtedness; incorporation and annexation; eminent domain; licensing and franchising; municipal tort liability.

**363L Mining, Oil, and Gas (2-3).** Severance and classification of mineral interests, mineral lease clauses, implied covenants, title and conveyancing problems, transfers by lessor or lessee, pooling and unitization, taxation, pollution and surface reclamation, surface and mineral owner relations.

**364L Mental Disorders and the Criminal Law (2).** A study of the role of psychiatric concepts in the criminal law. Subjects include: competency to stand trial, criminal responsibility, criminal commitment to and release from state mental health facilities.

**365L Natural Resources (3).** Water rights: diffused surface water, groundwater, riparian rights, prior appropriation, permit systems, public rights, governmental powers, pollution control, interstate problems; mining oil, gas; types of mineral rights, leases, conveyancing, conservation methods, surface owners' rights, strip mine reclamation.

**366L Negotiation (3).** Theory, strategy, and skill development in negotiating in the lawyer's role in a variety of legal contexts. Videotaped practice sessions, competition. Graded S/U. Limited to 20 students.

**367L Partnership Law and Taxation (2-3).** Matters not dealt with in 361L; focuses on enforcement and administration of the collective bargaining agreement, and on other selected problems. 361L is not prerequisite. W.

**368L Pension and Profit Sharing (2).** Study of pension and profit sharing plans with consideration of benefits to individuals and effect on the business entity. Heavy emphasis placed upon the tax consequences of any such plans in various contexts.

**369L Problems in Environmental Control (2).** Seminar on the environmental effects of human activity. Subjects include the National Environmental Policy Act, air and water pollution, solid waste disposal, toxic substances, nuclear power plant regulation.

**371L Problems in Practice (1-2).** Required of students enrolled in certain clinical programs and designed to provide training for the practical aspects of clinical experiences; subject matter will be adapted to cover problems encountered in placement. Graded S/U.

**372L Professional Responsibility (2).** Responsibilities of lawyer to client, courts and the public. Topics include: organization of the legal profession, fees, conflicts of interest, the confidential relationship, advertising and solicitation, unauthorized practice, courtroom behavior. Course required.

**375L Real Estate Finance (3).** Real estate mortgages and financing substitutes—theory and practice; receivers; redemption; foreclosure; priorities; the Missouri Deed of Trust; subdivision development; leasehold mortgages; shopping centers; government intervention in the mortgage market.

**377L Restitution (1-2).** Form and nature of relief afforded by judicial process to prevent unjust retention of benefits acquired by fraud, mistake, conversion, illegality and other selected instances.

**378L Sales (1-2).** A concentrated study of the common law governing sales of goods. The primary focus is on Article 2 of the Uniform Commercial Code, the case law interpreting Article 2, and the common law concepts which supplement its provisions.

**380L Securities Regulation (3).** Financing a new business enterprise through sale of securities. Examines federal and state securities acts, securities registration, powers of the SEC; private actions, injunctive and criminal sanctions; reporting, inside trading and proxy solicitation problems.

**381L Social Legislation (2-3).** Benefits for mental and physical disabilities, including workmen's compensation; social security; unemployment compensation and benefits for the aged and children.

**382L State and Local Taxation (2).** A review of the taxing authority of state and local governments and the statutory and constitutional limitations thereon. The course will investigate the policy and philosophy of state and local taxation and its impact on land use, urban sprawl, and related urban problems.

**383L Tax Policy (3).** Study of the policies of the federal tax system, recurrent themes in the tax structure, and alternative tax structures. Prerequisite 227L.

**384L Trial Practice (2-4).** Techniques of pleading, discovery, jury selection, opening statements, direct/cross examination of witnesses, prepares jury instructions, closing arguments. Each student participates in classroom problems selected from various phases of litigation, and in one complete trial.

**386L Urban Problems (2).** Examines selected legal problems which grow out of urbanization. Examples of topics: the federal grant-in-aid system; urban renewal; public housing; and the model cities program.

**387L Water Law (2-3).** Diffused surface water, groundwater, riparian rights, prior appropriation, permit systems, public rights, federal and

state governmental powers, National Environmental Policy Act, federal and state pollution control, interstate and international allocation, bed ownership.

**389L Selected Seminar Topics (2).** Seminars are offered on communications law, (graded S/U), criminal law, environmental law, law and medicine, law and the aged, taxation, legal history, urban problems and other selected topics.

**390L Law Review (1-3).** Credit for work as prescribed by the faculty for members of the Missouri Law Review. Graded S/U.

**391L Advanced Advocacy Research (1-2).** Credit for work as prescribed by the faculty for members of the Board of Advocates. Graded S/U.

**392L Research (1-3).** Individual research and a written paper on a special problem under supervision of a faculty member. Prior approval of the dean is necessary for initial or cumulative credit in excess of one semester hour.

## LIBRARY SCIENCE

**105 Library Skills (cr. arr.)** Designed to improve student use of the library's facilities and materials in any subject; instruction in use of card catalog, indexes, bibliographies, government publications, microforms, etc. f, w.

**205 Library Resources and Bibliography (1-3).** Structured approach to library resources on any subject, use of the card catalog, periodical indexes, bibliographies, government documents, etc. Sections on specific subjects will be organized.

**211 Elementary Cataloging (3).** Cataloging of books with personal authors, using Anglo-American code and the Dewey classification. Prerequisite: junior standing. f, w, s.

**231 Elementary Reference (3).** Introduction to reference materials and procedures. Prerequisite: junior standing. f, w, s.

**241 Libraries and Librarianship (2).** Types, objectives, and functions of libraries; their internal organization and procedures for fulfilling their functions; duties and qualifications of librarians; role of professional associations. Prerequisite: junior standing. f, w, s.

**301 Topics (1-99).** Organized study of selected topics. Subjects and earnable credit may vary from semester to semester. Repeatable upon consent of department.

**312 Principles of Cataloging and Classification (5).** Descriptive cataloging of library materials using Anglo-American Rules (AACR2) and OCLC. Subject cataloging according to Dewey decimal classification and Library of Congress classification and subject headings. Theory of classification and bibliographical organization. f, w, s.

**320 Introduction to Archives and Manuscripts (3).** Introduction to value and use of archives and manuscripts, to develop awareness of the unique role of archives and manuscript repositories as information resources; concepts, terminology, and archival principles. w, s.

**321 Library Materials for Children and Youth (3).** Background of library materials for children; philosophy of children, youth; characteristics in use of print, nonprint material; current publishing trends. Reader's guidance, book talk techniques, story-telling resources. Prerequisites: 221 & departmental consent. f.

**322 Literature of the Humanities (3).** Development of religion, philosophy, literature, art and music in the Western world during the eras of humanism, discovery, enlightenment, revolution, and democracy versus totalitarianism. Prerequisite: 231. f. alt. s.

**323 Literature of the Social Sciences (3).** Publishing trends; major authors and their works; special library problems in history, political science, economics, geography, sociology, psychology, and related fields. Prerequisite: 231. w. alt. s.

**324 Literature of Science and Technology (3).** Publishing trends; major authors and their works; special library problems in mathematical, physical, and biological sciences and technologies based upon them. Prerequisite: 231. w. alt. s.

**325 Use of Public Documents and Records (3).** Introduction for non-library science students on the value, variety and use of public documents and records; provides overview of government generated/produced materials as information sources. f, w, s.

**326 Developing Library Collections (2).** Selection and acquisition of library materials including sources of print and nonprint materials, collection development policies, community needs analysis, acquisition practices, evaluation techniques and special issues such as censorship, racism and sexism.

**327 Preservation and Restoration (3).** Theoretical and practical work with archival materials, rare books, and media; concerned with legal aspects, methods and materials for preservation and restoration. Prerequisite: 211, 212, 231, 241 or departmental consent. f. alt. s.

**332 Bibliography and Reference (5).** National, trade, and subject bibliography; general reference tools (encyclopedias, dictionaries, handbooks, etc.); selected information sources in major subject areas; principles, developments, and trends in reference service. f, w, s.

**341 Management of Information Agencies (3).** Concepts of management applied to libraries and information systems; management tools, programming, models and simulation in an environment of an information producing or disseminating agency. Prerequisites or concurrent: 241 & departmental consent. f, w. alt. s.

**342 The Administration of School Libraries/Media Centers (3).** (same as Curriculum & Instruction T378). Purposes, objectives, functions and activities of the school learning resource center; qualifications of personnel; physical facilities; standards. w, s.

**350 Special Readings (cr. arr.)** (same as Information Science 350). Individual study on specific subjects in library and information science performed under the direction of an assigned faculty instructor. f, w, s.

**351 Library Research in Special Areas (cr. arr.)** Reference sources



and bibliographic aids in various disciplines studied on an individual basis by actual use in performance of research under direction of assigned faculty instructors. f, w, s.

- 380 Practicum (2-3).** Supervised work in a school, public, special, or college library. Prerequisites: 211, 221, 231, 241. f, w, s.
- 400 Problems (cr. arr.)** Independent, directed study on a topic in the field of library science. Prerequisite: graduate standing; departmental consent. f, w, s.
- 401 Library Information Systems (5).** (same as Information Science 401).
- 410 Seminar in Library Science (1-3).** Discussion and critical study of current developments in library science. Prerequisite: admission to candidacy for master's degree in library science or departmental consent. f, w.
- 413 Abstracting and Indexing (3).** (same as Information Science 413). f. alt. s.
- 416 Medical Subject Analysis (3).** Cataloging and classification systems used in health sciences libraries; efficiency of content analysis of books and periodicals; computerized retrieval systems; information centers and communication media. Prerequisites: 211, 221, 231, 241, & departmental consent. w. alt. s.
- 424 Micrographics and Libraries (3).** Types of microforms and their acquisition, handling, interpretation and utilization. Basic technical considerations include evaluating hardware, building collections, bibliographic control and the microform environment. Prerequisite: departmental consent. f.
- 425 Government Publications (3).** Survey of publications of local, state, national, and international governments, with emphasis on publications of the United States. Prerequisites: 211, 221, 231, 241 & departmental consent. f. alt. s.
- 426 Multimedia Resources of Libraries (3).** Acquisition and utilization of non-book materials, with special attention to motion pictures and phonorecords; organization and operation of audiovisual departments; cooperative ownership; similar topics. Prerequisites: 211, 221, 231, 241, & departmental consent. f. alt. s.
- 427 The History of Books and Printing: The Manuscript Book (3).** Prerequisites: 211, 221, 231, & 241; or departmental consent. f.
- 428 The History of Books and Printing: The Printed Book (3).** Prerequisites: 211, 221, 231, & 241; or departmental consent. w.
- 429 Seminar in Rare Books and Manuscripts (3).** Selected topics in the history of books and the antiquarian book trade. Prerequisite: 427 or 428 or 449; or departmental consent. w.
- 432 Automated Reference Services (3).** (same as Information Science 432).
- 433 Services to Children (3).** Collection development, organization of children's services, pre-school activities, relations with the school library, story-telling techniques. Prerequisites: 211, 221, 231, 241, & departmental consent. w. alt. s.
- 435 Studies in Library Services (3-6).** Directed toward students' interests; individual projects a significant part of course. Attention given services to physically handicapped, culturally deprived, industry, adult education groups, etc. Prerequisites: 211, 221, 231, 241, & departmental consent. f. alt. s.
- 441 Information Systems Resource Management (3).** (same as Information Science 441). w. alt. s.
- 443 The Academic Library (3).** Development, objectives, organization and structure, nature of the collections and responsibility for their development, philosophy of library services, measurement and standards of library effectiveness. Prerequisites: 211, 221, 231, 241, & departmental consent. w. alt. s.
- 444 The Public Library (3).** Objectives, relations with other institutions, scope of its services, public relations, standards. Prerequisites: 211, 221, 231, 241, & departmental consent. w. alt. s.
- 445 Special Libraries and Information Centers (3).** Variety, functions of special libraries/information centers, relations with academic and public libraries, philosophies of service; problems of cataloging/classification peculiar to special libraries. Prerequisites: 211, 221, 231, 241, & departmental consent. w. alt. s.
- 446 Health-Science Librarianship and Bibliography (3).** Administration, organization, functions, services and collections of health science libraries. Prerequisites: 211, 221, 231, 241, & departmental consent. w. alt. s.
- 447 Archive Administration (3).** Principles and concepts of archival techniques and administration of archives and archival material. Includes legal, moral and sociological implications of archival theory and practice. Prerequisites: 211, 221, 231, 241 or departmental consent. f. alt. s.
- 448 Seminar in Records and Manuscript Management (3).** Advanced seminar on the development of techniques for archival and manuscript management. Deals with issues and problems of institutional relationships, operational planning and programming, and security and law. w. alt. s.
- 449 History of Libraries (3).** Development of libraries and library services from ancient times to present; role of libraries in different times, societies; identification of problems faced by librarians, analysis of solutions. Prerequisites: 211, 221, 231, 241, & departmental consent. w. alt. s.
- 450 Research (cr. arr.)** Investigation and research into a topic, not leading to a thesis. Prerequisite: departmental consent. f, w, s.
- 451 The Biomedical Community (3).** Environmental and institutional loci of medical education, practice and research in which the health sciences librarian works. Prerequisites: 211, 221, 231, 241, & departmental consent. f. alt. s.

## LINGUISTICS

- 20 Introduction to Language Science (3).** (same as Anthropology 20). General introduction to various aspects of linguistic study. Elementary analysis of language data, with some attention to application of linguistic study to other disciplines.
- 101 Topics (cr. arr.)** Organized study of selected topics. Subjects and earnable credit may vary from semester to semester. Repeatable upon consent of chairperson. Prerequisites: Sophomore standing.
- 102 American Phonetics (3).** (Same as Speech Pathology and Audiology 101)
- 120 Languages of the World (3).** Survey of the important language families of the world, where they are spoken, and important features presented with a minimal amount of technical detail. Prerequisite: some knowledge of one language other than English or instructor's consent.
- 154 Introduction to Anthropological Linguistics (3).** (same as Anthropology 154).
- 190 Honors Thesis (3).** Based on an original research project in theoretical or applied linguistics. Topic, director, and second reader approved by Linguistics Committee, College of Arts & Science. Prerequisite: qualification for Honors degree.
- 201 Topics (cr. arr.)** Organized study of selected topics. Subjects and earnable credit may vary from semester to semester. Repeatable upon consent of the chairperson.
- 210 Japanese III (3).** Reviews essential grammar, reinforces aural-oral drills, and promotes skills in reading and writing. Prerequisites: 101 (Topics: Japanese I) and 101 (Topics: Japanese II) or equivalent. f.
- 211 Japanese Readings (3).** Reviews and reinforces major grammatical topics; insures advanced vocabulary through aural-oral drills, readings and written exercises. Prerequisite: 201. w.
- 212 Speech Science (3).** (Same as Speech Pathology and Audiology 210)
- 301 Topics (cr. arr.)** Organized study of selected topics. Subjects and earnable credit may vary from semester to semester. Repeatable upon consent of chairperson.
- 306 Sociolinguistics (3).** (same as Anthropology 306).
- 308 Historical Linguistics (3).** (same as Anthropology 308).
- 309 Topics in Linguistics (3-6).** (same as English 309).
- 311 History of the French Language (3).** (same as French 311).
- 312 Psychosocial Aspects of Speech (3).** (same as Speech and Dramatic Art 312).
- 313 History of the Greek and Latin Languages (3).** (same as Classical Studies 311).
- 314 Symbolic Logic (3).** (same as Philosophy 314).
- 319 The Structure of American English (3).** (same as English 319).
- 320 History of the English Language (3).** (same as English 320).
- 322 Regional and Social Dialects of American English (3).** (same as English 322).
- 323 Principles of Teaching English as a Second Language (3).** (same as English 323).
- 346 Language and Culture (3).** (same as Anthropology 346).
- 350 Special Readings (1-3).** Independent study through readings, conferences, reports. Prerequisites: one linguistics course & instructor's consent.
- 360 Phonetics (3).** (Spanish Language)(same as Spanish 360).
- 361 History of the Spanish Language (3).** (same as Spanish 361).
- 364 Analytic Philosophy (3).** (same as Philosophy 365).
- 365 History of the Russian Language (3).** (same as Russian 365).
- 366 Structure of the Russian Language (3).** (same as Russian 366).
- 371 Introduction to General Linguistics (3).** (same as Anthropology 371, Romance Languages 371).
- 372 Techniques in Linguistic Analysis (3).** (same as Anthropology 372, Romance Languages 372).
- 373 Linguistic Phonetics (3).** (same as Anthropology 373, Romance Languages 373).
- 374 Issues in Linguistic Analysis (3).** Key issues in analysis of languages such as accounting for variation, nature and abstractness of underlying representations, and typological characteristics treated comparatively. Prerequisite: 372. w.
- 378 Structure of Modern French (3).** (same as French 378).
- 393 Field Methods in Linguistics (4).** (same as Anthropology 393).
- 400 Problems (cr. arr.)** Independent study through readings, analysis of special linguistic problems, reports. Prerequisite: one advanced linguistics course & instructor's consent.
- 410 Acoustic Phonetics (3).** (same as Speech Pathology/Audiology 410).
- 411 Physiological Phonetics (3).** (same as Speech Pathology/Audiology 411).
- 417 Studies in the English Language (3).** (same as English 417).
- 418 Introduction to Old English (3).** (same as English 418, German 418).
- 428 Studies in Psycholinguistics (3).** (same as Psychology 428).
- 446 Seminar in Anthropological Linguistics (3).** (same as Anthropology 446).
- 460 History of the German Language (3).** (same as German 460).
- 461 Middle High German (3).** (same as German 461).
- 483 Seminar (3).** Topic varies according to instructor. May be repeated for credit with approval of instructor. Prerequisite: instructor's consent.
- 490 Research in Linguistics (cr. arr.)**
- 493 Phonology (3).** (same as Anthropology 493, Romance Languages 493).
- 494 Syntax (3).** (same as Anthropology 494).

## MANAGEMENT

- 202 Fundamentals of Management (3).** Introduction to the basic concepts of management and organization; their application to operations and personnel management. f, w, cor.
- 254 Introduction to Business Law (3).** The legal aspects of business related to society--introduction to the legal system; constitutional, criminal, tort law; contracts and sales law cases and problems; administrative regulation of business and consumer issues. Prerequisite: junior standing. f, w.
- 255 Legal Aspects of Business Organization and Operation (3).** Includes agency and employment relationships, sole proprietorships, partnerships, and corporations, also operational aspects of business associations such as administrative regulation, taxation, bankruptcy, and trade regulation. Prerequisite: 254. f, w.
- 300 Problems (cr. arr.)**
- 305 Elements of the Law of Business (3).** Role of law in societies; body of law applicable to commerce and industry. Open only to graduate students. No credit given to those having prior courses in business law.
- 308 Operations Management (3).** Managerial analysis of operating problems, with emphasis on planning and control systems. Prerequisite: 202 or instructor's consent. f, w.
- 310 Personnel Management (3).** Manpower policies, procedures of business enterprise. Prerequisite: 202 or instructor's consent. f, w, cor.
- 311 Collective Bargaining (3).** Content, negotiation, administration of collective labor agreements and settlement of disputes. Prerequisites: 336 & junior standing or instructor's consent. f.
- 318 Management Science (3).** Further development of models and quantitative analysis as applied to production management problems. Management research design and experimentation; computer applications; quantitative case analyses; individual industrial field studies. Prerequisite: 308 or instructor's consent. w.
- 319 Production Systems Analysis (3).** Constructive and quantitative analysis of models of inventory and production systems; uncertainty, risk, and policy considerations; systems design/simulation; analysis of networks; management problems in application. Prerequisite: 318.
- 320 Personnel Administration Law (3).** Analysis and evaluation of legal and administrative regulations of terms of employment; Fair Labor Standards, discriminatory practices, safety and health regulations, other regulations. Prerequisites: senior standing & 310, or instructor's consent. w.
- 329 Organizational Behavior (3).** Examines theoretical constructs and research findings on human behavior in work organizations such as businesses, especially individual differences, dyadic relations and small group behavior. Prerequisite: 202 or instructor's consent. f, w.
- 330 Organizational Theory (3).** Elements of the managerial process; emphasis on theory of organization structure and design and the impact of technology and culture on organization systems. Prerequisite: 202 or instructor's consent. f, w.
- 345 Management of Service Operations (3).** Selected operations management topics: applications of operations concepts, techniques, and methodologies applied to service sector organizations--hospitals, government, agencies, schools, banks. Focus on designing, planning, controlling service operations. Prerequisite: 308 or instructor's consent.
- 347 Compensation Theory and Practice (3).** Examines the empirical research and theory relating to the effect of compensation administration systems upon employee satisfaction and performance. Analysis of financial compensation systems and benefit programs in use in modern organizations. Prerequisite: 310. f.
- 353 Selected Problems in Personnel Management (3).** Advanced studies in selected administrative and technical policies, practices in employee relations, with individual and group project work, research. Focuses on policy issues, research findings, advanced techniques. Prerequisite: 310 or instructor's consent. w.
- 356 The Law of Commercial Credit Transactions (3).** Purchase and sale of goods, services and real property--discussion includes drafts, notes, security agreements under the Uniform Commercial Code, and credit financing of real estate. Prerequisite: 254. f, w.
- 375 Management Policies and Problems (3).** Enterprise-level case studies, simulations, similar exercises to integrate business functional decisions; assessment of environmental influences on business. Development, implementation of company strategies. Prerequisites: 202 & senior standing (B&PA) or instructor's consent. f, w.
- 383 Advanced Organizational Behavior (3).** Based upon behavioral science concepts and research findings directed toward understanding and explaining human behavior within organizations. Selected topics in individual behavior, groups and the larger organization. Prerequisite: 329 or instructor's consent.
- 384 Advanced Organization Theory (3).** Examines manager's role in developing and changing organizations. Emphasis on new organizational forms and processes. Considers matrix structures, environmental assessment, long-range planning and designs for innovation. Case studies, individual or team projects. Prerequisite: 330 or instructor's consent. w.
- 400 Problems (cr. arr.)** Graduate students may select topics for study and investigation from fields suggested by undergraduate courses listed above.
- 405 Seminar in Management (cr. arr.)** Intensive studies of current research and issues. Readings, independent investigations, reports. Prerequisite: open to Ph.D. students, or instructor's consent. f, w.
- 434 Advanced Problems in Compensation Theory (3).** Intensive analysis of financial compensation systems and benefit programs: wage and salary methods, pensions, time off with pay. Theoretical-empirical approach and analyses of current practices. Prerequisite: either 301, 336, 347, or instructor's consent.

- 435 Topics in Management (3).** Selected current topics in management. Prerequisite: instructor's consent.
- 436 Advanced Personnel Management (3).** Analysis of research and practice in planning for attracting, selecting, developing, and disciplining of employees at work. Prerequisite: either 301, 336, or instructor's consent.
- 437 Management of Labor Relations (3).** Managerial approaches to collective bargaining. Negotiation, grievances, agreement administration; emphasis on recent developments. w.
- 438 Organizational Behavior and Group Dynamics (3).** Organizational and business applications of theory and research in individual differences, interpersonal relations, small group dynamics. Prerequisite: 329, 330, Business Administration 301 or instructor's consent. f.
- 439 Organizational Theory and Design (3).** Organizational design; relationships to technical, cultural, and environmental factors; problems of effecting change. Prerequisite: 329, 330, Business Administration 301 or instructor's consent. w.
- 440 Organizational Change and Development (3).** The change process in organizations with emphasis on planned, orderly development of organizational capabilities. Prerequisite: 301, 309 or instructor's consent.
- 446 Operations Planning (3).** Emphasizes operations planning and design. Selected topics in planning aggregate output, location, layout, capacity, maintenance, and equipment replacement, and use of improvement curves and long-term forecasting. Cases, lecture, simulation, projects. Prerequisites: Business Administration 324 and Business Administration 342 or instructor's consent.
- 447 Operations Scheduling and Control (3).** Topics selected from job-shop scheduling; project scheduling; line balancing; reliability; MRP; short-term forecasting; inventory, quality and cost control; and measurement. Cases, lecture, simulation, projects. Prerequisite: Business Administration 324 and Business Administration 342 or instructor's consent.
- 448 Operations Policy (3).** Cases dealing with operations policy within selected manufacturing and service industries and firms. Analysis as a basis of policy is stressed. Prerequisite: Business Administration 342 or instructor's consent.
- 490 Research (cr. arr.)** Thesis research for Ph.D. degree.

## MARKETING

- 204 Principles of Marketing (3).** Institutions, processes, problems involved in transferring goods from producer to consumers; emphasis on economics, social aspects. Prerequisite: Economics 51.
- 206 Distribution Systems (3).** Analysis of physical distribution function in marketing; emphasis on transportation, warehousing, materials handling, and facility location as elements of an integrated system. Prerequisite: Economics 51.
- 300 Problems (cr. arr.)**
- 309 Marketing Management (3).** Analysis of the broad range of managerial marketing issues of relevance to modern business firms. May not be used in meeting the marketing or logistics curricula requirements. Prerequisite 204.
- 313 Marketing Research (3).** Use of scientific method in solution of marketing problems. Round table discussions, practice in field investigations. Prerequisites: junior standing and 204.
- 314 Consumer Behavior (3).** Dimensions of the consumer market and decision-making process of consumers by analyzing economic, psychological and sociopsychological influences on consumer market and buying behavior. Prerequisites: junior standing and 204.
- 335 Management of Promotion (3).** The promotion function; special problems associated with the sales force from the managerial point of view. Prerequisites: junior standing and 204.
- 336 Sales Management (3).** Analyzes effective methods and tools employed by salesmen and field sales managers; emphasis on underlying behavioral and quantitative theory. Prerequisites: junior standing and 204.
- 347 Channel Management (3).** Determination of marketing channels for distribution of consumer and industrial goods. Particular emphasis on elements of the product mix as they relate to channel decisions. Prerequisites: junior standing and 204.
- 350 Marketing, Society, and Government (3).** Critical examination of relationships and conflicts between marketing, society and government. Emphasis on contemporary issues pertaining to competition, monopoly, regulation by government. Prerequisites: junior standing and 204.
- 355 Contemporary Issues in Marketing (3).** Intensive study of selected issues in marketing. Prerequisite: 6 hours marketing.
- 358 Purchasing (3).** Organization, functions of purchasing departments; particular emphasis on industrial purchasing. Prerequisite: Management 202 & 6 hours marketing.
- 360 Quantitative Analysis in Marketing (3).** Use of quantitative analysis to solve marketing problems. Prerequisite: Statistics 250.
- 371 World Marketing (3).** Examination of the rationale of international trade and the operational aspects of international marketing. Prerequisite: junior standing & 204.
- 373 Distribution Management (3).** Analysis of transportation and logistics policy and administration, emphasizing use of quantitative aids to decision making. Prerequisites: junior standing and 206.
- 381 Transportation Policy (3).** Problems in intra- and inter-modal competition, consolidation and integration, criteria for public investment, subsidy policies, urban transportation, and analysis of national transportation policy. Prerequisites: junior standing and 206.
- 390 Marketing Policy (3).** Marketing decisions from the viewpoint of the manager. Prerequisite: 12 hours of marketing beyond 204.
- 400 Problems (cr. arr.)** Graduate students may select topics for study

- and investigation from fields suggested by undergraduate courses listed above.
- 401 Seminar in Marketing (4).** Intensive studies of selected current issues. Readings, independent investigations, reports.
- 413 Advanced Marketing Research (3).** Evaluates the contribution of research to marketing management. Special emphasis on the research used in development of new products and new markets.
- 444 Advanced Consumer Behavior (3).** Basic factors influencing consumer decision making. Attention given to psychological, sociological, economic variables: motivation, attitude, learning, personality, small group, social class, demographic factors, culture; analyzes their effects on consumer decision-making process.
- 465 Marketing Strategy (3).** Theory of determining marketing strategy by business firms and organizations.
- 466 Quantitative Methods for Marketing (3).** Examines and appraises use of quantitative tools of analysis in solving marketing problems.
- 468 Distribution Strategy (3).** The role of various modes of transportation, traffic management, warehousing, and materials handling in the marketing system. Current transportation and traffic problems analyzed.
- 470 International Marketing (3).** Examination of competition and market structure abroad including common market and trade bloc arrangements.
- 471 Markets in Transition (3).** Analysis of selected industries; emphasis on marketing activities and environments. Particular emphasis given to forecasting major trends or changes anticipated in markets over the next decade.
- 490 Research (cr. arr.)** Thesis research for Ph.D. degree.

## MATHEMATICS

- 3 Basic Algebra (3).** For students with less than one unit of high school algebra. No credit toward a degree in Arts and Science and not recommended for credit toward any baccalaureate degree. cor.
- 4 Business Mathematics (3).** For students in education specializing in commercial education, distributive education; others on dean's request. Application of elementary arithmetic and algebra to retailing, general business. No credit in A&S or B&PA. cor.
- 7 Algebra for Elementary Teachers (3).** Open only to students majoring in elementary education. Focuses on development of real number system; other numeration systems; some elementary number theory; functions, relations, linear equations, inequalities, other polynomials. No credit toward a degree in Arts and Science. cor.
- 8 Geometry for Elementary Teachers (3).** Devoted primarily to informal geometry: study of points, lines, planes, space similarity, congruence, measurement, elementary geometric constructions. Other topics discussed: probability and characteristics of other geometries. Prerequisite: 7; No credit toward a degree in Arts and Science. cor.
- 9 Trigonometry (2).** Prerequisite: any of the following (a) 1.5 units algebra & 1 unit geometry; (b) 1 unit geometry & Mathematics 10 concurrently. cor.
- 10 College Algebra (3).** Review of topics from elementary algebra, sets, quadratics, systems of linear equations with introduction to determinants, graphing, progressions, inequalities, complex numbers, mathematical induction, binomial theorem, theory of equations, logarithms. Prerequisite: one and one half units of high school mathematics including one unit in algebra. cor.
- 12 Basic Concepts of Modern Mathematics (3).** Basic ideas in mathematics, with emphasis on its variety and structure. Gives an appreciation of mathematics in everyday life. cor.
- 14 Algebra and Trigonometry (5).** Review of elementary algebra. Background material for Mathematics 80, including algebraic, trigonometric, logarithmic, exponential functions. Prerequisite: 1 1/2 high school units, algebra, 1 unit geometry. No credit for both 14 and any of 9, 10 or 15.
- 15 Elementary Functions (3).** Review of elementary algebra. Background material for Mathematics including algebraic, trigonometric, logarithmic, exponential functions. Prerequisite: 2 high school units algebra, 1 unit geometry. No credit for both 15 and any of 9, 10 or 14.
- 60 Finite Mathematics (3).** Introduces matrices and linear programming and probability. Primarily for non-physical science students. Prerequisite: C in 10 or equivalent.
- 61 Elements of Calculus (3).** Introductory analytic geometry, derivatives, definite integrals. Restricted to students preparing to enter College of Business and Public Administration. No credit for students who have completed a calculus course. Prerequisite: C in 10 or equivalent.
- 80 Analytic Geometry and Calculus I (5).** Elementary analytic geometry, functions, limits, continuity, derivatives, antiderivatives, definite integrals. Prerequisite: C in 14 or 15 or equivalent.
- 155 The Mathematics of Finance (3).** Compound interest, annuities with variety of applications; introduction to mathematics of life insurance. Prerequisite: 10 or equivalent.
- 175 Calculus II (5).** Definite integrals, applications and techniques of integration, elementary transcendental functions, infinite series. Prerequisite: a grade of C or better in 80 or 81 or equivalent training. cor.
- 198 Honors (2).** Special work for senior A.B. Honors candidates.
- 199 Honors (2).** Special work for senior A.B. Honors candidates.
- 201 Calculus III (3).** Vectors, solid analytic geometry, calculus of several variables. Prerequisite: grade of C or better in 175 or equivalent training. cor.
- 205 Selected Topics in Analysis (3).** Selected topics from analytic geometry and calculus of particular interest to non-physical science

- students. No credit for students who have completed a calculus course. Prerequisites: 10 or equivalent training & senior or graduate standing.
- 207 Calculus for Social and Natural Sciences I (3).** The real number system, functions, analytic geometry, sequences, derivatives, maximum-minimum problems. No credit for students who have completed a calculus course. Prerequisite: 10 or equivalent. cor.
- 208 Calculus for Social and Natural Sciences II (3).** Riemann integral, transcendental functions, techniques of integration, improper integrals and functions of several variables. No credit for students who have completed two calculus courses. Prerequisite: 207 or 205 or 61.
- 226 Discrete Mathematical Structures (3).** Basic set theory, groups, semigroups, Boolean algebra, graph theory and combinatorics. Applications oriented toward computer science. Prerequisites: 175 and Computer Science 104.
- 231 Elementary Matrix Theory (3).** Selected topics in linear algebra. Prerequisite: Mathematics 175 or equivalent.
- 250 Survey of Mathematics (3).** Selected topics from fundamental concepts of algebra, geometry, mathematical logic, history of mathematics. Recommended for students who plan to teach secondary school mathematics. Student may not receive credit for both 203 & 250. Prerequisite: 175.
- 301 Topics (cr. arr.)** Organized study of selected topics. Subjects and earnable credit may vary from semester to semester. Repeatable upon consent of department. Prerequisites: 201 & instructor's consent.
- 302 Advanced Calculus With Applications (3).** Numerical sequences and series, sequences and series of functions, uniform convergence, power series and improper integrals. Applications to special functions. Fourier series and orthogonal functions. Prerequisite: 201.
- 304 Differential Equations (3).** Common types of ordinary differential equations including many applied problems, operational methods. Prerequisite: 201. cor.
- 305 Introduction to Complex Variables (3).** Complex functions, contour integration, power series, residues and poles, conformal mapping. Prerequisite: 302 or 310.
- 307 Operational Methods (3).** Selected analytical techniques for applications to problems in applied sciences, including the study of Laplace and Fourier transformations. Prerequisite: 302 or 310.
- 308 Applied Mathematics I (3).** Ordinary differential equations: analytical, operational, numerical, and series methods of solutions. Fourier series and boundary value problems. May be substituted for 304. Credit not awarded for both 304 and 308. Prerequisite: 201.
- 309 Applied Mathematics II (3).** Eigenfunction expansions. Multivariate calculus: line and surface integrals, potential functions, the divergence, Green's and Stoke's theorems, curvilinear coordinates, Lagrange multipliers. Partial differential equations of mathematical physics. Prerequisites: 304 or 308 & instructor's consent.
- 310 Advanced Calculus I (3).** Basic topology of the real line, numerical sequences and series, properties of continuous functions, differentiation, Riemann-Stieltjes integration, uniform convergence. Prerequisite: 201. Recommended: a 300-level mathematics course.
- 311 Advanced Calculus II (3).** Power series, elementary topology of Euclidean spaces, functions of several variables, implicit functions, partial differentiation, integration theory. Prerequisite: 310 or equivalent.
- 320 Introduction to Mathematical Statistics (3).** (same as Statistics 320).
- 323 Numerical Analysis (3).** (same as Computer Science 323). Solutions of equations and systems of equations, interpolation and approximation, numerical differentiation and integration, and numerical solutions of differential equations. Selected algorithms programmed for solution on computers. Prerequisite: 201, Computer Science 104 or equivalent.
- 324 Numerical Linear Algebra (3).** (same as Computer Science 324). Solution of linear systems of equations by direct and iterative methods. Calculation of eigenvalues and eigenvectors of matrices. Selected algorithms programmed for solution on computers. Prerequisites: 201, Computer Science 104 or equivalent.
- 325 Introduction to Probability Theory (3).** (same as Statistics 325).
- 326 Statistical Inference I (3).** (same as Statistics 326).
- 330 Theory of Equations (3).** Study of polynomials and their zeros and elementary determinant and matrix theory. Prerequisite: 201 or 226.
- 331 Matrix Theory (3).** Basic properties of matrices, vector spaces, and determinants with some emphasis on applications. Prerequisite: 201 or 226.
- 333 Higher Algebra (3).** Introduction to rings, integral domains, fields, groups. Prerequisite: 201 or 226.
- 335 Theory of Numbers (3).** Factorization, Euler phi-function, congruences, primitive roots. Prerequisite: 201 or 226.
- 337 Applied Modern Algebra (3).** (same as Computer Science 337). Introduction to modern algebra; emphasis on applications to computer science, engineering, related subjects. Basic concepts of modern algebra applied to computer design. Prerequisite: 201 or 226 & Computer Science 104 or equivalent.
- 340 Introduction to Abstract Algebra I (3).** Introduction to groups, rings, linear algebra, and fields; special emphasis on groups and elementary properties of rings. Prerequisite: 201. Recommended: a 300-level mathematics course.
- 341 Introduction to Abstract Algebra II (3).** Continuation of 340. Special emphasis on rings, vector spaces, and fields. Prerequisite: 340.
- 350 Special Readings (1-3).** Prerequisites: 201 & instructor's consent.
- 355 History of Mathematics (3).** Includes Greek mathematics and the invention of the calculus with emphasis on the mathematical aspects of topics studied. Prerequisite: 201.
- 358 Mathematical Logic (3).** Introduction to classical modern logics as deductive systems; applications to foundations of mathematics.

**Prerequisite:** junior or senior standing & interest and background in mathematics or philosophy.

**360 College Geometry (3).** Euclidean geometry from an advanced viewpoint. Synthetic and coordinate methods will be used. The Euclidean group of transformations will be studied. Prerequisite: 201.

**362 Projective Geometry (3).** Basic ideas and methods of projective geometry built around the concept of geometry as the study of invariants of a group. Extensive treatment of collineations. Prerequisite: 201.

**366 Foundations of Geometry (3).** Coordination of affine, projective planes by means of various kinds of algebraic structures: planar ternary rings, Veblen-Wedderburn systems, division rings, skew fields, and fields. Prerequisite: 201.

**367 Introduction to Non-Euclidean Geometry (3).** Account of rise, development of non-Euclidean geometries. Intensive study of plane hyperbolic geometry. Prerequisite: 201.

**372 Introduction to Topology (3).** Topics from topology of Euclidean spaces, generalizations to metric spaces and topological spaces. Fundamentals of point set topology. Prerequisite: 201.

**400 Problems (1-3).**

**404 Theory of Functions of Real Variables I (3).** Properties of functions of one real variable. Lebesgue measure and integration on the line. Prerequisites: 310 & 311, or equivalent.

**405 Theory of Functions of Real Variables II (3).** Continuation of 404. Lp spaces, general measure and integration theory. Prerequisite: 404.

**408 Partial Differential Equations (3).** Sturm-Liouville problems and orthogonal functions. Solutions of partial differential equations by separation of variables and integral transforms. Properties of hyperbolic, elliptic, and parabolic equations. Prerequisites: 304, & either 302 or 310.

**409 Functional Analysis I (3).** Linear topological spaces, Banach spaces, Hilbert spaces. Operator theory, including the Hahn-Banach, uniform boundedness and closed graph theorems. Prerequisite: 404.

**410 Functional Analysis II (3).** Continuation of 409. Topological vector spaces, duality theory, Banach algebras.

**412 Calculus of Variations I (3).** Development of necessary conditions and of sufficient conditions for nonparametric and parametric problems. Hamilton's principle, related topics. Prerequisite: instructor's consent.

**413 Complex Analysis I (3).** Rigorous introduction to the theory of functions of a complex variable. Prerequisite: 311 or equivalent.

**414 Complex Analysis II (3).** Analytic continuation, Riemann surfaces, entire and meromorphic functions, selected topics. Prerequisite: 413.

**418 Nonlinear Differential Equations (3).** Existence theorems; criteria for periodic solutions; boundedness of solutions; perturbation theory. Emphasizes second order equations. Prerequisite: 304 & 302 or 310.

**420 Topological Dynamics (3).** Periodicity and its generalizations in dynamical systems. Prerequisite: 404.

**423 Advanced Numerical Analysis (3).** Elimination and iterative methods for solving linear systems of equations. Finite difference approximations to linear partial differential equations, integral equations, and boundary value problems for ordinary differential equations. Error analyses. Prerequisite: 310, 323 or equivalent, 331.

**426 Advanced Ordinary Differential Equations I (3).** Topics from existence and uniqueness theorems, plane autonomous systems, periodicity and boundedness of solutions of second order nonlinear equations, perturbation theory, Sturm-Liouville systems, behavior of solutions at singularities. Prerequisite: 310 or equivalent.

**429 Topics in Analysis (cr. arr.)** Advanced topics in analysis. Prerequisite: instructor's consent.

**430 Topics From Algebra (cr. arr.)** Prerequisite: instructor's consent.

**432 Algebra I (3).** Theory of algebraic structures--groups, rings, fields, algebraic and transcendental extensions of fields. Prerequisites: 340 and 341, or equivalent.

**433 Algebra II (3).** Theory of modules, Galois theory and additional topics to be selected by the instructor. Prerequisite: 432 or equivalent.

**434 Topics in Algebra (3).** Advanced topics in algebra. Prerequisite: 432.

**440 Advanced Probability (3).** (same as Statistics 440).

**449 Topics in Applied Mathematics (cr. arr.)** Selected topics in applied mathematics drawn from variety of areas: partial differential equations, tensor analysis, calculus of variations, asymptotic methods, integral equations, advanced theory of transforms and distributions, numerical analysis.

**456 Differentiable Manifolds and Riemannian Geometry (3).** Tensor product spaces and tensor fields on manifolds. Differentiation and integration of differential forms. Riemannian geometry and applications. Prerequisite: 310 or 372.

**457 Differential Geometry for Scientists and Engineers (3).** Tensors and multilinear forms. Connections, covariant differentiation, geodesics and curvature on Riemannian and pseudo-Riemannian manifolds. Applications to special relativity and general relativity. Prerequisites: 302 and some knowledge of matrix theory.

**468 General Topology I (3).** Introduction to axiomatic theory of general topology. Continuous functions and homeomorphisms. Convergence in abstract topological spaces. Compact and locally compact spaces. Connectedness. Metrizable spaces.

**469 General Topology II (3).** Continuation of 468. Product spaces and Tychonoff's theorem. Introduction to homotopy theory. Fixed point theorems. Prerequisite: 468.

**470 Introduction to Algebraic Topology (3).** Development of singular homology theory; reference to other homology and cohomology theories. Introduction to homological algebra. Prerequisite: 468.

**479 Topics in Topology (cr. arr.)** Advanced topics in topology or topological algebra.

**480 Analysis Seminar (cr. arr.)**

**482 Algebra Seminar (cr. arr.)**

**484 Geometry Seminar (cr. arr.)**

**486 Topology Seminar (cr. arr.)**

**488 Applied Mathematics Seminar (cr. arr.)**

**490 Research (cr. arr.)**

## MECHANICAL AND AEROSPACE ENGINEERING

**20 Engineering Drawing (3).** Lettering, drawing technique and use of instruments, orthographic, isometric, oblique, perspective and architectural drawing and sketching. Size description, object representation and drafting conventions. Design layout.

**33 Social History of Engineering (3).** Interaction between technology and society from the Industrial Revolution to the present. Meets Humanistic/Social Studies requirement.

**117 Experimental Course (cr. arr.)** Experimental course. For sophomore-level students. Content and credit hours to be listed in Schedule of Courses.

**120 Architectural Drawing and House Construction (3).** Residential planning, construction. Architectural/construction elements, terminology, materials. Floor plans, room size, arrangement. Appliance selection/arrangement. Specifications/material standards, cost analysis. New materials, cost reduction techniques. Prerequisite: 20 or Engineering 30, or instructor's consent.

**185 Introduction to Dynamics (3).** (same as Civil Engineering 185). Basic fundamentals of particle and rigid body dynamics; energy and momentum methods. Prerequisite: Engineering 85.

**199 Engineering Thermodynamics II (3).** (same as Chemical Engineering 199).

**210 Introduction to Biomechanics (3).** Introduces engineering topics applicable to areas of physical therapy, physical medicine, orthopedics. Student must have had basic courses in physics, chemistry, biology, algebra, and preferably trigonometry. May not be taken for credit by engineering students.

**224 Engineering Materials I (3).** Principles and concepts of the solid state and their relationship to behavior of solids. Structural dependency of properties. Prerequisites: Engineering 85, Engineering 99.

**234 Engineering Materials II (3).** Behavior of materials in engineering applications. Topics in fatigue, fracture mechanics, creep, forming processes, and residual stresses. Prerequisites: 224, Engineering 195.

**251 Fluid Mechanics (3).** (same as Civil Engineering 251).

**252 Instrumentation and Measurements Laboratory I (3).** Static and dynamic errors; experiment design; instrumentation selection and calibration; measurement of voltage, resistance, amperage, duration, frequency, displacement, velocity, acceleration, strain, force, torque. Prerequisites: 185, Engineering 195, Mathematics 304, & Engineering 124 or concurrently.

**254 Properties of Materials Laboratory (I).** Experimental investigation of physical, mechanical and thermodynamic properties of materials. Prerequisite: 224, 244 or 264 concurrently.

**256 Design of Machine Elements (4).** Methodology of engineering design. Design and selection of mechanical elements to meet functional, environmental and manufacturing requirements. Case studies, lab demonstrations, experiments. Prerequisites: 185, 234 & Engineering 30.

**261 Thermodynamics of Compressible Flow (3).** One dimensional compressible flow with and without friction and heat transfer. Isentropic flow and shock phenomenon in nozzles and diffusers. Topics from flow measurement and propulsion. Prerequisites: 251 & Mathematics 304.

**262 Instrumentation and Measurements Laboratory II (3).** Continuation of 252 with emphasis on instruments to measure temperature, pressure, fluid flow, fluid velocity, sound, spectral content and emissions. Prerequisites: 251, 252.

**264 Physical/Thermodynamic Properties of Materials (2).** Principles underlying relationships between physical and thermodynamic properties and structure in the solid state. Prerequisites: 224, 254 concurrently.

**271 Aerodynamics (3).** Presents fundamentals of wing and airfoil theory for incompressible flow, including fluid kinematics and dynamics, potential flow, flow about a body, thin-airfoil theory, and finite wing. Prerequisites: 251 & Mathematics 304.

**276 Aerospace Structures I (3).** (same as Civil Engineering 276).

**285 Systems Dynamics (3).** Three-dimensional rigid body dynamics; mechanical vibration; response, control, and stability of mechanical systems. Prerequisites: 185 & Mathematics 304.

**296 Design Synthesis (3).** Synthesis procedures in mechanical and aerospace design; physical, economic and manufacturing constraints; modeling, optimization; design case studies from industry; design projects. Prerequisite: departmental senior standing.

**299 Heat Transfer (3).** Fundamentals of conduction, convection, radiation. Use of nondimensional parameters. Theory of heat exchangers. Prerequisites: 251 & Mathematics 304.

**300 Problems (cr. arr.)** Special design, experimental and analytical problems in mechanical and aerospace engineering. Prerequisite: senior standing in Mechanical & Aerospace Engineering.

**301 Topics in Mechanical and Aerospace Engineering (3).** Current and new technical developments in mechanical and aerospace engineering. Prerequisite: instructor's consent.

**304 Digital Computer Applications in Engineering (3).** (same as Chemical Engineering 304, Electrical Engineering 304, Nuclear Engineering 304).

**306 Design Analysis of Mechanisms (4).** Graphical, analytical and computer-assisted kinematic, dynamic bearing and shaking force, time response analysis of mechanisms including cams, gears and linkages. Cam design. Prerequisites: 185, Engineering 5.

**310 Introduction to Bioengineering (3).** (same as Electrical Engineering 310).

**314 Material Science for Advanced Applications (3).** Study of the interaction of chemical, metallurgical, and mechanical phenomena in advanced material applications. Prerequisite: 224.

**315 Engineering Evaluation of Energy Systems and Resources (3).** (same as Electrical Engineering 315, Nuclear Engineering 315).

**316 Life-Support Systems Design (3).** Environmental, ecological, and human factors for life-support systems. Prerequisite: senior standing.

**321 Creativity in Design (3).** Identification and strengthening of attitudes and talents essential in design. Creative aspects and value considerations in design. Prerequisite: senior or graduate standing in engineering.

**324 Non-Metallic Engineering Materials (3).** Structures, properties and applications of ceramics, glasses, cermets, polymers and composite materials. Prerequisite: 224.

**325 Energy Methods in Mechanics (3).** (same as Mechanical and Aerospace Engineering 325). Utilization of energy concepts in the solution of advanced problems in mechanics. Prerequisite: 185.

**326 Synthesis of Linkages (3).** Type, number and dimensional synthesis of linkages to produce a given input-output motion and/or force. Prerequisite: 306, Engineering 5 or equivalent.

**331 Experimental Methods in Fluid Flow and Heat Transfer (3).** Laboratory experiments involving fundamental mechanisms and phenomena associated with fluid flow and heat transfer. Current experimental methods and techniques employed. Prerequisites: 262 & 299.

**334 Introduction to X-Ray Diffraction (3).** Principles of x-ray production, instrumentation and diffraction. Application of diffraction techniques to problems of current interest. Prerequisite: instructor's consent.

**339 Solar Energy Utilization (3).** Thermal aspects of solar radiation applied to human and industrial needs. Solar energy availability: hourly, daily, and seasonally. Space and water heating. Thermal storage. Passive and active solar design of buildings and homes. Prerequisite: 299.

**340 Heating and Air Conditioning (3).** General principles. Conditioning air of buildings for comfort, ventilation, industrial purposes. Steam, water, hot air heating systems. Prerequisite: 299.

**346 Introduction to Nuclear Reactor Engineering I (3).** (same as Nuclear Engineering 346). Nuclear reactions and radiations; neutron diffusion and slowing down; steady-state and time dependent theory; reactor control; energy removal. Prerequisite: Mathematics 304 or instructor's consent.

**350 Honors Research (cr. arr.)** Independent investigation to be presented as an undergraduate honors thesis. Prerequisite: honors student in Mechanical & Aerospace Engineering.

**351 Power Plant Design (3).** Preliminary thermal design of a complete power plant. Pollution problems of the power industry are considered. Prerequisites: 199 & 299.

**352 Advanced Mechanics of Materials (3).** (same as Civil Engineering 352).

**353 Experimental Stress Analysis (3).** (same as Civil Engineering 353).

**357 Automatic Control of Mechanical Systems (3).** Basic study of controller characteristics, feedback elements, process characteristics, analysis of complete systems. Prerequisites: 285 & Mathematics or equivalent.

**360 Internal Combustion Engines (3).** Gas and oil engines. Thermodynamics of ideal and actual cycles, fuels and combustion, carburetor and injection systems, performance, construction. Prerequisite: 251.

**361 Energy Considerations in Transportation System Design (3).** Energy factors influencing the selection and design of transport systems; energy conservation and decision-making strategies; effects on future design concepts for prime movers, vehicles and transportation systems. Prerequisite: 251.

**365 Automotive Engineering (3).** Principles of design, construction, operating characteristics of automotive vehicles. Selected design problems, review of current developments. Prerequisite: 256 or concurrently.

**366 Applied Mechanical Optimization (3).** Introduction to mathematical programming techniques and applications to the design of mechanical systems and components. Prerequisites: 256, Engineering 5.

**368 Principles of Turbomachinery (3).** Thermodynamics and fluid dynamics involved in study of turbomachinery. Prerequisite: 251.

**369 Principles of Direct Energy Conversion (3).** Principles and utilization of thermoelectric, thermionic, photovoltaic, magnetohydrodynamic generators and fuel cells. Prerequisites: 199 & 251 or equivalent.

**370 Refrigeration Systems (3).** General principles of basic methods of producing refrigeration. Special emphasis on vapor compression and absorption systems. Properties of refrigerants. Prerequisite: 199, 299 or concurrently.

**371 Applied Robotics in Production (3).** (same as Industrial Engineering 371).

**372 Integrated Production Systems (3).** (same as Industrial Engineering 372).

**375 Introduction to Plasmas (3).** (same as Nuclear Engineering 375, Electrical Engineering 375).

**382 Lasers and Their Applications (3).** (same as Electrical Engineering 382, Nuclear Engineering 382). Principles of laser operation, characteristics of gas, doped insulator, semiconductor and dye lasers, areas of application and laboratory demonstrations and experiments.

**385 Vibration Analysis (3).** (same as Civil Engineering 385).

**386 Introduction to Finite Element Methods (3).** The application of matrix operations, energy concepts and structural mechanics to the development of the finite element method. Application of finite element method to beams, frames and trusses. Prerequisites: 185 and Engineering 195.

**389 Advanced Thermodynamics (3).** Topics from availability, thermodynamic relationships, equations of state of pure substances and mixtures. Computation of properties. Chemical and phase equilibria. Prerequisite: 199; 304 or equivalent concurrently.

**399 Intermediate Heat Transfer (3).** Industrial applications involving more than one mode of heat transfer. Numerical and graphical solution of transient heat flow. Heat transfer with change of phase heat exchangers. Heat transfer in high speed flow. Prerequisite: 299.

**400 Problems (cr. arr.)** Supervised investigation in mechanical and aerospace engineering to be presented in the form of a report.

**401 Advanced Topics in Mechanical and Aerospace Engineering (3).**

**404 Advanced Metallurgy Principles (3).** Advanced treatment of physical metallurgy principles to provide a theoretical understanding of engineering materials. Prerequisite: 244 or equivalent.

**406 Materials at Elevated Temperatures (3).** Study of the mechanical behavior of materials at elevated temperature covering creep and stress rupture under combined stresses, variable conditions of stresses and temperatures. Effect of thermal shock and thermal fatigue. Prerequisite: 244.

**407 Materials at Low Temperatures (3).** Properties of structural materials in the refrigeration and cryogenic ranges; selected design applications. Materials covered include metals, alloys, plastics, glass. Prerequisite: 244.

**408 State Variable Methods in Automatic Control (3).** (same as Chemical Engineering 408, Electrical Engineering 408, Nuclear Engineering 408).

**410 Seminar (1).** Reviews recent investigations, projects of major importance in mechanical and aerospace engineering.

**411 Continuum Mechanics (3).** (same as Civil Engineering 411).

**412 Theory of Elasticity (3).** (same as Civil Engineering 412).

**413 Theory of Plates and Shells (3).** (same as Civil Engineering 413).

**414 Theory of Elastic Stability (3).** (same as Civil Engineering 414).

**415 Aeroelasticity (3).** Deformations of aerospace structures under static and dynamic loads, natural mode shapes and frequencies, aerodynamic and inertial loads, flutter analysis, dynamic response phenomena, and critical speeds and frequencies. Prerequisites: 286 & 390.

**416 Theory of Plasticity (3).** (same as Civil Engineering 416).

**418 Advanced Dynamics (3).** (same as Civil Engineering 418).

**419 Nonlinear Mechanical Analysis (3).** (same as Civil Engineering 419).

**426 Space Mechanics (3).** (same as Civil Engineering 426).

**427 Dynamics of Machinery (3).** Dynamic balancing of rotating and reciprocating components of turbo-machinery and internal combustion engines. Gas torque analysis, vibration stress analysis and equivalent systems. Numerical and graphical techniques. Prerequisite: 385.

**428 Vibrations of Distributed Parameter Systems (3).** (same as Civil Engineering 428).

**430 Boundary Layer Theory (3).** Fluid motion at high Reynolds Number. Derivation of Navier-Stokes equations and boundary layer equations. Methods of solution. Transition to turbulent flow. Completely developed turbulent flow. Prerequisite: instructor's consent.

**431 Gas Dynamics II (3).** Advanced study of selected topics in compressible flow. Prerequisite: 335.

**433 Statistical Thermodynamics (3).** Statistical methods of evaluating thermodynamic properties. Elements of quantum mechanics, statistical mechanics and kinetic theory applied to topics of engineering thermodynamics. Prerequisite: 199.

**434 Fracture Mechanics I (3).** Mechanics of flawed structure. Concepts include Griffith theory, Barenblatt's theory, Irwin analysis, energy analysis of cracked bodies, fracture toughness testing, plane strain, plane stress, transition temperature concepts, subcritical flow growth. Prerequisite: 224, 244 or instructor's consent.

**435 Heat Transfer-Conduction (3).** Distribution of temperature and temperature history within solids by the four essential methods of evaluation of these temperature fields. Prerequisite: 299.

**436 Heat Transfer-Convection (3).** Principles of heat transfer by convection, review of boundary layer theory, laminar and turbulent heat transfer, temperature-dependent fluid properties, high velocity heat transfer and an introduction to mass transfer. Prerequisite: 299 & 430.

**437 Heat Transfer-Radiation (3).** Advanced study of engineering radiation heat transfer. Concepts of electromagnetic theory. Development of thermal radiation laws from thermodynamic laws. Analysis of grey and non-grey systems with intervening gases. Study of recent literature. Prerequisite: 299, 304.

**438 Introduction to Turbulence (3).** Introduction to the physical phenomena of turbulence, supported by mathematical and statistical descriptions. Especially appropriate for engineers involved in research aspects of momentum, heat, and mass transport. Prerequisite: 430 or instructor's consent.

**441 Physical Gas Dynamics (3).** Study of the flow of chemically reacting gases of interest in mechanical and aerospace engineering. Prerequisite: 261 & 299.

**444 Fracture and Fatigue Prevention in Engineering Practice (3).** Practical design problems. Introduction to retrofit design, maintenance, product improvement and new design from a fatigue and fracture prevention philosophy. Fail safe and safe life designs are presented. Prerequisite: 434.

**445 Instrumentation Theory (3).** Applied theory of dynamical and energizing systems for analyzing, computing, control devices. Prerequisite: 345.

**447 Magnetogasdynamics (3).** (same as Electrical Engineering 447).

**458 Dynamical Theory (3).** (same as Civil Engineering 458).

**459 Dynamics of Structures (3).** (same as Civil Engineering 459).

**460 Combustion (3).** Study of advanced topics in flames and combustion. Detonation and deflagrations, supersonic combustion, air pollution. Prerequisites: 199 & 261.

**470 Refrigeration and Cryogenics (3).** Advanced topics in refrigeration and cryogenics. Prerequisite: 370.

**475 Random Vibration (3).** (same as Civil Engineering 475).

**486 Finite Element Methods (3).** (same as Civil Engineering 486). The concepts and fundamentals of the finite element method with applications to problems in solid and fluid mechanics. Prerequisite: 386 or Civil Engineering 375.

**490 Research (cr. arr.)** Independent investigation in field of mechanical and aerospace engineering to be presented as a thesis.

## MEDICAL PHYSICS

**327 Nuclear Medicine Instrumentation (3).** (same as Radiologic Sciences 327).

**403 Applied Topics in Medical Physics & Health Physics (1-6).** Directed observations and experience in scientific aspects of daily operations in nuclear medicine, diagnostic radiology, radiotherapy and health physics. Prerequisite: departmental consent. f.w.s.

**435 Physics of Diagnostic Radiology I (3).** Principles and applications of X-ray film, intensifying screens grids, fluoroscopy, image intensification, and television monitors. Image quality analysis and assessment. Prerequisite: Nuclear Engineering 409 or equivalent or instructor's consent. w.

**439 Clinical Physics in Radiotherapy I (3).** Principles and applications of radiation producing units, exposure and dose measurements, and calibration. External beam physics parameters and application to fixed field and rotational field treatment planning. Prerequisite: Nuclear Engineering 409 or equivalent or instructor's consent. w.

**445 Physics of Diagnostic Radiology II (3).** Physical principles, equipment and techniques of imaging with ionizing radiation; conventional tomography, xerography, computed tomography, and others. Physical principles, equipment and techniques of imaging with non-ionizing radiation; thermography and ultrasound. Prerequisite: 435 or instructor's consent. f.

**449 Clinical Physics in Radiotherapy II (3).** Theory and calculational and measurement principles of external beam treatment planning, irregular field treatment planning, brachytherapy, electrons, high energy photons, and future modalities. Prerequisite: 439 or instructor's consent. f.

## MEDICINE

**A Medicine, Third Year (15).** Students are assigned to medical wards for 12 consecutive weeks of intensive instruction in basic internal medicine. During the first six weeks of the rotation emphasis is placed upon the fundamental skills of history taking, physical diagnosis and case presentation. Emphasis during the second six weeks is on acquisition of a solid data base in internal medicine, development of skills in problem solving and clinical diagnosis, and principles of patient management and therapeutics. The level of student responsibility for patients increases as the rotation progresses. A thorough knowledge and understanding of all the patient's problems are stressed. Third-year students participate in daily patient-teaching rounds and a series of morning seminars which cover key topics in general internal medicine.

**B Medicine, Fourth Year (10).** During senior medicine, students are assigned to either general medicine or specialty experiences for a period of approximately 8-9 weeks. Experiences in general medicine involve inpatient care. Experiences in the specialties involve both inpatient and outpatient activities. In selected situations, externships are available, as well as time in a research laboratory.

**C Elective Medicine (20).** Upon completion of the 12-week, third-year medicine rotation, the student is provided with a wide variety of clinical elective programs. Elective and/or free time may be spent in any of several areas, including: cardiology, dermatology, endocrinology, gastroenterology, geriatric medicine, hematology and immunology and rheumatology, infectious diseases, nephrology, and pulmonary medicine. In addition, there are extensive elective and free time opportunities available within the Department of Medicine for experiences in research. The director of the respective division should be contacted for details of opportunities available.

**P Postgraduate Instruction (0).** A fully accredited straight Internal Medicine residency program for three or more years is offered by the Department of Medicine. Fellowships are available after completion of residency in all major subspecialty areas.

**200M Problems (cr. arr.)** Prerequisite: dean's consent. f.w.s.

**205M Social and Behavioral Sciences I (3).** Examines social, psychological, and cultural aspects of physician-patient relationship and the hospital as one of the institutional sites of patient care. Emphasizes interviewing skills and management of human crises.

**206M Social and Behavioral Sciences II (2).** Examines the delivery of health care; provides opportunities for student to explore in depth a selected area among a range of health care delivery problems.

**207M Social and Behavioral Sciences III (2).** Examines the biological, psychological, and social foundations of behavior; examines animal as well as human behavior, and the development of behavior and its relevance to clinical considerations.

**208M Social and Behavioral Sciences IV (1).** Issues discussed include: the doctor/patient relationship, pain management, health care team communication, and psychosocial management issues in relation to a variety of illness and disease contexts.

**220M Introduction to Clinical Medicine I (1).** During the second semester of the first year, the goal is to introduce methods of physical examination.

**221M Introduction to Clinical Medicine II (2).** Goals include: (1) development of insight concerning physician-patient relationship, emphasis on interviewing skills; (2) developing skill in medical history-taking and physical diagnosis; (3) understanding of basic procedure in infectious disease epidemiology.

**222M Introduction to Clinical Medicine III (2).** Goals include: (1) refinement of the techniques of the medical history and physical diagnosis; (2) understanding of the pathophysiology of the patient's symptoms; (3) introduction to process of diagnosis and patient management.

**240M Neurosciences I (5).** (same as Biochemistry 240M, Physiology 240M). The human central nervous system, its composition and function, from an interdisciplinary point of view. Laboratory of neuroanatomical study and correlation sessions illustrating pathophysiology of nervous system disorders. Intended primarily for first year medical students.

**241M Neurosciences II (3).** Pathophysiology of the nervous system; lectures and clinical demonstrations will be integrated to provide detailed exposition and discussion of key areas of CNS function and disease mechanisms. An interdisciplinary course by both pre-clinical and clinical faculty. Prerequisites: 240M, Pathology 210M; prerequisite or co-requisite Pharmacology 320. w.

**SUMMER School of Medicine Summer Program (0).**

## MEDIEVAL AND RENAISSANCE STUDIES

**405 Seminar in Medieval and Renaissance Studies (3).** Interdisciplinary course. Advanced study/research in selected topics: European civilization during medieval, Renaissance, Reformation periods. May be repeated twice. Prerequisite: graduate status in departments having courses in medieval or Renaissance area (humanities/social sciences).

## MICROBIOLOGY

**205 Fundamentals of Medical and Public Health Microbiology (4).** Fundamental principles of infection, immunity and control of infectious disease agents. Designed primarily for students in nursing and other colleges and schools of the University. f.

**301 Medical Microbiology (8).** For graduate students and sophomore medical students. Fundamentals of microbiology and immunology with host-parasite relationships stressed. Pathogenic bacteria, fungi, rickettsia, viruses, animal parasites and diseases they produce studied. Prerequisite: organic chemistry; general bacteriology recommended. f.

**304 Immunology (3).** Covers immunocytology and immunochemistry of antigens immunoglobulins, and the complement system, serologic reactions, immunoglobulin and T cell mediated allergy, tumor and transplantation immunology and autoimmune disease, also laboratory demonstrations. Prerequisite: organic chemistry or biochemistry. f.

**307 Instrumental Methods in Medical Microbiology (2).** Orients students toward techniques and application of instruments to research problems in medical microbiology. Primarily a lab/demonstration course; phase and fluorescent microscopy, density gradient centrifugation, Warburg methods, etc. Prerequisite: course in microbiology. w.

**314 Advanced Immunologic Techniques (3).** Lecture and laboratory with primary emphasis on practical and theoretical aspects of modern immunologic techniques and their present and future applications in the more detailed areas of this science. Prerequisite: 304 or instructor's consent. alt. w. odd years

**315 Bacterial and Viral Genetics (4).** Role of bacteria and viruses in study of molecular genetics, lecture and laboratory. Prerequisites: course in microbiology & in biochemistry. w.

**400 Problems (cr. arr.)** Students assigned individual problems in microbiology for library or lab investigation. Prerequisite: strong background in microbiology. f.w.s.

**401 Topics (cr. arr.)** Current topics, highly specialized topics taught infrequently, or courses taught by visiting professors. Prerequisite: instructor's consent.

**402 Virology (4).** Comparative survey of viruses, with emphasis on biochemical, biophysical, and genetic nature. Interrelations of viruses with their host cells studied. Lecture & lab. Prerequisite: medical microbiology & biochemistry. w.

**403 Advanced Medical Microbiology (cr. arr.)** Similar to 301 but treats medical microbiology and immunology in a more advanced manner. Methods of preparation and instruction stressed. Prerequisite: 301 or equivalent.

**404 Pathogenic Mechanisms (cr. arr.)** Pathogenic microbes, their toxins, virulence factors and interactions with the host. Prerequisites: 301 or equivalent and Biochemistry 304 or equivalent. w.

**405 Advanced Animal Virology (3).** Replication, biological, biochemical and biophysical properties of animal viruses. The subject material will be covered through lectures and discussion of the literature. Prerequisites: 301, Biochemistry 304 and instructor's consent. w, even yrs.

**406 Medical Mycology (3).** Covers the superficial, subcutaneous and systematic fungi pathogenic to man. Isolation and identification of the pathogens, as well as contaminant saprophytes stressed in lecture and lab. Prerequisite: medical microbiology. w.

**407 Advanced Immunology (2).** Discussions and conferences emphasizing theoretical aspects of immunology and detailed considerations of the more involved areas of this science. Prerequisite: 304. w.

**410 Seminar (1).** Presentation and critical discussion of student and staff research, current literature, and guest lectures on subjects in various areas of microbiology. f.w.

**490 Research (cr. arr.)** Original investigations in various areas of microbiology related to bacteria, fungi, rickettsia, viruses, and animal parasites, or immunology relating to antigens and antibodies of infectious and noninfectious nature. Designed for graduate thesis research.

## MILITARY SCIENCE

**10 Introduction to Military Science (1).** Introduction to the adventure training offered in ROTC with practical application. Topics include marksmanship, rappelling, orienteering, outdoor survival and opportunities the Army ROTC program offers. Discussion of the Army officer's lifestyle and career. f.

**11 The Military and Society (1).** Role of the military in American society with emphasis on role of the U.S. Army and the Army officer. Examines contemporary U.S. defense organization, policy making and efforts at arms control. w.

**20 Land Navigation (2).** Study and application of map and aerial photography. Fundamentals of military use of compass, map and nature in crosscountry navigation. Individual techniques of military science. f.

**22 Seminar in Military Instructional Techniques (2).** Study of military teaching techniques with emphasis on practical development of the students' teaching skills. Small unit tactical organization and operations are employed as subject matter for the practical exercise learning method. w.

**130 Intermediate Techniques of Military Science and Leadership (3).** Theories, models, behavioral patterns involved in interaction among individuals, groups and leaders. Study of contemporary behavioral theory and counseling techniques. Introduction to ethics, standards of conduct. Leadership of squad and platoon. Leadership laboratory required.

**131 Command Operations (3).**

**150 Techniques of Military Staff Organization and Management (3).** Study of principles, structure and functions of military staffs, introduction to the military training management system, development of verbal and written communication skills. Practical application of leadership and communication skills at staff level. f.

**151 Military Administration and Management of Resources (3).** Study of the principles and procedures of the Army management system and concepts of Army administration. Allocation of limited resources to accomplish organization goals. Introduction to ethics and standards of conduct. w.

**262 The Military and Wars in American Society (3).** (same as History 262).

## MUSIC

### GENERAL

**101 Topics (2).** Organized study of selected topics. Subjects vary from semester to semester. Repeatable once with departmental consent.

**120 Music Travel Course (1-4).** Study tour designed to broaden perspective of persons interested in music. Stresses relationship of music to art and ideas in a variety of contexts. Prerequisites: instructor's consent. Participant bears cost of course.

**300 Problems (cr. arr.)** Independent investigation leading to a paper or project. May be repeated for credit. Prerequisite: instructor's consent. Sections are: Music Theory, Music History, Music Performance/Pedagogy, Composition.

**301 Topics (cr. arr.)** Organized study of selected topics in music. Subjects and credit variable. May be repeated with departmental consent. Prerequisites: junior standing in music and instructor's consent.

**400 Problems (cr. arr.)** Independent investigation leading to a paper or project. May be repeated for credit. Prerequisite: instructor's consent. Sections are: Music Theory, Music History, Music Performance/Pedagogy, Composition.

**401 Topics (cr. arr.)** Organized study of selected topics in music. Subjects and credit variable. May be repeated with departmental consent. Prerequisite: instructor's consent. Sections are: Composition, Music Theory, Music History, Music Performance/Pedagogy.

**402 Introduction to Graduate Study (2).** Introduction to library procedures, basic sources of information in music and techniques for research. Sections are: Music, Music History, Music Education.

**420 Travel Seminar (1-4).** Selected topics for directed study in music undertaken in context of the tour. Emphasis on subjects with cross-disciplinary implications. Participant bears cost of course. Prerequisite: instructor's consent.

**490 Research (cr. arr.)** Thesis course. May be repeated for additional credit. Sections are: Music Theory, Composition, Music History.

**499 Seminar (1-3).** Sections are: Music Theory, Music History, Composition, Performance/Pedagogy.

## MUSIC THEORY

**1 Fundamentals of Music I (2).** Introduction to rhythmic, melodic, harmonic and structural elements of music. Designed for elementary education majors. No credit for music majors.

**2 Fundamentals of Music II (2).** Continuation of Music I. No credit for music majors. Prerequisite: 1 or instructor's consent.

**3 Syntax, Structure and Style of Music I (2).** Review of fundamentals. Study of rhythm, melody, harmony, structure and stylistic characteristics of various periods. Application through original composition projects. Prerequisite: none for music majors; others: instructor's consent.

**4 Syntax, Structure and Style of Music II (2).** Continuation of 3. Study of smaller forms and introduction to chromatic harmony. Prerequisite: 3 or instructor's consent.

**5 Aural Training and Sight Singing I (2).** Development of aural and sight singing skills. Prerequisite: 3 (or concurrently).

**6 Aural Training and Sight Singing II (2).** Continuation of 5. Prerequisites: 5 and 4 (or 4 concurrently).

**103 Syntax, Structure and Style of Music III (2).** Chromatic harmony, variation techniques and contrapuntal genres. Study of traditional forms in instrumental, vocal and choral compositions. Applications through original composition projects. Prerequisite: 4.

**104 Syntax, Structure and Style of Music IV (2).** Continued study of chromatic harmony and compositions in larger forms. Application through original composition projects. Prerequisite: 103.

**105 Aural Training and Sight Singing III (2).** Continuation of 6. Further development of aural and sight singing skills with an emphasis on chromatic harmony and decorative pitches. Introduction of structural preception. Prerequisites: 6 and 103 (or 103 concurrently).

**106 Aural Training and Sight Singing IV (2).** Continuation of 105. Prerequisites: 105 and 104 (or 104 concurrently).

**115 Composition I (2).** Fundamentals of composition and writing of small forms. Prerequisite: 4 or instructor's consent.

**116 Composition II (2).** Continuation of 115. Prerequisite: 115.

**203 Syntax, Structure and Style of Music V (2).** Study of 20th-century compositional techniques and analysis of twentieth-century music. Prerequisite: 104.

**204 Syntax, Structure and Style of Music VI (2).** Detailed analysis of selected compositions from the seventeenth to twentieth centuries. Individual projects and reports. Prerequisite: 203.

**215 Composition III (2).** Further development of creative writing in traditional forms. Prerequisite: 116.

**216 Composition IV (2).** Continuation of 215. Prerequisite: 215.

**303 Eighteenth-Century Counterpoint I (2).** Study of contrapuntal procedures and representative compositions of the eighteenth century. Emphasis on two-voice compositions and the style of Johann Sebastian Bach. Original composition projects: canons and invention. Prerequisite: 104.

**304 Eighteenth-Century Counterpoint II (2).** Continuation of 303. Analysis of three- and four-voice instrumental and choral compositions. Original composition projects: chorale preludes and fugues. Prerequisite: 303.

**305 Sixteenth-Century Counterpoint I (2).** Analysis of contrapuntal procedures and representative compositions of 16th century. Emphasis on styles of Palestrina, Lassus and Victoria. Stylistic writing in two voices. Prerequisite: 104.

**306 Sixteenth-Century Counterpoint II (2).** Continuation of 305. Composition of canons, mass movements and motets in three or more voices. Prerequisite: 305.

**307 Orchestration I (2).** Study of orchestral instruments and the process of scoring for various orchestral combinations. Prerequisite: 104.

**308 Orchestration II (2).** Continuation of 307. Prerequisite: 307.

**309 Band Arranging (2).** Transcription, scoring of solo and ensemble literature for band instrument combinations of varying sizes up to and including concert band. Prerequisite: 104.

**310 Choral Arranging (2).** Transcription and arrangement of music suitable for performance by various vocal ensembles. Prerequisite: 104.

**315 Composition V (2).** Writing of works in larger forms for a solo instrument or chamber ensemble. Prerequisite: 216.

**316 Composition VI (2).** Continuation of 315. May be repeated for additional credit. Prerequisite: 315.

**331 Schenkerian Analysis (3).** Techniques of musical analysis developed by Heinrich Schenker. Prerequisite: 104.

**333 Acoustics of Music (2).** The study of tuning systems and the properties, production and reception of musical sound. Prerequisite: 3 or instructor's consent.

**344 Analysis of Music (2).** An analytical study of rhythmic, melodic, harmonic and structural aspects of 18th-, 19th- and 20th-century music. Prerequisite: 104 or equivalent.

**345 Introduction to Electronic Music (2).** Techniques used in the creation of music with tape recorders, voltage-controlled synthesizers and electronics. Prerequisite: 203 or instructor's consent.

**402 Introduction to Graduate Study (3).** Introduces library procedures, basic sources of information on music, and techniques for research. Section A Comprehensive Research and Section B Musicology (or Music History).

**403 Analysis of Musical Styles I (2).** Analytical study of specific rhythmic, melodic, harmonic and structural factors which constitute the stylistic practices of the early Baroque through the early Romantic periods. Prerequisite: 344 or equivalent.

**407 Advanced Orchestration I (2).** Transcription for full orchestra of large works from different style periods. Scoring or original works for orchestra. Seminar, private lessons. Prerequisite: 308.

**408 Advanced Orchestration II (2).** Continuation or 407. Survey of original works for orchestra. Prerequisite 407.

**411 Comparative Approaches to Music Theory I (2).** Techniques and materials for teaching basic music theory courses for high school and college. Prerequisite: 104.

**412 Comparative Approaches to Music Theory II (2).** Techniques and materials for advanced college courses in music theory. Prerequisite: 411.

**415 Composition VII (2).** Intensive work in larger forms. Seminar, private lessons. May be repeated for additional credit. Prerequisite: 316 or instructor's consent.

**444 Contemporary Analytical Techniques (2).** Study and application of various analytical systems for 20th-century compositions. Analysis of music employing contemporary theories.

## MUSIC HISTORY AND LITERATURE

**21 Masterpieces of Music (3).** For non-majors. Non-technical survey of musical works from every style period. Emphasis on developing listening skills.

**30 Jazz, Pop and Rock (3).** Historical survey of American jazz, tracing its development and subsequent influences on pop and rock music since 1945. No credit for students who have taken Music 31.

**31 History of Jazz (2).** Historical survey of American jazz from its origin to the present. No credit for students who have taken 30.

**121 Introduction to Musical Literature (1).** For music majors. Listening laboratory for the study of selected works in the context of music history. Emphasis on style criticism. May be repeated once for credit.

**122 Music in the United States (2).** The traditions and practice of music in the United States from colonial times to the present. Prerequisite: 21 recommended.

**123 Symphony and Symphonic Poem (3).** The symphony since Beethoven, with emphasis on program symphonies and symphonic poems of the later 19th century and early 20th century. Prerequisite: 21 recommended.

**124 Nationalism in Music (2).** Rise of national consciousness in music from the 19th through 20th centuries; masterpieces of present-day concert repertory. Recommended: 21.

**125 Introduction to Opera (2).** Masterpieces of opera; study of drama in music through selected scenes, acts and complete works. Recommended: 21.

**187 History of Western Music I (2).** Surveys music from ca. 600 A.D. to ca. 1750. Not open to freshmen. Prerequisite: 21 or equivalent.

**188 History of Western Music II (2).** Continuing survey of music history from ca. 1750 to present. Not open to freshmen. Prerequisite: 21 or equivalent.

**197 Honors in Music History (3).** Special readings, directed research for graduation with Honors in music history. Prerequisites: 187 & 188.

**198 Honors in Music History (3).** Continuation of 197 leading to Honors thesis in music history. Prerequisite: 197.

**221 Bach and His Time (3).** Historical survey of the works of Bach. His relationship to his time; his position in history. Recommended: 21 or 187.

**222 Haydn, Mozart and Beethoven (3).** Historical, critical survey of the works of one or more of the masters of Viennese classical music. Recommended: 21 or 188.

**223 Richard Wagner and the Music Drama (3).** Wagner's life, his theories and writings on music and drama, and his relationship to the 19th-century world of politics and the arts. Prerequisite: 21 or 188 recommended.

**224 Stravinsky and the 20th Century (3).** Historical, critical survey of the works of Stravinsky. His relation to the work of the arts in our time. Recommended: 21 or 188.

**317 Graduate Review of Music History I (2).** Survey of the history of Western music from ca 1750 to the present. Special readings; individual projects.

**318 Graduate Review of Music History II (2).** Survey of the history of Western music from ca 1750 to the present. Special readings; individual projects.

**321 Music to 1600 (3).** Critical survey of the development of European music from Gregorian chant to the end of the Renaissance. Prerequisite: 187 or equivalent.

**322 Music in the 17th & 18th Centuries (3).** Critical survey of the development of European music from the Baroque through the Rococo and Classical periods. Prerequisite: 188 or equivalent.

**323 The Romantic Period (2).** Nineteenth-century music in relationship to Romantic Movement. Prerequisite: 188.

**324 Modern Music (2).** Music since 1900; emphasizes contemporary trends. Prerequisite: 188.

**422 Studies in the History of American Music (2).** Critical survey of the history of music in the Americas from the 16th century to the present. Prerequisites: 187 & 188 or equivalent.

**424 Studies in Music History II (2).** Selected themes for detailed investigation for the classic, romantic or modern periods. Special readings, individual projects. May be repeated once. Prerequisite: instructor's consent.

**426 History of Performance Practices (2).** Performance practices; emphasizes Renaissance and Baroque periods.

**427 Studies in the History of Opera (2).** Significant operatic masterpieces from 1600 to present.

**428 Studies in the History of Choral Music (2).** Significant choral works from Renaissance to present.

## APPLIED MUSIC

**7 Recital/Lecture Assembly (0).** Required course for all music majors (B.M. and B.S. in Music Education, except during student teaching semester) for each semester in residence, excluding the summer session. Graded S/U, f.w.

**54 Fundamental Individual Performance Study (1-2).** Acceptable for non-majors and as a secondary applied music subject on B.S. in Music Education and B.M. degrees. Material varies according to credit elected and educational purpose. May be repeated for credit. Prerequisite: instructor's consent.

**55 Fundamental Individual Performance Study (1-5).** Credit accepted toward a major on B.M. degree, and on B.S. in Music Education degree. May be repeated for credit. Prerequisite: instructor's consent.

**154 Individual Performance Study (1-2).** Acceptable for non-majors only. Prerequisites: audition by examining committee and instructor's consent.

**255 Upper-class Individual Performance Study (1-3).** Accepted as upper-class credit on B.S. in Music Education and for graduate credit on M.Ed. degree. Not used by B.M. degree candidates in their major study. May be repeated for credit. Prerequisites: 8 hours underclass course or equivalent; audition by examining committee and instructor's consent.

**295 Junior Recital (1).** Preparation and presentation of junior recital. Appropriate applied music course to be taken concurrently.

**340 Individual Instruction in Instrumental and Vocal Techniques (1).** For music teachers needing instruction in secondary instruments or voice. May repeat for credit.

**355 Advanced Upper-class Individual Performance Study (1-5).** Required for upper-class major study credit on B.M. degree. Acceptable as upper-class credit on B.S. in Music Education degree, graduate credit on M.A. and M.Ed. degree. May be repeated for credit. Prerequisites: audition by examining committee and instructor's consent.

**395 Senior Recital (1).** Preparation and presentation of senior recital. May be repeated for additional credit; maximum 4 hours. Appropriate applied music course to be taken concurrently.

**455 Graduate Individual Performance Study (1-5).** Required for graduate credit as major applied study on M.M. degree. Acceptable for graduate credit on M.A. and M.Ed. degrees. May be repeated for credit. Prerequisites: audition by examining committee and instructor's consent.

**495 Graduate Recital (1).** Preparation and presentation of graduate recital. May be repeated for additional credit; maximum 4 hours. Appropriate applied music course to be taken concurrently.

## INSTRUMENTAL AND VOCAL TECHNIQUES

**8 Beginning Piano Class (1).** For nonmusic majors only.

**9 Intermediate Piano Class (1).** For nonmusic majors only. Continuation of 8.

**10 Piano Class for Proficiency I (1).** Beginning piano for music majors and concentrations only. Prerequisite: instructor's consent.

**11 Piano Class for Proficiency II (1).** Continuation of 10. Prerequisite: instructor's consent.

**12 Elementary Folk Guitar Class (1).** Teaching correct hand position, strum patterns, and chords needed for accompaniment of popular and folk songs.

**13 Intermediate Folk Guitar Class (1).** Expanded study of chords. Introduces finger picks, bass runs, and coordination of bass runs with bar and picking patterns. Prerequisite: 12 or equivalent.

**14 Advanced Folk Guitar Class (1).** Develops solo techniques found in varying modern music styles. Prerequisite: 13 or equivalent.

**15 Elementary Classical Guitar Class (1).** Teaching correct hand position, notation, melodic study and two-part playing.

**110 Piano Class for Proficiency III (1).** Continuation of 11. Prerequisite: instructor's consent.

**111 Piano Class for Proficiency IV (1).** Continuation of 110. Prerequisite: instructor's consent.

**131 Basic Conducting (2).** Basic physical techniques of conducting; elementary score reading. Prerequisites: 4 & 6.

**133 Choral Conducting (2).** Rehearsal procedures for choral organizations. Program building and procedures for planning public performances. Prerequisites: 4 & 6 and instructor's consent.

**134 Instrumental Conducting (2).** Rehearsal procedures for instrumental organizations. Program building and procedures for planning public performances. Prerequisites: 4 & 6 and instructor's consent.

**137 Woodwinds I (1).** Class instruction in clarinet; playing and methods and materials for teaching. Taught on a laboratory basis. Meets twice weekly. Prerequisite: major in music or music education.

**138 Woodwinds II (1).** Class instruction in oboe and bassoon; playing and methods and materials for teaching. Taught on a laboratory basis. Meets twice weekly. Prerequisite: major in music or music education.

**139 Woodwinds III (1).** Class instruction in flute and saxophone; playing and methods and materials for teaching. Taught on laboratory basis. Meets twice weekly. Prerequisite: major in music or music education.

**140 Strings I (1).** Class instruction in violin and viola; playing and methods and materials for teaching. Taught on laboratory basis. Meets twice weekly. Prerequisite: major in music or music education.

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**141 Strings II (1).** Class instruction in violoncello and string bass; playing and methods and materials for teaching. Taught on laboratory basis. Meets twice weekly. Prerequisite: major in music or music education.

**145 Brass I (1).** Class instruction in trumpet; playing and methods and materials for teaching. Taught on laboratory basis. Meets twice weekly. Prerequisite: major in music or music education.

**146 Brass II (1).** Class instruction in horn and tuba; playing and methods and materials for teaching. Taught on laboratory basis. Meets twice weekly. Prerequisite: major in music or music education.

**147 Brass III (1).** Class instruction in trombone and euphonium; playing and methods and materials for teaching. Taught on laboratory basis. Meets twice weekly. Prerequisite: major in music or music education.

**148 Percussion (1).** Class instruction in percussion instruments; playing and methods and materials for teaching. Taught on laboratory basis. Meets twice weekly. Prerequisite: major in music or music education.

**151 Voice Class I (1).** Fundamentals of singing: posture, breath support, control, vocalization, concepts of tone quality, placement, and resonance. Literature selected for students with no previous vocal training. Adapted to needs of drama and other interdisciplinary students.

**152 Voice Class II (1).** Continuation of 151. Prerequisite: 151.

**240 Undergraduate Seminar in Vocal Techniques (1).** Discusses accepted techniques of singing, practical application to posture, breath support, tone placement, musicianship, diction, interpretation, stage deportment. Recognizing and solving specific vocal problems. Repeatable one time for credit. Prerequisite: instructor's consent.

**242 Seminar in String Techniques (1).** In-depth study of publications, philosophies, repertory, grading, specific problems for the string player. Repeatable once for credit. Prerequisites: 140 & 141, or instructor's consent.

**243 Symposium in Instrumental Music (2).** Study of procedures, techniques and literature for variable combinations of wind, string, and percussion classes and the administration of instrumental music programs. Prerequisite: junior standing in music or instructor's consent.

**244 Jazz Techniques: General (1).** Basic aspects of the jazz idiom including the functions of the ensemble, the contributions of each separate section, basic jazz theory and improvisation.

**245 Jazz Techniques: Improvisation (1).** Second semester course designed to further the knowledge of improvisation and open new avenues of creativity. Improvisation is the focal point of jazz music and can serve to enhance the understanding of functional music theory.

**246 Marching Band Techniques (2).** Study of techniques and procedures used in the development of field and street marching. Prerequisite: junior standing in music or music education.

**261 Accompanying Skills I (2).** Sight reading, harmonization, transposition, score reading, score reduction and figured bass realization. Prerequisites: 4 & 6.

**262 Accompanying Skills II (2).** Continuation of 261 including basic accompanying principles for voice, string, wind and percussion. Prerequisite: 261.

**270 Diction in Singing: Italian (1).** Study of the correct principles and application of Italian diction in singing; the International Phonetic Alphabet; spoken language drill, study and recitation of representative song literature. Prerequisite: sophomore standing.

**271 Diction in Singing: German (1).** Study of the correct principles and application of German diction in singing; the International Phonetic Alphabet; spoken language drill, study and recitation of representative song literature. Prerequisite: sophomore standing.

**272 Diction in Singing: French (1).** Study of the correct principles and application of French diction in singing; the International Phonetic Alphabet; spoken language drill, study and recitation of representative song literature. Prerequisites: sophomore standing.

**361 Piano Pedagogy Survey I (2).** Discussion of approaches for teaching young beginning and intermediate student; survey of materials and resources. Prerequisite: instructor's consent.

**362 Piano Pedagogy Survey II (2).** Approaches for teaching older, more advanced and class piano students; survey of materials and resources. Prerequisite: instructor's consent.

**363 Piano Pedagogy Lab (1).** Supervised instruction in private and class piano. May be repeated once for credit. Prerequisites: 361 & 362.

**431 Principles of Singing I (2).** Prerequisite: instructor's consent.

**433 Advanced Choral Conducting (2).** Advanced conducting techniques in the interpretation of choral literature; score analysis. May be repeated for credit. Prerequisite: 133 or instructor's consent.

**434 Advanced Instrumental Conducting (2).** Advanced conducting techniques in the interpretation of band and orchestral literature; score analysis. May be repeated for credit. Prerequisite: 134 or instructor's consent.

**461 Advanced Piano Pedagogy I (3).** (same as Curriculum and Instruction T461). A survey of materials and techniques of instruction for teaching and young beginner and the intermediate piano student. Supervised private teaching concurrently. Prerequisites: graduate standing and instructor's consent.

**462 Advanced Piano Pedagogy II (3).** (same as Curriculum and Instruction T462). Survey of materials and techniques of instruction for teaching class piano, the older beginner and the advanced student. Supervised class piano teaching concurrently. Prerequisites: graduate standing and instructor's consent.

**466 Choral Techniques (3).** Study of techniques to achieve and develop choral singing and musical interpretation. Prerequisites: graduate standing and instructor's consent.

## INSTRUMENTAL AND VOCAL REPERTORY

**353 Piano Literature I (2).** Study of keyboard music from ca. 1600 to ca. 1800. Prerequisites: junior standing and instructor's consent.

**354 Piano Literature II (2).** Survey of keyboard music from Beethoven's time to the present. Prerequisite: 353 or instructor's consent.

**367 Vocal Literature I (2).** Introduction to and study of song literature with emphasis on style and interpretation. Prerequisite: junior standing or instructor's consent.

**368 Vocal Literature (2).** Continuation of 367. Prerequisite: 367 or instructor's consent.

**382 Church Music (2).** Study of traditional and appropriate music for use in various types of church services. For organists. Prerequisites: junior standing in music or music education and instructor's consent.

**453 Piano Repertory I (3).** Study of specific aspects of Baroque and Classical keyboard music. Individual projects in research, analysis and performance. Prerequisite: 355 or instructor's consent.

**454 Piano Repertory II (3).** Study of specific aspects of nineteenth and twentieth-century piano music. Individual projects in research, analysis and performance. Prerequisite: 453 or instructor's consent.

**465 Choral Repertory (2).** Survey of choral works from selected periods with an emphasis on various aspects of choral performance. May be repeated for credit. Prerequisite: graduate standing and instructor's consent.

**467 Vocal Repertory I (3).** Study of specific aspects of vocal repertory. Individual projects in research, analysis and performance. Prerequisite: 355 or instructor's consent.

**468 Vocal Repertory II (3).** Continuation of 467. Prerequisite: 467 or instructor's consent.

**473 String Instrument Repertory I (1).** Prerequisite: 355 or instructor's consent.

**474 String Instrument Repertory II (1).** Continuation of 473. Prerequisite: 473.

**483 Organ Repertory I (1).** Prerequisite: 355 or instructor's consent.

**484 Organ Repertory II (1).** Continuation of 483. Prerequisite: 483.

## ENSEMBLE COURSES

**41 Instrumental Ensemble (1-2).** Provides experience in instrumental performance and repertory. Open to all UMC students by audition. May be repeated for credit. Prerequisite: audition. Sections and credit hours are: Philharmonic Orchestra (2), Chamber Orchestra (1), Symphonic Band (2), Wind Ensemble (1), Concert Band (1-2), Varsity Band (1-2), Studio Band (2), Stage Band (2), Marching Band (2).

**42 Choral Ensemble (1-2).** Provides experience in choral performance and repertory. Open to all UMC students. May be repeated for credit. Prerequisite: audition required for all but Choral Union; Sections and credit hours are: University Singers (2), Chamber Singers (1), Choral Union (1), Vocal Jazz Ensemble (2), Concert Chorale (2), Men's Chorus (1), Women's Chorus (1).

**43 Piano Ensemble (1).** Preparation and performance of standard piano literature for four hands. May be repeated for credit. Prerequisite: instructor's consent.

**46 Chamber Music (1).** Preparation and performance of chamber music. May be repeated for credit. Prerequisites: audition and instructor's consent. Sections are: String Ensemble, Woodwind Ensemble, Brass Ensemble, Percussion Ensemble.

**65 Opera Workshop (2).** Study, preparation and performance of selected operatic works in staged or concert versions. Open to all UMC students by audition. May be repeated for credit. Prerequisites: audition and instructor's consent.

**266 Musical Theatre Performance (3).** (Same as Speech and Dramatic Art 266).

**330 Collegium Musicum (1).** May be repeated for credit. Prerequisites: audition and instructor's consent. Sections are: Historic Instruments, Chamber Choir.

**341 Instrumental Ensemble (1-2).** Research, preparation and performance of instrumental compositions. May be repeated for credit. Prerequisite: instructor's consent. Sections and credit hours are: Philharmonic Orchestra (2), Chamber Orchestra (1), Symphonic Band (2), Wind Ensemble (1), Concert Band (1), Studio Band (2), Marching Band (2).

**342 Choral Ensemble (1-2).** Research, preparation and performance of choral compositions. May be repeated for credit. Prerequisite: instructor's consent. Sections and credit hours are: University Singers (2), Chamber Singers (1), Choral Union (1), Vocal Jazz Ensemble (2).

**343 Advanced Piano Ensemble (1).** Study, preparation and performance of standard piano literature for four hands. May be repeated for credit. Prerequisite: instructor's consent.

**346 Advanced Chamber Music (1).** Study, preparation and performance of chamber music. May be repeated for credit. Prerequisites: audition and instructor's consent. Sections are: String Ensemble, Woodwind Ensemble, Brass Ensemble, Percussion Ensemble.

**365 Opera Production (cr. arr.)** Study, preparation and performance of selected operatic works in staged or concert versions. May be repeated for credit. Prerequisites: audition and instructor's consent.

**666 Naval Science (2).** A general introduction to the naval service with particular emphasis on the mission, organization, regulations and broad warfare components of the Navy and Marine Corps. The student is made cognizant of the major challenges facing today's naval officer. f.

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**100 Navigation (3).** Theoretical and practical application of the principles of marine navigation. Includes fundamentals of dead reckoning, piloting, tides and current, celestial navigation, electronic navigation. f.

**103 Navy Management (3).** Applies principles of management using the Department of the Navy as a model. Emphasis placed on relationships between echelons and management of men, materiel, and funds at each echelon. f.

**112 Seapower and Maritime Affairs (2).** Seminars examine the application of seapower as an instrument of foreign policy by the major nations of the world. Emphasis placed on role of the Navy. w.

**123 Naval Ship Systems I (3).** Ship construction, stability and damage control, basic thermodynamics, the steam cycle and engineering plant, including introduction to gas turbine, diesel and nuclear powered systems.

**124 Naval Ship Systems II (3).** Naval weapons systems, their employment and control, including the basic fire control problem, with emphasis on new systems. f.

**155 Evolution of Warfare (3).** Evolution of strategy, tactics, weapons and leadership from earliest beginning through the Viet Nam period. Development of military policy, the impact of warfare on the political, social and economic structure of nations. alt. f. even yrs.

**156 Amphibious Warfare (3).** History and development of amphibious warfare, principles of amphibious warfare techniques; their application in selected examples from modern history, alt. f. odd yrs.

**235 Marine Navigation (3).** Theoretical and practical application of the principles of marine navigation. Includes fundamentals of dead reckoning, piloting, tides and current, celestial navigation, electronic navigation. f.

**236 Naval Operations (3).** Principles and concepts of naval operations: rules of the road, command and control in naval operations, communications, ASW warfare, international maritime law, and practical solution of relative motion problems. Prerequisite: 235. w.

**247 Management in the Naval Profession (2).** Applies principles of management using the Department of the Navy as a model. Emphasis placed on relationships between echelons and management of men, materiel and funds at each echelon. f.

**248 Administration in the Naval Profession (2).** Administrative aspects of naval leadership including selected current topics in personnel management, materiel management, organization and military law. Prerequisite: 247 or Management 202. w.

## NEUROLOGY

**B Medical/Surgical Neurology (5).** Required course emphasizing practical experience in diagnosis and management of nervous system disorders. Students have intensive patient contact on the medical or surgical wards and clinics, with combined teaching conferences and didactic lecture series. Prerequisite: completion of third year of medical school.

**C Neurology Elective--Third and Fourth Years (0).** Students who have completed Medical/Surgical Neurology may elect an experience in which the student participates in consultations rendered to other hospital services by the Department of Neurology. Additionally, elective opportunities exist for students at all levels after satisfactory completion of the first year of medical school. Details may be obtained from the Chairman of the Department of Neurology.

## NUCLEAR ENGINEERING

**301 Topics in Nuclear Engineering (2-5).** Current and new developments in nuclear engineering. Prerequisite: instructor's consent.

**302 Safe Handling of Radioisotopes (1).** Introduction of methods and procedures for safe handling of radioisotopes in the research laboratory. Intensive lecture and laboratory training sessions designed for persons planning to use radioisotopes at the University. Prerequisite: instructor's consent.

**303 Radiation Safety (3).** Types and origins of radiation; radiation detection and measurement; radiation interactions; shielding; dose calculations; federal, state and local regulations; and procedures for safe uses of radiations. Laboratory experiments in radiation measurements and protection. Prerequisite: instructor's consent.

**305 Survey of Nuclear Engineering (3).** Introductory topics in nuclear engineering. Atomic and nuclear physics; nuclear reactor principles under steady-state and transient conditions; heat removal; shielding; instrumentation; power generation; fusion. Prerequisite: Physics 124. Concurrent with Math 304.

**306 Engineering Analysis (3).** (same as Chemical Engineering 306).

**315 Engineering Evaluation of Energy Systems and Resources (3).** (same as Electrical Engineering 315, Mechanical & Aerospace Engineering 315).

**320 Natural Resources and Nuclear Energy (3).** Not for engineering students. Lecture, demonstration; describes physical environment, energy, power plants, nuclear reactors; radioactivity, its biological effects; health physics measures, rad-waste disposal; nuclear safeguards, nuclear explosives, societal implications. Prerequisite: high school algebra.

**328 Introductory Radiation Biology (3).** (same as Biological Sciences 328, Radiology 328, Veterinary Medicine & Surgery 328).

**341 Nuclear Chemical Engineering (3).** Principles and processes of importance in the field of nuclear technology.

**346 Introduction to Nuclear Reactor Engineering I (3).** (same as

Mechanical & Aerospace Engineering 346).

**347 Introduction to Nuclear Reactor Engineering II (3).** Reactor fuel and other materials; safety; shielding; structural components; system design; economics. Prerequisite: 346.

**349 Nuclear Engineering Materials (3).** Properties of materials for reactor components; radiation damage and corrosion; metallurgy of reactor materials. Prerequisite: upper division or graduate standing in physical sciences or engineering, or instructor's consent.

**353 Introduction to Fusion (3).** Basic plasma physics, principles of thermonuclear fusion, plasma confinement and heating, and devices. Prerequisite: senior standing in engineering or science or instructor's consent.

**355 Nuclear Reactor Laboratory I (3).** Experience with hands-on operation of nuclear reactors: startup/shutdown, power level changes, control rod effects, temperature/fission product effects, instrumentation. Experiments measure flux distribution, control rod worth, reactivity coefficients, xenon transient. Prerequisite: instructor's consent.

**357 Nuclear Heat Transport (2).** Principles of heat transport in nuclear reactors. Brief review of the theory of flow coast down and convective heat transfer. Heat transfer loop experiments on flow coast down, steady state and transient forced convection heat transfer, boiling heat transfer. Prerequisite: 305, 346 or instructor's consent.

**365 Nuclear Power Engineering (3).** Nuclear reactor heat generation and removal; nuclear reactor coolants; analysis of nuclear reactor power plants. Prerequisite: Engineering 99.

**375 Introduction to Plasmas (3).** (same as Electrical Engineering 375, Mechanical & Aerospace Engineering 375).

**382 Lasers and Their Applications (3).** (same as Electrical Engineering 382, Mechanical & Aerospace Engineering 382).

**391 Nuclear Radiation Detection (3).** Principles and application of radiation detectors and analyzers: ionization, Geiger-Muller, proportional, liquid and solid scintillation, semiconductor, pulse height analyzers, coincidence circuits, data reduction, tracer applications, activation analysis. Lectures, laboratory. Prerequisite: senior standing or instructor's consent.

**400 Problems (1-6).** Supervised investigation in nuclear engineering to be presented in the form of a report.

**401 Advanced Topics in Nuclear Engineering (3).** Advanced developments in nuclear engineering. Prerequisite: instructor's consent.

**405 Nuclear Reactor Laboratory II (3).** Advanced experiments to measure diffusion length, Fermi age, material buckling, transfer function, neutron spectrum and other reactor characteristics. Reactor simulation with an analog computer. Prerequisite: 355, 411 or 411 or instructor's consent.

**408 State Variable Methods in Automatic Control (3).** (same as Chemical Engineering 408, Electrical Engineering 408, Mechanical & Aerospace Engineering 408).

**409 Interaction of Radiation with Matter (3).** Theory/applications of radiation interaction processes. Reviews nuclear physics concepts; radioactive decay; sources/spectra of ionizing radiation; collision mechanisms for charged particles, electromagnetic radiation, neutrons for interaction with matter. Prerequisite: instructor's consent.

**410 Seminar (1).** Reviews of investigations and projects of importance in nuclear engineering.

**411 Nuclear Reactor Theory I (3).** Nuclear reactions; nuclear fusion; introduces neutron transport; diffusion and slowing down of neutrons; steady-state homogeneous and heterogeneous reactor theory. Prerequisite: 347 or instructor's consent.

**412 Nuclear Reactor Theory II (3).** Linear and non-linear reactor kinetics; perturbation theory; temperature and fission product effects; control rod theory; transport theory. Prerequisite: 411 or 346 & 347.

**421 Nuclear Pulse Analysis (3).** Principles of radiation pulse analysis with emphasis on applications. Radiation detection devices; amplifying, shaping and discrimination circuits; nuclear pulse analysis; automated data analysis systems. Lectures and lab. Prerequisite: 346, 391 or instructor's consent.

**422 Radiation Shielding (3).** Fundamentals of radiation interactions stressing neutron and gamma radiation transport; ray theory, removal theory, multigroup transport shield design principles. Prerequisite: 409 or instructor's consent.

**429 Radiation Dosimetry (3).** Basis and applications of conventional and microscopic radiation dosimetry. Dose concepts and quantities; biological dose-response models; dose measurement principles; photon, charged particle, and neutron dosimetry. Prerequisite: 409. Recommended: 328.

**432 Nuclear Reactor Engineering (3).** Engineering topics from reactor heat transfer and thermal stresses, fuel cycle analysis, power plant thermodynamics, shielding, and control rod analysis. Prerequisite: 411 or 347 & 365 or instructor's consent.

**434 Fracture Mechanics I (3).** (same as Mechanical & Aerospace Engineering 434).

**444 Fracture and Fatigue Prevention in Engineering Practice (3).** (same as Mechanical & Aerospace Engineering 444).

**451 Computational Methods of Reactor Analysis (3).** Applies numerical analysis and digital computation to topics from multigroup diffusion theory, transport theory, reactor kinetics, reactor thermal hydraulics, radiation shielding, reactor safety. Prerequisite: 304, 411, or Mathematics 307 or Mathematics 323.

**453 Fusion Theory (3).** Plasma stability theory, charged particle diffusion, slowing down of charged particles, interaction of radiation with matter, direct energy conversion using charged particles, and engineering considerations. Prerequisite: 353 and 375 or Physics 445 or instructor's consent.

**455 Nuclear Reactor Kinetics and Control (3).** Nuclear reactor kinetics equations; linear feedback systems; stability criteria; reactor transfer functions and nuclear systems analysis; analog simulation;

non-linear reactor kinetics; statistical control theory and reactor noise. Prerequisite: 412.

**461 Neutron Transport Theory (3).** The Boltzmann equation; general properties and solution; numerical methods of solving the transport equation; neutron thermalization and neutron spectra. Prerequisites: 412; Mathematics 305, Mathematics 307, or instructor's consent.

**470 Fast Reactor Analysis (3).** Analytical methods for designing fast breeder reactor systems. Prerequisite: 412, 432, 451, or instructor's consent.

**471 Radiation Protection (3).** Theory and applications of radiation protection and health physics. Radiation dosimetry methods and calculations, shielding evaluations, equipment surveys and inspection, environmental monitoring, radiation standards and regulations and administration presented. Prerequisites: 303 & 328.

**490 Research (cr. arr.)** Independent investigation in nuclear engineering to be presented as a thesis.

## NURSING

**71 Concepts of Nursing (2).** Introduces nursing as a professional practice discipline with historical, social, legal and ethical aspects. Considers research methods and findings in context of conceptual definition of nursing. Relates nursing to individuals and groups served. f, w.

**72 Concepts of Health and Health Care (3).** Considers health and effect of health practices on maintenance and promotion of health. Role of individuals as self-carers and of health care system in managing health problems. Prerequisite: history and political science, Psychology I, Sociology I. f, w.

**73 Nursing and the Healthy Individual (4).** Nursing related to individuals experiencing life cycle/developmental events. Focus on maintenance of health and nursing knowledge required to assist healthy individuals. Prerequisite: 71, 72, Child and Family Development 66. f, w.

**90 Nursing Process, Theory, and Assessment (6).** Focuses on self-care deficit theory and nursing process. Examines professional nursing as it relates to self-care deficit theory. Develops skills in health assessment with emphasis on physical examination techniques. Prerequisite: RN students only. s.

**91 Socialization and Professional Nursing (3).** Examines role theory, structure of health care system, ethical concerns and self-care as they relate to professional practice. Explores methods of assisting. Prerequisite: RN students only. f.

**102 Nursing in Multiperson Units (2).** Examines nurse roles and behaviors in promoting effective functioning within particular multiperson units. Learning experiences facilitate acquisition of knowledge and development, implementation, and evaluation of interpersonal nursing strategies. Prerequisite: N73. f, w.

**103 Nursing in the Expanding Family: Childbearing (4).** Examines action demands occurring within the expanding family unit. Emphasizes development, implementation, and evaluation of nursing systems for families and their members during childbearing. Prerequisite: N73. Prerequisite or concurrent: N102, N141, N142. f, w.

**120 Basic Cardiac Dysrhythmias (1).** Functional cardiac anatomy and electrophysiology, characteristics of normal sinus rhythm, mechanisms of arrhythmia formation, atrial and ventricular dysrhythmias, atrioventricular blocks, cardiac pacemakers, cardiac drugs, and appropriate nursing interventions. Graded S/U. Prerequisites: Senior standing, nursing curricula. f, w.

**121 Basic Critical Care Nursing (2).** Examines clinical problems of clients experiencing disruption in vital processes. Content will provide basis for developing expertise when dealing with the critically ill and their families. Supplemental to content of the undergraduate program. S/U. Prerequisites: Senior standing, nursing curricula. f, w.

**141 Pathology and Therapeutics I (3).** Considers impact of disruptions of human functioning, structure and development on self care, focusing on alterations in genetic development, psychopathology and regulatory processes. Incorporates major therapeutic modalities. Prerequisites: pharmacology, nutrition, 73. f, w.

**142 Methods of Assisting I (3).** Develop skills in assisting selected clients throughout life cycle. Self-instructional activities in media, technology laboratories. Selected field experiences used to achieve mastery of selected nursing technologies. Prerequisite: 73 or consent. Concurrent: 102, 103, 141, 152. f, w.

**143 Pathology and Therapeutics II (2).** Continuation of 141, considers the impact of disruptions of human functioning, structure and development on self care, focusing on major organ systems. Incorporates major therapeutic modalities and examines complex situations. f, w.

**144 Methods of Assisting II (2).** Develop skills in assisting selected adult and pediatric clients. Self-instructional activities in media, technology laboratories. Selected field experience used to achieve mastery of selected nursing technologies. Prerequisite: 142. Concurrent: 150, 151. f, w.

**150 Nursing in Child Health Deviations (5).** Theory and practice in nursing care of children and their families. Focuses on children with health and developmental deviations. Self-care abilities of the family unit are emphasized. Prerequisite: 102 and 103, prerequisite or concurrent 143, 144. f, w.

**151 Nursing in Adult Physiologic Health Deviations (5).** Application of nursing process to care for selected hospitalized adults with physiological health deviations. Knowledge of psychosocial health factors and developmental states will be incorporated in designing individualized nursing systems. Prerequisite or corequisite: 143, 144. f, w.

**152 Restorative Dimensions of Psychosocial Nursing Care (4).** Social, interpersonal, technological dimensions of psychosocial nursing. Produce systems based on theories of human behavior, therapeutic use of self related to client systems with mental health deviations. Prerequisite or concurrent: 102, 103, 141. f, w.

**153 Gerontological Nursing (2).** Examines broad concerns related to long-term care of the elderly client with health deviations. Focuses on nursing systems for selected elderly clients in acute and long-term care settings. Prerequisite: 102, 103. Prerequisite or corequisite: 143, 144, 151. f, w.

**170 Community Nursing (5).** Examines roles and functions of nurse within community with emphasis on application of community/public health concepts and design and implementation of nursing systems of care for families and groups with particular self-care requisites. Prerequisites: 150, 151, 152. f, w.

**180 Leadership and Management in Nursing (2).** Examines leadership and management as learned processes; relates organizational theory to the effective delivery of health care to sets of clients, to personnel and resource management within nursing systems and health care organizations. Pre- or Co-requisite: 170. f, w.

**181 Professional Nursing Practicum (4).** Application of management concepts, demonstration of professional nursing practice and scholarly endeavors in clinical settings. Requires synthesis, evaluation and validation of theory with focus on continuity of care. Pre- or Co-requisite: 180. S/U grading. f, w.

**182 Professional Perspectives (2).** Analyzes societal health care issues and trends related to nurse/client social systems. Examines nursing as a sub-system of the larger health care system. Explores professional nurse role characteristics; develops knowledge to strengthen role capabilities. Pre- or co requisite: 181. f, w.

**190 Individual Study (cr. arr.)** Independent study for qualified students in specific areas of interest in nursing under faculty guidance. Prerequisite: instructor's consent. f, w, s.

**199 Introduction to Home Nursing and Family Health (2).** Current trends in family health care; home nursing care with practice in the laboratory. f.

**301 Special Topics in Nursing (1-3).** Specialized topics in advanced nursing not available through regularly offered courses.

**302 Health Appraisal (2).** Repetitive practice of health history taking and physical examination for the purpose of discriminating normal from abnormal and making nursing diagnoses.

**310 Self-Care Deficit Theory I (3).** Analysis, application and evaluation of the general theory of nursing, examining the theories of self-care, self-care deficit, and nursing systems. Examines self-care and self-care behaviors from a historical and philosophical perspective.

**311 Self-Care Deficit Theory II (3).** Nursing practice disciplines are described and explained from the viewpoint of self-care deficit theory. Historical, social, economic, legal and ethical questions related to the use of this conceptual framework are identified and resolved. Prerequisite: 310 or instructor's consent.

**326 Child Health Nursing (0-6 years) (3).** Concepts from nursing and the biopsychosocio-cultural sciences are explored and applied from the perspective of self-care theory to the development of expertise in child health nursing practice with infants, toddlers, preschoolers and their families. Prerequisites: 310 (or concurrently).

**327 Child Health Nursing (6-18 years) (3).** Student develops knowledge in advanced child health nursing practice with school-agers, adolescents, and their families. Prerequisites: 310.

**351 Community Mental Health Programs (3).** Overview of purposes and functions of community mental health programs; rules and regulations for accreditation and federal funding. Explores the historical, philosophical, political and epidemiologic background of the mental health movement.

**401 Topics in Advanced Clinical Nursing (3).** Specialized topics in advanced clinical nursing not available through regularly offered courses.

**402 Research Methods in Nursing (3).** Rationale of scientific research; research methodology pertinent to nursing problems; hypothesis formulation, selection of appropriate design, instruments and analysis. Prerequisite: 310 (concurrently).

**404 Teaching Nursing (3).** Principles and methods of teaching, evaluation, and curriculum construction in undergraduate nursing education. Prerequisite: Educational Psychology A405 or equivalent.

**405 Teaching Practicum (3).** Participation in application of principles and methods of teaching, learning, and evaluation to the education of undergraduate nursing students. Graded S/U. Prerequisite: 404. w.

**416 Gerontologic Nursing (3).** Concepts and principles of nursing care of aged derived from biological and behavioral sciences; nursing research on the aging process and care needs. Clinical experience with aged clients in their homes, residential and institutional settings. Prerequisite: 411.

**418 Communication Processes and Intervention (3).** Communication will be explored using various theoretical frameworks appropriate to individuals and groups. Includes interpersonal learning, nature of groups, authority in groups, roles, processes, systems of groups, listening skills, decision making and conflict. Prerequisite: 310.

**420 Theories of Development and Psychopathology (3).** Theories and empirical research related to psychosexual and psychosocial development, perception, cognition and moral development evaluated for ability to explain or predict behavior throughout the life cycle.

**424 Family Dynamics and Intervention (3).** Theories of family function and dysfunction; techniques of assessment; models of family intervention. Practicum with selected families.

**428 Advanced Child Health Nursing Practicum (3).** Consists of guided clinical practice with clients with complex self-care demands. Problems identified within a specific client population will be the focus

of advanced practice and investigation. Prerequisites: 326, 327.

**429 Roles and Functions in Clinical Specialization (3).** Examines roles, functions and strategies utilized by clinical specialists to operationalize a technological nursing system for individuals and groups in a health care system. Examination of the power structure of various health care systems will be included.

**430 Independent Study (1-3).** Guided readings and/or a practicum in an area of the student's interest or one which the student needs to strengthen.

**431 Care of the Well Family (3).** Emphasizes independence in the design, implementation and evaluation of nursing systems generally supportive and educative for well individuals and families in ambulatory care settings. Prerequisites: 302, 424.

**432 The Family With Long-Term Health Deviations (5).** Emphasis on designing, implementing and evaluating nursing systems and participating in the medical management of individuals and families with long-term health deviations. Prerequisite: 431.

**433 The Childbearing Family (3).** Emphasis on designing, implementing and evaluating nursing systems, and participating in the medical management of individuals and families during the period of childbearing and early child rearing. Prerequisite: 431.

**434 The Family with Short-Term Health Deviations (4).** Emphasis on designing, implementing and evaluating nursing systems and participation in the medical management of individuals and families with short-term health deviations. Prerequisite: 431.

**435 Family Nurse Practitioner I (1).** Emphasizes development of an identity as an independent professional practitioner working in joint practice with a physician. Includes parameters of FNP practice, role clarification and professional responsibilities as a change agent and client advocate. Prerequisites: 310, 431

**436 Family Nurse Practitioner II (1).** Continuation of 435 with emphasis on use of role theory in understanding own Family Nurse Practitioner role development, team development, and peer review of health care delivery in a primary care setting. Prerequisites: 435.

**437 Family Nurse Practitioner III (1).** Content includes comparison of selected health delivery models, economic and legal implications of practice and methods for creating legislative and regulatory changes in legal nursing practice using research to develop the FNP discipline. Prerequisites: 436.

**438 Family Nurse Practitioner IV (1).** Continuation of 437 with emphasis on current legal, professional and economic issues, evaluation of a practice setting and development of a personal research and quality assurance evaluation model for practice. Prerequisites: 437.

**439 Family Practice Nursing Practicum (8).** Intensive clinical practice focused on synthesis of previous clinical courses and development of an autonomous identity as a family nurse practitioner. Prerequisites: 432, 433, 434, 437.

**440 Advanced Physiological Bases for Nursing Practice I (3).** Study of physiological processes as they relate to the identification of therapeutic self-care demands. Universal self-care requirements provide the foundation for lecture and discussion. Prerequisite: 310 (or concurrently). f.

**441 Advanced Physiological Bases for Nursing Practice II (3).** The study of patho-physiological processes in adulthood as they relate to identification of therapeutic self-care demand (s). Prerequisite: 440. w.

**442 Clinical Specialization in Adult Nursing (6).** Students learn roles of clinical specialization with a theory base for advanced adult nursing. Focus is on application of theory: designing, implementing and evaluating technological nursing systems as a clinical specialist. Prerequisites: 441. f, s.

**450 Research (1-6).** Independent research not leading to a thesis. Written report required. Prerequisites: 310, 402. f, w, s.

**452 Community Mental Health Nursing I (4).** Focus on the development of the nurse agency as it relates to primary prevention and distributive nursing care in the maintenance and promotion of mental health of individuals, families and groups.

**453 Community Mental Health Nursing II (4).** Focus on the nurse agency as it relates to secondary prevention and episodic patterns of clients (individuals and families) with community mental health deficits. Emphasis is on the technologic system. Prerequisites: 310, 452.

**454 Community Mental Health Nursing III (4).** Focus is on nurse agency as it relates to tertiary prevention and distributive nursing care of long-term mental patients and their families. Prerequisites: 453 and Psychology 313. f.

**456 Psychiatric Nurse Therapist (4).** Focus is on development of innovative, nontraditional nursing interventions that will be pertinent to chronically ill, longterm hospitalized mental patients. Prerequisites: 311, 453.

**457 Nursing Practicum With the Chronically Mentally Ill (4).** Course builds on 456 and gives the student further opportunity as a nurse therapist under supervision in a setting with chronically ill long-term hospitalized patients. Prerequisites: 456. w.

**461 Nursing Administration I (3).** Explores a conceptual model of organizational management that is applicable to any health care organization. A selected organizational management model was chosen to foster analytical thinking. Applicable to any organization and facilitates integration of knowledge from many disciplines.

**462 Practicum in Nursing Administration (3).** Observation and participation in the functions and activities of the nurse administrator. Emphasis is on the study of a specific individual content/problem area within the scope of nursing administration. Prerequisites: 310, 461, Management 329.

**463 Practicum in Clinical Specialization in Child Health Nursing (3).** Students apply theories and knowledge gained in 429 to a specific group of child health clients and their families. Prerequisites 326, 327, 428, 429. w.

**490 Research (1-6).** Investigates a special problem, or participates in ongoing research as a team member, followed by a written report of the study. Leads to a thesis. Prerequisites: 310, 402. f, w, s.

## NUTRITION

**300 Problems (1-6).** f, w, s.

**308 Poultry Feeding and Nutrition (3).** (same as Poultry Science 308).

**335 Nutrition During the Life Cycle (3).** (same as Human Nutrition, Foods & Food Systems Management 335).

**339 Medical Dietics (3-12).** (same as Human Nutrition, Foods & Food Systems Management 339).

**402 Animal Nutrition (3).** (same as Animal Science 402). w.

**406 Comparative Nutrition and Metabolism (2).** (same as Biochemistry 406). w.

**410 Seminar (1).** f.

**432 Ruminant Nutrition (3).** (same as Animal Science 432).

**440 Bioenergetics (3).** (same as Dairy Science 440).

**450 Investigations in Experimental Nutrition (1-6).** Written report required. f, w, s.

**465 Advanced Metabolism: Amino Acids (2).** (same as Biochemistry 465).

**490 Research (cr. arr.)** Investigation in any area of experimental nutrition. Thesis required. f, w, s.

## OBSTETRICS AND GYNECOLOGY

**A Obstetrics and Gynecology, Clinical Experience (10).** Students are assigned to the clinical service in groups of varying size. Normal and complicated obstetrics and gynecology are taught by lecture, ward rounds, seminars, and attendance in clinics, wards, delivery rooms and operating rooms. Weekly conferences with radiotherapy and pathology and seminars on maternal mortality, infertility and gynecologic endocrinology are held twice weekly.

**B Obstetrics and Gynecology, Elective (10).** Any student in the clinical elective period may make special arrangements with the department to do special work on a subject of interest.

**P Postgraduate Instruction (0).** Advanced graduate and postgraduate instruction in obstetrics and gynecology (both short-term and long-term, varying from 1 to 4 years) and residencies are available to qualified physicians by special arrangement.

## OCCUPATIONAL THERAPY

**135 Teaching Practicum for Allied Health Sciences (3).** (same as Curriculum & Instruction T245, Medical Technology 135, Radiologic Technology 135, Respiratory Therapy 135).

**150 Orientation to Occupational Therapy (1).** An introduction to occupational therapy through exposure to the various treatment areas and to provide history, ethics and limited treatment aspects of the profession.

**200 Occupational Therapy Theory I (5).** History and development of occupational therapy as a profession; theory and application of techniques in general medicine, surgery, and pediatrics. Study of perceptual motor dysfunctions.

**201 Occupational Therapy Theory II (4).** Theory and application of occupational therapy techniques with patients with physical disabilities.

**201OT Sensorimotor Development and the Self (3).** Growth and development of the sensory and motor systems and the development of the self, as it specifically applies to the practice of occupational therapy.

**202 Occupational Therapy Theory III (3).** Theory and application of occupational therapy techniques with patients exhibiting psychiatric disorders.

**203OT Developmental Adaptation (3).** Major types of developmental assessments and treatment techniques used by occupational therapists.

**205 Psychological Aspects of Physical Dysfunction (2).** Introduces students to emotional reactions of illness and disability. Explores the roles of therapists and patients, death and dying, body image and self-concept, and adjustment problems met in developing a new life style.

**210 Therapeutic Media (3).** Media used in Occupational Therapy treatment of physical, developmental, or psychosocial dysfunction. Presented within a work-leisure continuum, topics discussed include: Use of goal-directed activity, independent living skills, and therapeutic adaptation.

**211 Group Process (2).** To familiarize students with group dynamics through laboratory experience in which students encounter inter- and intrapersonal feelings through T (Training) Group and S (Sensitivity) Group techniques.

**220 Human Anatomy (7).** Gross structure and neuroanatomy of a human body, with dissection of extremities, back, head, neck, abdomen, and thorax.

**232OT Developmental Dysfunction (3).** Course includes the continuum of stress, distress, dysfunction related to the pathology of the handicapped child.

**233OT Clinical Pathophysiology I (3).** A system approach to normal physiology, disease and clinical manifestations of disease. f.

**234OT Clinical Pathophysiology II (3).** A system approach to normal physiology, disease and clinical manifestations of disease. w.



**241OT Field Work Experience Level I (2).** Assignment of an occupational therapy department or community agency to allow the student to apply didactic theory and techniques in a clinical setting. One hour lecture per week.

**242OT Field Work Experience Level I (1.5).** Assignment to an occupational therapy department or community agency to allow the student to apply the didactic theory and techniques in a clinical setting.

**243OT Field Work Experience Level I (1.5).** Assignment to an occupational therapy department or community agency to allow the student to apply the didactic theory and techniques in a clinical setting.

**270 Clinical Kinesiology (3).** Functional anatomy and biomechanics in normal and abnormal conditions of extremities, back, neck and thorax. Dynamics of human motion and motor skills.

**272OT Physical Dysfunction I (3).** Theory and application of occupational therapy techniques to general medicine and surgery.

**273OT Physical Dysfunction II (3).** Theory and application of occupational therapy techniques with patients with physical disabilities.

**304OT Psychosocial Dysfunction (3).** Theory and application of occupational therapy techniques with patients exhibiting psychiatric disorders.

**315OT Organization & Administration (2).** Organizational structure of occupational therapy departments in various types of institutions; inter- and intradepartmental relationships; ethics; community resources.

**331OT Basic Clinical Psychiatry (3).** Lectures designed to give better understandings of etiology, symptomology, prognosis and medical treatment of psychiatric disorders as necessary to the practice of occupational therapy.

**351OT Field Work Experience II (1.2).** Assignment to occupational therapy department in a physical, psychosocial or developmental dysfunction setting.

**352OT Field Work Experience - Developmental Dysfunction (6).** Assignment to occupational therapy department in a developmental dysfunction setting.

**353OT Field Work Experience - Physical Dysfunction (6).** Assignment to occupational therapy department in a physical dysfunction setting.

**354OT Field Work Experience - Psychosocial Dysfunction (6).** Assignment to occupational therapy department in a psychosocial dysfunction setting.

## OPHTHALMOLOGY

**C Ophthalmology Elective--Senior Students--8 Weeks (0).** Ophthalmology elective--senior students--8 weeks. Senior students who choose this elective are assigned to the service as junior residents, so that they may take part in all clinical and teaching functions of the department.

**P Postgraduate Instruction (0).** The department is approved for a formal three-year residency training program.

## PATHOLOGY

**A Pathology Elective (10).** Any medical student in the elective period may make special arrangements with the department to do research on a subject of interest.

**P Postgraduate Instruction (0).** Advanced graduate and post-graduate instruction in pathology (both short term and long term, varying from 1 to 4 years), and residencies are available to qualified physicians by arrangement.

**193 Cytology Female Genital Tract (10).** A definitive study of normal and abnormal cellular changes occurring within the organ system by means of light microscopy with histologic correlation. Prerequisite: instructor's consent.

**194 Respiratory Cytology (4).** A definitive study of the normal and abnormal cellular changes occurring within the system by means of light microscopy, with histologic correlation. Prerequisite: instructor's consent.

**195 Cytology of Body Fluids (4).** Normal and abnormal cellular changes within pleural, peritoneal, pericardial and cerebrospinal fluids by means of light microscopy, with histologic correlation. Prerequisite: instructor's consent.

**196 Gastrointestinal Cytology (4).** A definitive study of the normal and abnormal cellular changes occurring within the system by means of light microscopy, with histologic correlation. Prerequisite: instructor's consent.

**197 Oral Cytology (2).** Studies normal and abnormal cellular changes within the oral cavity and oropharynx by means of light microscopy, with histologic correlation. Prerequisite: instructor's consent.

**198 Urinary Cytology (4).** Studies normal and abnormal cellular morphology from kidney, ureter and bladder samples, with histologic correlation. Prerequisite: instructor's consent.

**199 Special Problems in Cytology (2).** Relating hematologic morphologic findings in conventional body fluid cytology; also review of techniques used in chromosome cultures and karyotyping, with emphasis on sex-related abnormalities.

**200 Basic Pathology (2).** Provides nonmedical students with a general understanding of the essential nature of disease, including mechanisms of its development and cause/effect relationships. Prerequisite: 5 hours biological science or equivalent and 5 hours chemistry, or Physiology 201. w.

**210M General and Clinical Pathology, Second Year (8).** Integrated study of fundamental pathological mechanisms of disease; effect on body organ systems. Clinical laboratory measurement of altered organ system function begun. Prerequisite: first year Medical School or equivalent. f.

**212M Systemic and Clinical Pathology, Second Year (8).** Integrated study of organ system diseases and their clinical laboratory manifestations. Emphasizes case study method. Open only to medical students. Prerequisite: 210M or equivalent. w.

**251 Interpretations of Lab Procedures in Primary Health Care (1).** Discussion and analysis of selected laboratory test procedures used in office and clinic settings involved with primary health care. Prerequisites: graduate level physiology course and departmental consent. f.

**310 General Pathology (5).** Basic pathological mechanisms of human disease. Introductory principles of clinical laboratory measurements of altered organ system function studied. Prerequisites: Biochemistry 206, Physiology 250; Anatomy 301, 302, 304, 305; & instructor's consent. f.

**311 General Pathology Laboratory (3).** Gross and microscopic applied study of basic pathological disease mechanisms. Laboratory assessment of these basic disease mechanisms. Prerequisites: Biochemistry 206, Physiology 250; Anatomy 301, 302, 304, 305; or the equivalents; & instructor's consent. f.

**312 Advanced Pathology (5).** Demonstration and simulation study of gross, microscopic and clinical laboratory pathology of major human organ systems. Prerequisites: 310 & 311 or equivalent & instructor's consent. w.

**313 Advanced Pathology Laboratory (3).** Demonstration and simulation and character of work depend upon needs, qualifications, and of major human organ systems. Prerequisite: 310 & 311 or equivalent & instructor's consent. w.

**404 Advanced Pathology (cr. arr.)** Graduate course in which amount and character of work depends upon needs, qualifications, and interests of student. Prerequisite: instructor's consent.

**430 Comparative Pathology (3).** (same as Plant Pathology 430, Veterinary Pathology 430).

**491 Research (cr. arr.)** Open only to properly qualified graduate students, with counsel of faculty. Includes preparation of dissertation.

## PEACE STUDIES

**50 Introduction to Peace Studies (3).** Interdisciplinary overview including theories on the nature of aggression and war, case studies of contemporary conflicts, consideration of various peace proposals, conditions making war or peace likely. f.w.

**100 History of Modern Europe (3-4).** (same as History 100).

**111 The World of the Middle Ages (3).** (same as History 111).

**118 The Man and His Ideas (3).** (same as History 118).

**139 Russia in Modern Times (3).** (same as History 139).

**141 Late Imperial China: China Enters the Modern World (3).** (same as History 141). Survey of China under the Manchu Ch'ing dynasty. Within framework of the dynastic cycle, examines imperial rule, Chinese society, culture, art, internal rebellion, Western intrusion, modernization. Prerequisite: sophomore standing.

**151 Politics and the Military (3).** (same as Political Science 151).

**160 Social Bases of War and Peace (3).** (same as Sociology 160).

**171 Group Communication (3).** (same as Speech & Dramatic Arts 171).

**183 Undergraduate Seminar IV (3).** Images of War and Peace. Study of war and peace in philosophical and religious systems, film, poetry, art, fiction, and the media. Prerequisite: 50 or consent of instructor.

**188 Senior Thesis I (3).** Prerequisite: consent of Peace Studies Committee.

**189 Senior Thesis II (3).** Prerequisite: consent of Peace Studies Committee.

**215 Collective Behavior (3).** (same as Sociology 215).

**260 Economic Development (3).** (same as Economics 260).

**261 The Third World: an Anthropological Perspective (3).** (same as Anthropology 260).

**300 Mass Media and Society (2).** (same as Journalism 300). Requires approval of the Dean of the School of Journalism.

**302 International Journalism (2).** (same as Journalism 303). Requires approval of the Dean of the School of Journalism.

**303 Politics and War (3).** (same as Political Science 303).

**318 Medieval Culture (3).** (same as History 318).

**325 Political and Social Philosophy (3).** (same as Philosophy 325).

**326 Political Anthropology (3).** (same as Anthropology 325).

**340 Internship in Peace Studies (1-6).**

**341 Sino-Soviet Conflict (3).** (same as History 341).

**354 Political Sociology (3).** (same as Sociology 354).

**355 Western Europe's Foreign Policy (3).** (same as Political Science 355).

**370 Political Development and Social Change (3).** (same as Political Science 370).

**371 American Foreign Policy from Colonial Times to 1898 (3).** (same as History 370).

**373 History of United States Foreign Relations, 1898 to Present (3).** (same as History 373).

## PEST MANAGEMENT

**180 Principles of Pest Management (3).** Basic concepts of integrated systems for the management of pest populations of insects, mites, plant pathogens, nematodes, weeds and vertebrates.

**181 Pesticide Chemicals (3).** (same as Entomology 181, Agriculture 181).

**198 Pesticide Application Equipment (3).** (same as Agricultural Engineering 198).

**305 Introduction to Plant Pathology (3).** (same as Plant Pathology 305, Forestry, Fisheries and Wildlife 305).

**310 Nematology (3).** (same as Plant Pathology 310)

**370 Advances in Insect Pest Management (3).** (same as Entomology 370).

**391 Plant Pathology Field Survey (2).** (same as Plant Pathology 391). s.

**392 Clinical Plant Pathology fall (1).** (same as Plant Pathology 392). f.

**393 Clinical Plant Pathology (1).** (same as Plant Pathology 393). w.

## PHARMACOLOGY

**130 Drugs and Behavior (3).** (same as Psychology 130).

**204 Elements of Pharmacology (3).** Introductory study of drugs commonly used in clinical medicine; particular reference to pharmacodynamics. Designed for medical science writers and nurses desiring a brief survey course. Prerequisite: Physiology 201 or equivalent. f.

**305 Topics in Pharmacology (cr. arr.)** Selected topics not in regularly offered courses. Prerequisite specified by instructor each semester course is offered.

**320 Pharmacology (8).** Basic pharmacology for graduate students and medical students. Special emphasis on actions, mechanisms of action, and therapeutic uses of selected drugs from major groups of medicinal compounds. Prerequisites: 5 hours biochemistry & Physiology 305 or equivalent. w.

**328 Principles of Toxicology (3).** (same as Veterinary Anatomy-Physiology 328).

**330 Introduction to General Pharmacology (2).** Discussion of the principles of drug actions. Prerequisites: general and organic chemistry and functional biology. f.

**331 Principles of Drug Action I (2).** A course for graduate students in pharmacology, toxicology and related fields emphasizing the physiological and biochemical principles of drug action. Discussion format. Prerequisite: 330 or instructor's consent. w.

**332 Principles of Drug Action II (2).** A course for graduate students in pharmacology, toxicology and related fields emphasizing the physiological and biochemical principles of drug action. Discussion format. Prerequisite: 331 or instructor's consent. f.

**334 History of Pharmacology (1).** Historical background of contemporary pharmacology. Prerequisite: 320 or equivalent. w.

**400 Problems (cr. arr.)** Individual projects in pharmacology.

**410 Seminar (1).** Review of current literature of pharmacological topics. f.w.

**420 Pharmacological Methods of Analysis (2).** Principles and application of basic instrumentation for study of drug action. Topics include fluorescence, drug-receptor binding, radioimmunoassay, liver perfusion, microcirculation and other methods. Prerequisites: Biochemistry 304 or 320, and instructor's consent. alt. f. odd yrs.

**427 Fate of Drugs in the Animal Body (2).** (same as Veterinary Anatomy-Physiology 427).

**431 Effects of Drugs on Enzymes (1).** Presentation of selected agents which exert their pharmacological action by means of an effect on an enzyme. Prerequisite: 320 or equivalent. alt. f. odd yrs.

**434 Pharmacodynamics of Autonomic Drugs (2).** Advanced study of autonomic drugs, primarily from current literature. Prerequisite: 320 or equivalent. alt. f. odd yrs.

**436 Pharmacodynamics of Cardiovascular Drugs (1).** Advanced study of cardiovascular drugs. Prerequisite: 320 or equivalent. alt. f. odd yrs.

**437 Endocrine and Metabolic Pharmacology (2).** Interaction of drugs with endocrine regulation mechanisms. Prerequisites: Biochemistry 304, Physiology 305 or equivalent courses and instructor's consent. alt. f. odd yrs.

**438 Neuropharmacology (3).** Biochemical and behavioral actions of drugs affecting the central nervous system. Effects of drugs on synaptic mechanisms including neurotransmitter metabolism and receptor interactions. Effects of drugs on unconditioned and conditioned behavior. Prerequisite: 320 or equivalent. alt. f.

**450 Research (cr. arr.)** Opportunities for research in pharmacology, not leading to dissertation.

**490 Research (cr. arr.)** Research in pharmacology, leading to dissertation.

## PHILOSOPHY

**1 General Introduction to Philosophy (3).** Introduction to traditional philosophical problems and methods of philosophical enquiry. Consideration given to different philosophical theories on nature of reality, man, nature and God; knowledge and how it is acquired; values and social issues. cor.

**5 Introduction to Ethics (3).** Introduction to different philosophical theories regarding when acts are morally right rather than wrong; when things are good rather than bad; nature of the "good life." Theories regarding nature of ethical reasoning and justification considered.

**10 Introduction to Logic (3).** Introduction to the principles of deductive and inductive reasoning, the critical analysis of arguments and the detection of fallacies. cor.

**115 Philosophy: East and West (3).** (same as South Asia Studies 115). Compares the interpretation and role of philosophical concepts such as experience, reason, permanence, change, immortality, soul, God, etc., in Indian, Chinese and European traditions. Prerequisite: sophomore standing.

**120 Philosophy of Religion (3).** Considers basis for and nature of religious beliefs. Philosophical approaches to religion, cultural implications of religion, psychoanalysis and religion, mysticism and myth. Prerequisite: sophomore standing.

**130 Philosophy and Human Nature (3).** Human existence, its nature, condition, foundations and significance, according to contemporary philosophies such as existentialism, pragmatism, Marxism, positivism, Thomism, process philosophy, religious personalism, etc. Students are asked to formulate their own self-conceptions. Prerequisite: sophomore standing.

**135 Ethics and the Professions (3).** Examination of ethical issues confronted by members of different professions. Ethical issues in medicine, law, business and engineering are considered. Prerequisite: sophomore standing.

**198 Honors I (3).** Special work for Honors candidates.

**199 Honors II (3).** Special work for Honors candidates.

**202 Medieval Philosophy (3).** Major thinkers from St. Augustine through 14th century Ockhamists. Prerequisite: sophomore standing.

**204 Ancient Western Philosophy (3).** Philosophic thought from Thales through Plotinus; emphasizes Plato and Aristotle. Prerequisite: sophomore standing.

**205 Early Modern Philosophy (3).** Surveys critical and speculative thinking of modern period from Descartes to Kant in relation to scientific, religious and social movements. Prerequisite: sophomore standing.

**206 Kant to Hegel (3).** Focus on the philosophic accomplishments of this very brief and yet extremely fertile period of the Enlightenment's transformation through Romanticism. Prerequisite: sophomore standing.

**207 19th Century Philosophy (3).** A careful and sympathetic study of some of the major thinkers of this period, notably Kierkegaard and Nietzsche. Prerequisite: sophomore standing.

**208 Contemporary Philosophy (3).** Major philosophical theories developed since the turn of the century. Attention is given to such philosophers as Dewey, Husserl, Russell and Wittgenstein. Prerequisite: sophomore standing.

**209 American Philosophy (3).** Leading philosophers and philosophic movements in American thought. Consideration is given to the works of such philosophers as Edwards, Emerson, Dewey and James. Prerequisite: sophomore standing.

**210 Philosophical Ideas in Literature (3).** Metaphysical, ethical, religious ideas embodied in literary classics from Plato and Lucretius to Dostoevsky and Eliot. Prerequisite: sophomore standing.

**212 Existentialism (3).** Existential ideas in Kierkegaard, Nietzsche, Heidegger, Jaspers, Sartre, Tillich. Prerequisite: sophomore standing.

**213 Political and Social Philosophy (3).** (same as Peace Studies 325). Examination through classical texts of man's relationship to the state and his relationship to both state and society in terms of such concepts as contract theory, general will, alienation, individualism and collectivism. Prerequisite: sophomore standing.

**214 Ethical Issues in Business (3).** Major theories of moral obligation and justice and their application to business practices. Corporate responsibility, government regulation, investment and production, advertisement, the environment, preferential hiring, etc. through case studies, legal opinions and philosophical analysis. Prerequisite: sophomore standing.

**220 Comparative Feminist Ideologies (3).** (same as Women Studies 220).

**230 Philosophy and Intellectual Revolution (3).** Examines such revolutions as the Copernican, Darwinian, Marxian and Freudian. What are the new views? How is man's place in the universe affected? What puzzles arise in replacing old by new views? Prerequisite: sophomore standing.

**301 Topics (cr. arr.)** Organized study of selected topics. Subjects and earnable credit may vary from semester to semester. Repeatable upon consent of department. Prerequisites: junior standing & instructor's consent.

**302 Selected Ancient Philosophers (3).** Advanced study of a particular philosopher or a number of philosophers from the same school in the ancient or Medieval periods. May be taken twice for credit with the permission of the department. Prerequisite: junior standing.

**303 Selected Modern Philosophers (3).** Advanced study of a particular philosopher or a number of philosophers from the same school in the modern period. May be taken twice for credit with permission of the department. Prerequisite: junior standing.

**304 Selected Contemporary Philosophers (3).** Advanced study of a particular philosopher or philosophers from the same school in the 20th century. May be taken twice for credit with permission of the department. Prerequisite: junior standing.

**305 Theories of Reality (3).** An introduction to classical and contemporary approaches to the problems of metaphysics: ontology, cosmology and theology. The relationships of the problems to other philosophical areas such as epistemology and ethics are considered. Prerequisite: junior standing.

**306 Theories of Knowledge (3).** Study of major issues in epistemology. The difference between knowledge and true opinion, the sources and kinds of knowledge, the limits of knowledge. Both classical and contemporary sources are considered. Prerequisite: junior standing.

**314 Symbolic Logic (3).** (same as Linguistics 314). Fundamental operations in variety of recent systems of logic using symbolic techniques. Prerequisite: junior standing.

**316 Intermediate Logic (3).** Critical examination of so-called "alternative logics"; their uses to solve philosophical problems. Prerequisite: 314.

**317 Aesthetics (3).** Typical components of art; theories of art as representation, form, expression; relation of art to value. Prerequisite: junior standing.

**318 Advanced Symbolic Logic (3).** Analyzes formal systems with

respect to such properties as consistency and completeness. Prerequisite: 314.

**320 Philosophy of Science (3).** Critical analysis of methods and presuppositions of science. Prerequisites: junior standing & 10 hours science.

**323 Philosophy of History (3).** Readings from classic and contemporary philosophers of history. Problems about nature and limits of historical knowledge; relation between history and other disciplines; the existence, nature, and kinds of historical laws. Prerequisite: junior standing.

**328 Philosophy of Mind (3).** Examines problems and issues in the philosophy of mind, focusing on the works of such recent philosophers as Ryle, Strawson, Hampshire and Wittgenstein. Prerequisite: junior standing.

**330 Logical Theory (3).** Critical examination of subject matter and task of logic as seen from the traditional point of view and from that of symbolic logic, inductive logic, idealism, pragmatism, realism. Prerequisites: junior standing & course in logic.

**331 Medical Ethics (3).** Considers moral issues posed by developments in biological sciences and medical technology. Topics may include: genetic engineering, abortion and euthanasia, distribution of health care. Prerequisite: junior standing.

**332 Philosophy of Law (3).** What is law? Are there pre- or translegal rights? Is punishment justifiable? How can judicial decisions be justified? What are the relations between law and morality? Prerequisite: junior standing.

**340 Latin American Philosophy (3).** Examines philosophical and related ideas in Latin America. Prerequisite: course in philosophy or junior standing.

**341 Marxism (3).** A philosophical examination of (a) the notion of critique as seen in Marx's early and middle writings, and (b) specific topics by such authors as Lenin, Lukacs and Plekhanov. Prerequisite: junior standing.

**350 Special Readings (1-3).** Prerequisite: junior standing.

**360 Asian Philosophy (3).** (same as South Asia Studies 360). Survey of philosophical ideas in India, China and other centers. Prerequisite: junior standing.

**362 Philosophy of India (3).** (same as South Asia Studies 362). General development of Indian philosophy. Prerequisite: junior standing.

**365 Analytic Philosophy (3).** (same as Linguistics 364). Writings of Russell, Moore, Ayer, Carnap, Ryle, Austin and Wittgenstein. Prerequisite: junior standing.

**366 Classical Theories in Ethics (3).** A survey of classical approaches to traditional problems of ethics: the nature of moral obligation; the nature of good and evil; the nature of the good life. Mill, Hume and Kant are among the philosophers considered. Prerequisite: junior standing.

**405 Problems in the Teaching of Philosophy (2).** Discusses presentation of material, plans courses, selects texts. Supervised practice teaching.

**410 Seminar (1-3).** Offered in a wide variety of topics. May be repeated for credit.

**412 Seminar in Plato (1-3).** Advanced studies in Plato; emphasis on recent scholarship.

**413 Seminar in Aristotle (1-3).** Advanced studies in Aristotle; emphasis on recent scholarship.

**415 Problems in Metaphysics (1-6).** Different topics studied alternate years. May be taken twice for credit.

**417 History of Aesthetics (1-3).** Works of Plato, Aristotle, Kant, and Croce on art and beauty.

**420 Problems in Theory of Knowledge (1-6).** Critical analysis and evaluation of (1) ways of knowing; (2) problem of perception. Topics (1) and (2) studied in alternate years. May be taken twice for credit.

**423 Problems in Asian Philosophy (1-6).** Different topics studied in alternate years: (1) Buddhist philosophy; (2) Vedanta philosophy. May be taken twice for credit.

**427 History of Ethics (1-3).** Ethical works of Plato, Aristotle, Aquinas, Spinoza, Kant, Mill, and Nietzsche.

**430 Continental Rationalism (3).** Philosophies of Descartes, Spinoza, Leibnitz.

**435 British Empiricism (1-3).** Philosophies of Locke, Berkeley, Hume.

**436 Kant (1-3).** Kant's Critique of Pure Reason; his contribution to ethical theory.

**438 Problems in Social and Political Philosophy (1-6).** Selected topics in social and political philosophy.

**440 Seminar in Logic (1-6).** Critical examination of selected topics from the history and theory of logic.

**445 Schopenhauer and Nietzsche (1-3).** Comparative study of criticism of reason; role of will in nature, man, art; pessimism, creativity in life, art.

**446 Whitehead and Bergson (1-3).** Comparative study of intuition and other methods, temporal and nontemporal reality, natural religion.

**447 Sartre (2-3).** Existentialism and phenomenology; emphasis on Being and Nothingness. Analysis of consciousness, the world, social relations, values, freedom, anguish and related concepts.

**448 Heidegger (3).** Close analysis of Being and Time and later essays.

**450 Research (cr. arr.)** Research not leading to thesis.

**451 Problems in the Philosophy of Science (1-6).** Selected topics in alternate years from (1) the epistemology and methodology of science, and (2) philosophical implications of substantive scientific concepts.

**453 Problems in Philosophy of Social Science (1-3).** Foundations of the social sciences and their implications for the philosophy of man.

**465 Russell and Wittgenstein (1-3).** Philosophy of logical atomism. The views of these men in epistemology, philosophy of language, and other topics.

**470 Seminar in Phenomenology (1-3).** The phenomenological program, methods and investigations into specific topics by such authors as Husserl, Merleau-Ponty, Ricoeur and Schutz. May be taken twice to a maximum of 6 hours.

**490 Research (cr. arr.)** Work toward preparation of thesis or dissertation.

## PHYSICAL EDUCATION

### ACTIVITIES

**1 Physical Education (1).**

**1 Physical Education (1).**

**1 Physical Education (0.5-1).** Various games and sports may be selected, including bowling, volleyball, tumbling, swimming, golf, others. Two classes weekly.

**14 Recreational Activities (1).** Two classes weekly.

## PROFESSIONAL EDUCATION COURSES

**H20 Introduction to Physical Education (2).** Orientation to physical education as a profession. Historical background, teacher training, study of related areas.

**H27 Modern Dance (1).** Dance from standpoint of use in education, physical education. Includes materials in fundamentals of movements, rhythm.

**H28 Modern Dance (1).** Continuation of 27. Includes dance composition.

**H47 Backpacking and Outdoor Living (2).** Fundamentals of backpacking and self-sufficient living in a wilderness setting. Includes consideration of equipment, techniques of trail living, and survival in emergency situations. Overnight field experience required. Meets two hours per week.

**H50 Activity Proficiency (0.5-1).** For physical education majors only. Participation, leading to demonstrated proficiency, in a variety of prescribed and elected physical activities. Maximum credit: 10 hours. Prerequisite: departmental permission.

**H51 Under-class Practicum in Physical Education (1).** An under-class experience as a teaching aide in an approved physical education setting. S/U grading only. Prerequisite: departmental consent.

**H56 Games of Low Organization (2).** Theory and practice in conducting games of low organization suitable for playgrounds, recreation centers, and elementary and secondary schools.

**H58 First Aid (2).** Theory and practice of basic emergency care procedures. Meets requirements for Red Cross and Heart Association certification.

**H65 Elements of Health Education (2).** Health needs of university students and school-age children are investigated by knowledge and decision-making activities concerning personal and community health problems.

**H66 Scuba Theory (2).** Theory of skin and scuba diving as it relates to physics, physiology, fundamentals of compressed gases, mechanics, first aid, environment, oceanography, marine life, and how to plan a safe dive.

**H68 Water Safety Instructor (2).** A two-part training course: (1) reviews lifesaving, basic swimming skills, strokes, diving; (2) give candidates theoretical/practical knowledge, and assistance in teaching Red Cross lifesaving and water safety courses. Prerequisite: Advanced Life Saving Certificate.

**H102 Coaching of Volleyball (2).** Methods of instruction, management of volleyball squads in interschool competition. Prerequisite: junior standing.

**H103 Coaching of Individual and Dual Sports (2).** Methods of instruction, management of individual and dual sports in interschool competition. Prerequisite: junior standing.

**H104 Coaching of Baseball and Softball (2).** Methods of instruction, management of baseball and softball squads in interschool competition. Prerequisite: junior standing.

**H105 Coaching of Basketball (2).** Methods of instruction, management of basketball squads in interschool competition. Prerequisite: junior standing.

**H106 Coaching of Football (2).** Methods of instruction, management of football squads in interschool competition. Prerequisite: junior standing.

**H107 Coaching of Track and Field (2).** Methods of instruction, management of track and field squads in interschool competition. Prerequisite: junior standing.

**H108 Introduction to Tests and Measurements in Physical Education (2).** Experiences with activity and laboratory type tests in the area of physical education.

**H119 Teaching of Physical Education (2).** Teaching methods, selection of activities, program planning in physical education. Prerequisite: Educational Psychology A102.

**H122 Movement and Its Rhythmic Structure (2).** Nature of rhythm and basic rhythmic motor experiences.

**H124 Dance for Elementary Schools (2).** Elementary school dance, with emphasis on expressive movement plus introduction to selected singing games, folk dances and social dance.

**H127 Physical Education Activities for the Elementary School (2).** Objectives of physical education for elementary school child, with application of choice of activities, organization of program. Theory, practice in rhythms, games. Prerequisite: junior standing.

**H133 Teaching of Gymnastics (2).** Methods, materials and equipment in teaching gymnastic skills.

**H135 Teaching of Modern Dance (1).** Methods, materials and practice in teaching of modern dance.

**H146 Recreational Shooting Sports Instructor (2).** Techniques of instruction, safety procedures, organization and management of shooting sports programs. Involves both classroom lecture and supervised firing on shotgun, rifle and pistol ranges.

**H147 Fundamentals of Outdoor Education (3).** Basic skills and knowledge in selected activities that provide essential background for effective use and for teaching in the outdoors. Two day field experience is required. Meets four hours per week.

**H152 Principles of Physical Education (2).** Survey and analysis of scientific principles related to the teaching of physical activities.

**H157 Sports Officiating (2).** Methods, techniques of officiating in football, volleyball and soccer.

**H158 Sports Officiating (2).** Methods, techniques of officiating in basketball, baseball, soccer.

**H162 Advanced Recreational Dance (2).** Analysis of dance patterns and dances, methods of instruction, practice teaching in folk, square, round and social dance. Prerequisite: 122.

**H165 Teaching of Health (2).** Considers basic subject matter in health teaching and its adaptation to the elementary, secondary curriculum. Prerequisite: an elementary or secondary education methods course.

**H170 Psychological and Sociological Perspectives of Sports (2).** An introduction to psychological concepts relating to physical performance, sport and athletics; relationships between movement forms and socialization processes; social control, conflict, change and stratification.

**H172 Teaching of Individual and Dual Sports (2).** Prepares teachers of physical education in techniques, methods and materials for individual and dual sports. Prerequisite: junior standing.

**H173 Teaching of Team Sports (2).** Prepares teachers of physical education in techniques, methods and materials for team sports. Prerequisite: junior standing.

**H181 Care and Prevention of Athletic Injuries (2).** Theory, practice in prevention, emergency care, rehabilitation of injuries encountered in vigorous games. Prerequisite: anatomy.

**H185 Basic Driver Education (3).** Introductory course in the preparation of teachers of driver education in secondary schools. Includes classroom instruction in the basic knowledge of driving and laboratory experience in basic skills of driving.

**H186 Advanced Driver Education (2).** Advanced course in the preparation of teachers of driver education. Modern teaching techniques in the classroom; driving simulators; testing range; in-car practice in the laboratory. Prerequisite: H185.

**H187 Introduction to Safety Education (2).** Review of the total safety education program: traffic, school, civil defense, home, shops, etc. Provides a background for establishment of education programs to reduce accidents. cor.

**H199 Organization and Administration of Physical Education Programs (2).** Introductory course on problems, methods of organization and administration of physical education programs, relative to use of facilities, schedule of activities, budget, personnel, purchase and care of equipment. cor.

**H260 Field Experience in Health and Physical Education (1-8).** Supervised experience in an approved setting. Approval is based upon the relationship to the student's degree objective and adviser's consent.

**H299 Student Teaching in Health and/Or Physical Education (cr. arr.)** Credit arranged with director of educational field experience. Apply during February for following year. Prerequisites: special methods course(s) in the elementary area or Curriculum and Instruction T240 and special methods course(s) in the secondary area.

**H300 Problems (1-3).** Studies professional programs and issues in health or physical education. Prerequisite: instructor's consent.

**H320 Administration of Interscholastic Athletics (3).** Organization, management of interscholastic, intercollegiate athletics.

**H321 Health Education in the Elementary School (3).** Defines teacher's role in school health program; investigates health needs of school children; focuses on teaching strategies, health resources and development of elementary school health education curricula and materials.

**H326 Motor Development in Early Childhood (3).** Introduction to theory and practice of developmental movement, perceptual-motor assessment and remediation, and teaching of movement experiences in early childhood education for those planning teaching or other work with pre-school through primary grade children. Prerequisite: Educational Psychology A102.

**H327 Elementary School Physical Education (3).** Current theory and practice in physical education for the elementary school child. Programs and supervision of elementary school physical education: philosophy, methods, materials, problems. Prerequisite: 56, H124, Educational Psychology A102 or instructor's consent.

**H328 Theory of Modern Dance (2).** Brief history of the dance; its place in the curriculum as an educational and creative art activity. Prerequisite: two semesters of dance.

**H331 Dance and Rhythmic Activities for Teachers of the Handicapped (2).** Materials for and methods of designing, teaching and practical experiences in designing and teaching sessions for selected handicapped groups of children and adults. Prerequisite: Special Education L339 or instructor's consent.

**H332 Aquatic Activities for Teachers of the Handicapped (1).** To help prepare the teacher of swimming to become more competent in adapting aquatic skills to the needs of disabled students. Prerequisite: water-safe swimmer, Special Education L339, or instructor's consent.

**H335 Philosophy of the Dance (2).** Dance as related to art and education. Prerequisite: senior standing.

**H336 Advanced Rhythmic Structure and Dance Accompaniment (2).** Analysis and synthesis of movements, with selection and experience in various accompanying media. Prerequisites: senior standing, 122.

**H337 Dance Composition and Production (3).**

**H338 Perceptual-Motor Development and the Severely Handicapped Child (3).** Study of the experimental and experiential research concerning reflex integration and perceptual-motor development and the severely handicapped child. Prerequisites: Special Education L339 and departmental consent.

**H347 Outdoor Education Programs (3).** Use of the outdoors in teaching in the regular school program; development of field study and teaching materials; administrative aspects of teaching outdoors; research and evaluation in outdoor education. Meets 4 hours weekly.

**H349 Practicum in Outdoor Education (1-2).** Appropriate selected experiences in observation and supervised teaching in outdoor education in established programs and institutions, under the direction of qualified professionals.

**H360 Topics in Health and Physical Education (1-3).** Social, medical, and/or legal aspects of current issues in health and/or physical education, with special emphasis on the role of the teacher in relation to these issues.

**H361 Education in Human Sexuality (3).** The biological, psychosocial and educational aspects of human sexuality with special emphasis on instructional activities related to interpersonal communication, decision-making ability and clarification of values. Course is designed for both teachers and health-care personnel. Prerequisite: H65 or equivalent.

**H365 The School Curriculum in Physical Education (2).** Critical examination of physical education activities, programs leading to construction of general, special curricula for schools. Prerequisite: H152.

**H366 Intramural Sports (2).** Consideration of objectives, principles of administration in intramural sports in high schools, colleges.

**H380 Kinesiology (3).** Joint, muscular mechanisms of body; relationships of muscular activity to bodily development, efficiency. Prerequisite: Anatomy 201.

**H382 Adapted Physical Education (2-3).** Principles and practice of physical education, recreation and motor therapy for the exceptional child and adult. Prerequisite: Educational Psychology A102, Anatomy 201 or Physiology 201, or instructor's consent.

**H383 Developmental Physical Activity (3).** Role and application of motor activities in the physical and educational development of children and youth. Prerequisite: Educational Psychology A102, Anatomy 201 or Physiology 201, or instructor's consent.

**H385 Physiology of Exercise (3).** Effects of exercise on the human organism; physiologic capacity and limitation for activity; role of exercise in health and fitness. Prerequisites: Anatomy 201 & Physiology 201.

**H391 Organization and Administration of Health Education Programs (3).** Considers the problem of the school health program, including health services, healthful school living, and health instruction. Prerequisite: H65 or equivalent.

**H396 Drug Education (3).** The psychosocial, legal and pharmacological aspects of the recreational use of over-the-counter and street drugs are investigated with emphasis being placed on personal decision making, principles of school and community drug education, rehabilitation and community health services.

**H400 Problems (1-6).**

**H407 Tests and Measurements in Physical Education (3).** Measurements of aptitude and achievement in physical education activities, with particular reference to the determination of standards.

**H409 Administration of Physical Education (3).** Problems of administrators, supervisors: finances, construction, equipment, care of physical education plant, selection of staff. Prerequisites: H119 & H199.

**H410 Seminar in Physical Education (1-3).**

**H440 Scientific Studies in Physical Education (3).** Survey, critical evaluation and methods of research in physical education.

**H444 Professional Literature in Physical Education (3).** Review, analysis of outstanding professional literature in health, physical education, recreation and related fields of physiology, psychology, sociology and others. Critical analysis of selected publications.

**H450 Individual Research (1-3).** Independent research not leading to thesis. Prerequisites: H407 & H440.

**H480 Mechanical Analysis of Motor Skills (3).** Application of fundamental physical and mechanical principles to the performance of motor activities. Prerequisite: H380, Physics 123 or equivalent.

**H482 Practicum in Adapted Physical Education (2-6).**

**H485 Advanced Exercise Physiology (3).** Lectures, laboratory experiences, and readings in current literature to provide reasonable depth in selected areas of physiology as applied to activity and health. Prerequisite: H385; some chemistry suggested.

**H490 Research in Physical Education (cr. arr.)**

**B Research in Physical Medicine and Rehabilitation (10).** Original research requiring formal research report.

**C Clinical Fellowship in Physical Medicine and Rehabilitation (10).** Eight-week experience in the clinical practice of rehabilitation medicine for selected students. Prerequisite: clinical clerkship in physical medicine & rehabilitation.

## PHYSICAL THERAPY

**202PT Human Anatomy (7).** Gross structure and neuroanatomy of human body; dissection of extremities, back, head, neck, abdomen, thorax. s.

**203 Therapeutic Exercise I (3).**

**203PT Therapeutic Exercise I (3).** Developmental and physiological foundations of therapeutic exercise; principles of application. f.

**204PT Therapeutic Exercise II (4).** Principles and techniques of therapeutic exercise in the treatment of acute and chronic conditions. w.

**213PT Theory and Technique of Physical Therapy I (3).** Principles and procedures of physical therapy; emphasis on basic evaluation techniques. Major topics: transfers, range of motion measurement, muscle testing, massage, mobility, activities of daily living, splinting and taping. s.

**214PT Theory and Technique of Physical Therapy II (4).** Principles, indications, methods of application, physiological effects of hydrotherapy and electrotherapy in diagnosis and treatment of diseases, disabilities; topics in biophysics and concepts of physics underlying use of electricity. f.

**223PT Clinical Education I (1).** Supervised treatment of patients, addressing the scope of future clinical practice. S/U.

**224PT Clinical Education II (1).** Continuation of Clinical Education I. S/U.

**233PT Clinical Pathophysiology I (3).** A systems approach to normal physiology, disease and clinical manifestations of disease. f, w.

**234PT Clinical Pathophysiology II (3).** A systems approach to normal physiology, disease and clinical manifestations of disease. f, w.

**243PT Applied Neurophysiology for Allied Health Students (3).** Principles of basic neurophysiology, emphasizing correlation of structure and function of the nervous system.

**244PT Clinical Kinesiology (4).** Functional anatomy and biomechanics in normal and abnormal conditions of extremities, back, neck, thorax. Dynamics of human motion and motor skills. w.

**300PT Problems in Physical Therapy (1-3).** Content geared to individual needs and interests of students in broad scope of physical medicine and rehabilitation. Self-instruction and participatory learning stressed; descriptive thesis required. w.

**306PT Therapeutic Exercise III (3).** Continuation of 204PT. f.

**316PT Approaches to Long Term Care (5).** Integration of evaluative and therapeutic procedures applied to chronically disabling conditions. Development of problem-solving skills emphasized. A variety of teaching modes used including lab. f.

**325PT Clinical Education III (3).** Continuation of Clinical Education II. Patient-therapist relationships and teaching methods emphasized. S/U.

**326PT Clinical Education IV (1).** Continuation of 182 Clinical Education III. Graded S/U. f.

**327PT Clinical Externship I (5).** Full-time student assignment to physical therapy departments providing educational experience in hospitals, special schools, rehabilitation centers. Students supervised by experienced physical therapists and guided in developing skills necessary to fulfill their professional role. w.

**337PT Clinical Externship II (5).** Continuation of 327PT. w.

**347PT Clinical Externship III (3).** Continuation of 337PT. Independent study for those who qualify.

## PHYSICS

**3 Physical Science (5).** (same as Chemistry 3). Surveys aspects of physics and chemistry relevant to energy use by society. Many lecture demonstrations. Discussion mainly qualitative. Course includes a laboratory and is recommended for non-science or non-engineering majors.

**11 Elementary College Physics (5).** Covers in an introductory manner nearly all areas of physics including mechanics, sound, magnetism, electricity, atomic physics and light. Four lectures, one lab weekly. Prerequisites: high school algebra & plane geometry.

**12 Elementary College Physics (3).** Continuation of 11. Introduces heat and properties of matter; additional topics in mechanics, electricity and modern physics. Two lectures, one lab weekly. Prerequisite: C in 11.

**80 University Physics I (3).** Physical quantities, standards and units, vectors, Newton's laws of motion, kinematics, statics, work and energy, rotational dynamics and oscillatory motion. Includes lab. Corequisite: Mathematics 80.

**123 University Physics II (3).** Gravitation, fluid dynamics, wave motion, thermodynamics and electrostatics. Includes a lab. Prerequisite: Grade of C or better in 10. Corequisite: Mathematics 175.

**124 University Physics III (3).** Magnetism, electromagnetic phenomena, elementary circuits, optics, matter waves and particles. Includes a lab. Prerequisite: Grade of C or better in 123. Corequisite: Mathematics 201.

**180 Undergraduate Seminar (cr. arr.)** Individual study, paper, presentation.

## PHYSICAL MEDICINE AND REHABILITATION

**A Physical Medicine and Rehabilitation (5).** Each medical student is provided a four-week clinical clerkship to develop an overall concept of restorative care and the principles of rehabilitation. Experience gained in working with the allied health professions in the delivery of comprehensive health care.

**190 Honors Seminar (cr. arr.)** Presentation of topics of current interest in physics by staff and students at junior-senior level.

**196 Honors Problems in Physics (cr. arr.)**

**201 Introduction to Modern Astrophysics (3).** (same as Astronomy 201).

**202 Astronomical Observations and Measurements (2).** (same as Astronomy 202).

**215 Intermediate Modern Physics (3).** Introduces quantum mechanics; atomic and molecular physics; electronic structure; spectra; electrical, thermal and magnetic properties of solids; imperfections; nuclear physics. Prerequisite: 124 or 130. Includes several laboratory experiments.

**225 Fundamentals of Physics for High School Teachers I (2).** Surveys mechanics, heat, sound for the high school teacher. Special reference to fundamental concepts, demonstrations, use of equipment, problems.

**226 Fundamentals of Physics for High School Teachers II (2).** Similar to 225 but covers magnetism and electricity, light, certain features of modern physics. May be taken before 225.

**300 Problems (cr. arr.)** Special studies for advanced undergraduate students in physics covering subjects not included in courses regularly offered.

**304 Principles of Physical Measurements (3).** Analyzes direct/alternating current circuits. Measures solid, liquid properties of materials of current research interest. Uses computer to analyze data. One class, two laboratories weekly. Prerequisites: Mathematics 175; Mathematics 201 or concurrently.

**306 Advanced Physics Laboratory I (3).** Experiments in atomic, nuclear and solid state physics including X-ray and neutron diffraction, NMR and Mossbauer effect measurements. Experiments familiarize students with modern equipment found in most physics laboratories. Two 3-hour labs weekly. Prerequisites: 215, 304.

**307 Advanced Physics Laboratory II (3).** Experiments include: superconductivity, resistivity, specific heat, optical, and computer-related measurements. Two 3-hour labs weekly. Prerequisites: 215, 304.

**310 Electricity and Magnetism I (3).** Mathematical preliminaries. Properties of charge distributions at rest and in motion, the field concept, introduces electromagnetic radiation. Prerequisites: 314 & Mathematics 201 or concurrently.

**311 Light and Modern Optics (4).** Principles of geometrical and physical optics. Coherent radiation, lasers. Three classes weekly, six 3-hour laboratories during the semester. Prerequisite: Mathematics 175.

**312 Introduction to Thermodynamics (3).** Development of the concepts of temperature, heat, work, entropy, enthalpy and free energy. Applications to gases, liquids and solids. Statistical methods. Prerequisite: 215.

**313 Electricity and Magnetism II (3).** Application of Maxwell's equations. Prerequisite: 310.

**314 Mechanics (3).** Development of fundamental concepts, principles of mechanics using mathematical methods. Many problems used. Prerequisite: Mathematics 201 or concurrently.

**315 Solar System Astrophysics (3).** (same as Astronomy 315).

**320 Observational Astronomy (3).** (same as Astronomy 320). Elements of astronomical observational techniques and procedures for reduction of astronomical data: theory of the photographic plate. Emphasis on development of observing skills through use of the telescope. Prerequisite: 201 or equivalent.

**325 Stellar Astrophysics (3).** (same as Astronomy 325).

**335 Galactic Astronomy (3).** (same as Astronomy 335).

**340 Extragalactic Astronomy (3).** (same as Astronomy 340).

**370 Introduction to Methods in Mathematical Physics (3).** Introduces mathematical methods and theories of physics. Topics usually covered are complex analysis, partial differential equations, integral equations and tensor analysis. Prerequisite: Mathematics 304.

**375 Computational Methods in Physics (3).** Use of modern computational techniques in solving a wide variety of problems in solid state, nuclear, quantum and statistical physics. Prerequisite: 215.

**380 Modern Physics I (3).** Special relativity and elementary wave mechanics. Schrodinger equation for harmonic oscillators and hydrogen-like atoms discussed in detail. Prerequisite: instructor's consent. Recommended: Mathematics 304.

**381 Modern Physics II (3).** Applications of wave mechanics to atoms, nuclei and solids. Prerequisite: 380 or instructor's consent.

**400 Problems (cr. arr.)** Laboratory work involving study of literature of special experiments in physics. Introduces research methods.

**404 Study of Techniques of Teaching College Physics (1-3).** Objectives, methods and problems related to teaching college physics. Some credit in this course is required for all students teaching physics. May repeat for 3 hours maximum.

**411 Seminar in Solid State Physics (1).** Topics of current interest selected for discussion. May be elected repeatedly. Prerequisite: 415.

**414 Seminar in Theoretical Physics (1).** Topics of current interest selected for discussion. May be elected repeatedly.

**415 Electronic Structure of Solids I (3).** Theoretical, experimental aspects of electronic properties of solids; metals, semi-conductors, insulators.

**416 Electronic Structure of Solids II (3).** Continuation of 415. Mechanical, thermal, optical and magnetic properties of solids.

**420 Nuclear Physics I (3).** Properties of nuclei and nuclear radiations, detection methods, high-energy nuclear phenomena. Prerequisite: 380.

**440 Low Energy Neutron Scattering (3).** Theory, application of low energy neutron scattering to investigation of structure and dynamics of aggregate matter including lattice vibrations, ordered spin systems, spin waves, diffusive motions in liquids; experimental techniques discussed. Prerequisite: 415.

**445 Plasma Physics (3).** Orbit theory, kinetic theory, magnetohydrodynamics, multi-fluid formulations, wave propagation, instabilities, and plasma flow.

**450 Research (cr. arr.)** Selected experiments in advanced physics or selected topics in advanced reading. Report required. Does not lead to dissertation.

**452 Stellar Interiors (3).** (same as Astronomy 452).

**461 Dynamics (3).** Hamilton's principle and Weill's principle; interplay of dynamics and symmetry. Lagrangian, Hamiltonian, Hamilton-Jacobi formulations applied to point particles, rigid bodies, small oscillations, nonlinear oscillations and fields (continuous systems). Prerequisite: instructor's consent.

**462 Electromagnetic Theory (3).** Electrostatics/magnetostatics, Cartesian, cylindrical/spherical coordinates. Separation of variables, eigenfunction expansions, Green's functions. Maxwell's equations, plane waves, time varying fields. Causality, Kramers-Kronig relations, dispersive media, Fresnel relations, dipole radiation, Kirchoff integral method for diffraction. Prerequisite: 461.

**464 Electrodynamics (3).** Tensor analysis, special theory of relativity and the Lorentz group. Classical theory of fields including variational principle, Noether's theorem and invariance principle. Microscopic Maxwell's equation, electromagnetic conservation laws and applications to radiation. Prerequisite: 462 or instructor's consent.

**466 Methods in Mathematical Physics (3).** Concentrates on mathematical techniques used in modern physics. Linear vector spaces, function spaces, differential equations, special functions, integral equations, applications of complex variables and Green's functions.

**468 Thermodynamics and Statistical Mechanics (3).** Thermodynamics as applied in physics, chemistry; laws of distribution; statistical methods of study matter, radiation. Prerequisite: 471 or concurrently.

**471 Quantum Mechanics I (3).** Basic definitions, axioms, exact solutions to the non-relativistic Schrodinger's equation, angular momentum, and perturbation theory. Prerequisite: 461.

**472 Quantum Mechanics II (3).** Approximation methods, semiclassical treatment of radiation, identical particle systems, scattering theory, relativistic quantum mechanics, and introduction to quantum field theory. Prerequisite: 471, f.

**473 Quantum Mechanics III (3).** Quantum theory of fields; discussions on quantization of the Klein, Gordon, Dirac, and Maxwell fields. Reduction of S-matrix, Feynman diagrams, renormalization; applications to quantum electrodynamics. Prerequisite: 472, w.

**478 Topics in Solid State Theory (3).** Selected topics in solid state theory, including various elementary excitations in solids and their interactions. May be elected twice.

**486 Theory of Elementary Particles (3).** Invariance principles: parity, charge conjugation, time reversal, isotopic spin, g-parity, SUR, etc. Dynamic relationships: statistical model, field theoretical methods and dispersion relations. Prerequisite: 473 or instructor's consent.

**490 Research (cr. arr.)** Work for preparation of dissertation for master's or doctor's degree.

## ASTRONOMY

**1 Introduction to Astronomy (4).** Survey of methods of astronomy; description of the solar system, stellar astronomy, structure of the galaxy and the universe. Prerequisites: one year each of high school algebra and plane geometry.

**2 Introduction to Laboratory Astronomy (2).** Laboratory supplement to 1. Satisfies physical science laboratory requirement. Survey of astronomical methods, instruments, observations and measurement techniques. Pre- or corequisite: 1.

**110 Archaeo-Astronomy (3).** Interpretation of evidence of mankind's early use of celestial phenomena for calendric, navigational and architectural purposes; interrelation of astronomical events to mythologies, religions and other aspects of societies. Astronomy I and Anthropology 152 strongly recommended.

**201 Introduction to Modern Astrophysics (3).** (same as Physics 201). Elements of solar system, stellar, and galactic astrophysics. Interpretation of observations and physical conditions of various astronomical objects including planets, stars, gaseous nebulae, galaxies. Prerequisite: Physics 124 and Mathematics 201.

**202 Astronomical Observations and Measurements (2).** (same as Physics 202). Elements of modern astronomical instruments, observations and analysis. Prerequisite: 201 or concurrently.

**300 Problems (cr. arr.)** Special studies in astronomy; covers subjects not included in courses regularly offered. Prerequisite: instructor's consent.

**315 Solar System Astrophysics (3).** (same as Physics 315). Investigates physical states of various members of solar system—planets, satellites, comets, sun. Emphasizes orbital mechanics, planetary interiors, structure and evolutionary state of sun, cosmogony. Prerequisite: Physics 314 or concurrently or instructor's consent.

**320 Observational Astronomy (3).** (same as Physics 320). Elements of astronomical observational techniques and procedures for reduction of astronomical data; theory of the photographic plate. Emphasis on development of observing skills through use of the telescope. Prerequisite: 201 or equivalent.

**325 Stellar Astrophysics (3).** (same as Physics 325). Basic astrophysics of stable and unusual stars, stellar systems. Investigates stellar dimensions, radiation, spectra, energy, evolution, populations; interstellar medium; stellar motions and aggregations. Prerequisite: 201, Physics 314 or concurrently or instructor's consent.

**335 Galactic Astronomy (3).** (same as Physics 335). Reviews of physical properties of stars; investigates distribution and motion of stars in space, structure of our galaxy, galactic and star cluster dynamics. Prerequisite: 201, Physics 314 or instructor's consent.

**340 Extragalactic Astronomy (3).** (same as Physics 340). Observa-

tional properties of normal galaxies and clusters of galaxies; theory of structure and dynamics of galaxies; interacting galaxies, Seyfert and emission-line galaxies, quasi-stellar objects. Introduction to cosmology. Prerequisite: 201, 335 or instructor's consent.

**452 Stellar Interiors (3).** (same as Physics 452). Investigates physical phenomena in stars: quantum thermodynamics, energy transport mechanisms; stellar structure, evolution and nucleosynthesis. Prerequisites: 325 and Physics 380 or instructor's consent.

## PHYSIOLOGY

**201 Elements of Physiology (5).** Beginning course for upper-class and graduate students designed to cover the basic functional aspects of all systems of the body. Prerequisite: 5 hours general zoology or equivalent.

**208 Human Physiology (3).** In-depth training in principles of basic and applied physiology. Prerequisites: 201, Anatomy 201, or equivalent, and departmental consent.

**240M Neurosciences I (5).** (same as School of Medicine—Interdisciplinary Courses 240M, Biochemistry 240M, & Anatomy 240M).

**250 Medical Physiology (7).** Functional survey of the organ systems of man with special emphasis on the physiological basis of medical practice. Laboratory illustrates basic principles of physiology with emphasis on experimental design and data interpretation. Medical students only, w.

**305 Mammalian Physiology (6-10).** Graduate-level course on the physiology of the major organ systems of mammals, with strong emphasis on physiological principles. Laboratory illustrates basic psychological concepts and design and interpretation of physiological experiments. Prerequisite: instructor's consent, w.

**325 Medical Neurophysiology (3).** Aspects of central nervous system function; emphasis on human pathophysiology. Prerequisites: 201 or 250 or Veterinary Anatomy-Physiology 420, and instructor's consent, f.

**400 Problems (cr. arr.)** Individual problems in physiology are assigned to expand previous work or an introduction to research.

**410 Seminar (1).** Reviews current literature on physiological topics, f, w.

**418 Advanced Mammalian Physiology (3).** Critical study of current status of various topics in mammalian physiology. Prerequisite: instructor's consent, w.

**420 Mammalian Membrane Physiology (3).** Advanced discussions of membrane transport behavior and electrical properties of excitable tissues. Quantitative as well as conceptual aspects will be emphasized. Prerequisites: 205 or Veterinary Physiology 220V, 221V or Biological Sciences 371 or equivalent, alt. s.

**430 Cardiovascular Physiology (2).** Covers important aspects of the cardiovascular system, with emphasis on recent developments. Prerequisite: 305 or Veterinary Anatomy-Physiology 220V & Veterinary Anatomy-Physiology 221V or equivalent, alt. f, odd yrs.

**439 Renal Physiology (2).** Mechanisms in mammalian renal physiology presented with particular emphasis on micropuncture analysis of intrarenal function. Prerequisites: 305, Veterinary Anatomy Physiology 220V & Veterinary Anatomy-Physiology 221V or equivalent, alt. f even yrs.

**450 Research (cr. arr.)** Opportunities for research in physiology not leading to dissertation.

**490 Research (cr. arr.)** Research in physiology, leading to dissertation, f, w, s.

## PLANT PATHOLOGY

**305 Introduction to Plant Pathology (3).** (same as Forestry, Fisheries & Wildlife 305, Pest Management 305). Provides basic understanding of biotic and abiotic agents which cause plant disease, and current approaches to disease control. Prerequisite: minimum of 5 hours biology or equivalent, f.

**307 Mycology (4).** (same as Biological Sciences 307).

**310 Nematology (3).** (same as Pest Management 310) Biology, pathology, economic importance and control of plant diseases caused by nematodes. Prerequisite: 1 year biology, f.

**322 Diseases of Field Crops (2).** Detailed study of diseases of corn, soybean, wheat, rice, and other world food or seed crops. Prerequisite: 305 or equivalent, w, 1/2 semester, class meets 3 lectures, 1 2-hour lab weekly.

**323 Diseases of Ornamentals and Turf (2).** (same as Horticulture 323). Study of the diseases of ornamental plants and turf. Prerequisite: 305 or equivalent, w, 1/2 semester, 3 lectures, 1 2-hour lab per week.

**361 Insects in Relation to Plant Diseases (3).** (same as Entomology 361). Principles of insect transmission and dissemination of plant pathogens. Lectures, laboratory, greenhouse. Prerequisites: 305 & Entomology 101 or Entomology 201 or instructor's consent, alt. w, odd yrs.

**369 Genetics of Plant Disease Development (3).** (same as Biological Sciences 369).

**391 Plant Pathology Field Survey (2).** (same as Pest Management 391). Prerequisites: 305 or equivalent and instructor's consent, s.

**392 Clinical Plant Pathology (1).** (same as Pest Management 392). Procedures for isolating and identifying diseases as they occur throughout the year on woody and herbaceous plants; determines causal agents and predisposing factors; discusses control measures.

**393 Clinical Plant Pathology (1).** (same as Pest Management 393). Procedures for isolating and identifying diseases as they occur throughout the year on woody and herbaceous plants; determines causal agents and predisposing factors; discusses control measures.

- 400 Problems (cr. arr.)** Advanced individual studies; minor research problems. f, w, s.
- 401 Topics (cr. arr.)** Specialized topics in advanced plant pathology not available through regularly offered courses.
- 405 Plant Virology (2).** Principles of plant virus biology, structure and pathogenesis. Prerequisites : 305 or equivalent, and 3 hours microbiology or equivalent. First half winter.
- 406 Plant Bacteriology (2).** Detailed study of diseases caused by bacteria: infection process, establishment of host pathogen complexes (compatibility vs. incompatibility). Defense mechanisms against bacteria. Types of bacterial diseases. Prerequisites: 305 or equivalent, and 3 hours microbiology or equivalent. Second half winter.
- 407 Diseases of Plants (Fungal) (3).** First 9 weeks. w.
- 409 Genera Fungi Imperfecti (3).** (same as Biological Science 307). Conidium otogen-based system examined for basis of deuteromycotina genera. Covers representative amorphous fungi but not human pathogens. Prerequisites: 307 Mycology. w.
- 410 Seminar (1).** Presentation, discussion of extension studies, literature. f, w.
- 411 Biochemistry and Physiology of Plant Diseases (3).** Physiology of infectious plant diseases; physical/chemical plant surface interactions between host/pathogen in rhizosphere, metabolic alterations within host/pathogen. Prerequisites: 305, Biological Sciences 313 & Chemistry 210. alt. f. odd yrs.
- 412 Experimental Plant Disease Physiology (4).** In-depth discussion of most recent concepts in area of host-pathogen interactions. Laboratory experiments provide experience with techniques used to measure physiological changes in the diseased plant. Prerequisites: 411, organic chemistry, microbiology, biochemistry and instructor's consent. alt. w. odd years.
- 416 Transport and Metabolism of Plant Nutrients (3).** (same as Agronomy 416). Current concepts in ion transport across plant membranes and translocation of nutrients in the plant; nitrogen fixation and the function of plant nutrients; and stress caused by imbalance of mineral elements and/or pathogens. Prerequisites: Biological Sciences 313 or Agronomy 315 and Biochemistry 270 and 272. alt. f. odd yrs.
- 430 Comparative Pathology (3).** (same as Veterinary Pathology 430, Pathology 430).
- 450 Research (cr. arr.)** Research not expected to terminate in dissertation.
- 451 Electron Microscopy (1).** (same as Veterinary Pathology 451). Basic principles of electron microscopy; emphasis on biological applications. Prerequisites: graduate status & instructor's consent. w.
- 452 Transmission Electron Microscopy Laboratory (4).** (same as Veterinary Pathology 452). Provides experience with current techniques and instrumentation with emphasis on applications of transmission electron microscopy in biological research. Prerequisites: graduate status, 451 and instructor's consent. s.
- 453 Scanning Electron Microscopy Laboratory (3).** (same as Veterinary Pathology 453). Provides extensive exposure to instrumentation and current procedures required for scanning electron microscopic analysis of physical and biological materials. Prerequisites: graduate status, 451 and instructor's consent. May be taken concurrently with 451. Second half winter.
- 490 Research (cr. arr.)** Independent investigation in field of plant pathology to be presented as a thesis.

## POLITICAL SCIENCE

- 1 American Government (3-5).** Topics covered include Constitution, federalism, civil liberties, political attitudes, interest groups, political parties, nominations, elections, and campaigns, voting behavior, Congress, Presidency, bureaucracy, and judiciary. Meets state law requirement. cor.
- 11 Introduction to Political Science (3).** Introduces scope and content of politics: theory and operation of democratic and non-democratic governments. Meets state law constitutional requirement. Students taking this course may not take 1, and vice versa. cor.
- 55 International Relations (3).** Contemporary international affairs including family of nations, control of national foreign policies, competition and cooperation in legal, political, economic, social fields.
- 101 Topics (1-3).** Organized study of selected topics. Subjects and earnable credit may vary from semester to semester. Repeatable upon departmental consent.
- 102 State Government (3).** Government and politics at the state level, with emphasis on Missouri.
- 120 The Judicial Process (3).** Analysis of role played by American judges and courts in democratic policy formation.
- 150 Comparative Political Systems (3).** Analysis of major political systems selected from Europe, Asia, Africa, and Latin America, emphasizing basic concepts of comparative political study. Prerequisite: 1 or 11.
- 151 Politics and the Military (3).** (same as Peace Studies 151). Dynamics of contemporary civil/military relations; the military industrial complex and the military regime. Also deals with military as an interest group and as a modern socializing agent.
- 160 Contemporary Political Ideologies (3).** Analyzes and compares varieties of liberal, socialist, conservative, religious, and fascist theories in relation to problems of the modern state.
- 181 Asian Civilizations (3).** (same as History 181, South Asia Studies 181). Introductory survey of civilizations of India, China and Japan.
- 190 Proseminar in Political Science (1-3).** For political science

- Honors candidates. Analyzes content, methods, and problems of the discipline using classical and contemporary writing. Normally taken in junior or senior year.
- 198 Honors (1-6).** Special readings, reports in the several fields of political science. For political science Honors candidates.
- 210 Current Issues in American Politics (3).** Investigation primarily through reading and discussion of contemporary issues in American politics. Content varies. Prerequisite: 1 or 11.
- 260 Themes in Political Theory (3).** Selected themes and issues in political theory. Specific subject matter varies each semester.
- 262 Classical Political Thought (3).** Origin and development of political theory; nature of justice; ethics and politics; political regimes and types of leadership; political revolutionary change; stoic and Christian natural law concepts; and church-state relations. Prerequisite: junior standing or instructor's consent.
- 263 Modern Political Thought (3).** Political theory of modern state; political realism in Machiavelli and Hobbes; social contract; natural right and utilitarianism as basis for liberal state; Marxist criticism of liberal capitalism; reevaluation of modern culture. Prerequisite: junior standing or instructor's consent.
- 300 Special Problems (cr. arr.)** Independent investigation to meet needs of the individual student. Prerequisite: instructor's consent.
- 301 Topics (1-99).** Organized study of selected topics. Subjects and earnable credit vary from semester to semester. Repeatable with departmental consent. Prerequisites: junior standing & instructor's consent.
- 303 Politics and War (3).** (same as Peace Studies 303). Why do wars occur? The functions of force and uses of a threat of force. Problems of national security strategy and arms control.
- 305 Political Parties (3).** Development, organization, functions, activities of major and minor political parties, pressure groups; election administration, especially in United States. Prerequisites: junior standing; 1 or 11.
- 306 Municipal Government (3).** Study of government of cities; political organization and urban problems. Prerequisites: 1 or 11, junior standing.
- 307 Political Campaigns and Voter Behavior (3).** The role of elections in a democracy, the bases on which voters make decisions, and the principles and procedures of managing campaigns, including the gathering and use of money, workers and other resources. Prerequisite: 1 or equivalent.
- 308 Comparative Urban Politics (3).** Compares political processes in metropolitan areas of United States with those in other cultural settings. Includes an examination of political conflict, influence, and relationships of political and social organization in urban areas.
- 310 Introduction to Public Administration (3).** Surveys recurring themes, conceptual problems, and substantive findings in the literature of public administration with particular attention to U.S. public bureaucracies. cor.
- 311 Administrative Regulation of Business (3).** Role of administrative agencies in development of regulatory policy in the U.S.
- 312 Issues in Public Bureaucracy (3).** Investigates selected political and administrative problems affecting public bureaucratic units. Context varies.
- 314 American Foreign Policies (3).** Bases, formulation, evaluation of current American foreign policies. Prerequisite: upper-class standing.
- 315 County and Metropolitan Government (3).** History and structure of county government. Role in federal system. County services and finances. County charters, city-county consolidation and separation. County and metropolitan politics.
- 316 Congress and Legislative Policy (3).** Study of national and state legislative systems, and legislative systems, and legislative policy making, with emphasis on Congress. Prerequisite: 1 or 11.
- 317 Public Policy (3).** Introduction to the study of public policy in the United States. Analyzes public policy choices of national, state, and local governments and the variety of forces which serve to shape policy decisions.
- 318 Comparative State Politics (3).** Analyzes similarities and differences of state politics and the ways in which such politics are shaped by political and socioeconomic environments of the states.
- 319 Policy Analysis (3).** Approaches to designing public policies including cost-benefit accounting, decision theory, and programming. Investigation of formulation of policy objectives with special emphasis on problems of collective choice and rationales for market intervention.
- 320 The American Constitution (3).** Leading American constitutional principles as they have evolved through important decisions of the United States Supreme Court. Prerequisites: junior standing; 1 or 11.
- 321 The Constitution and Civil Rights (3).** Civil rights in American constitutional context emphasizing freedom of religion, freedom of expression, minority discrimination, loyalty, rights of defendants. Prerequisites: junior standing; 1 or 11.
- 322 The United States Supreme Court (3).** Role of Supreme Court in American system of government; particular attention given to reading biographies and writings of the Justices. Prerequisite: 320.
- 323 Law and the Political Process (3).** Political uses of courts and legal bureaucracies; development of legal issues, recruitment, internal dynamics and decision making, policy outcomes, and public opinion.
- 324 Survey Research Methods (3).** Selection of survey research topics, questionnaire development, sampling, interviewing, coding, and preparation of data for computer analysis. Emphasis on practical participation.
- 325 Politics of Pressure Groups (3).** Internal politics of special interest groups--business, labor, agriculture, etc.; techniques of influencing public policy in American political system. Prerequisites: junior standing; 1 or 11.
- 326 Data Analysis in Political Research (3).** Introduces methods and

- techniques of data collection and analysis. Prerequisites: 1 or 11; junior standing.
- 328 Political Behavior (3).** Economic, psychological, and social dimensions of political behavior; participation, leadership and elites; political attitudes; voting behavior and decision-making processes. Prerequisites: junior standing; 1 or 11.
- 332 Administrative Agency Internship (3-6).** Work experience with government agency at local, state, or national level. S/U grade only. Prerequisite: Junior standing. 102 or 306 concurrent with 332 is recommended.
- 333 Legislative Internship (3-6).** Weekly work experience with an assigned individual legislator in Jefferson City during regular session of state legislature, coordinated by faculty member. S/U grade only. Suggested 102 or 316 previously or simultaneously.
- 334 Campaign Internship (3-6).** Participation in political campaigns with coordination by faculty member. S/U grade only. Prerequisite: 307 or simultaneously. f, even yrs.
- 335 Lobbying Internship (3-6).** Weekly work experience with an assigned lobbyist or lobbying group in Jefferson City during regular session of state legislature, coordinated by faculty member. S/U grade only. Prerequisite 325 or simultaneously. w.
- 336 Special Internship (3-6).** Competitive paid internships in Jefferson City and Washington D.C., with recipients selected by political science department. Coordinated by faculty members. S/U grade only.
- 340 The American Presidency (3).** Evolution of the presidency; particular emphasis on constitutional and political roles played by chief executive in shaping public policy. Prerequisites: junior standing; 1 or 11.
- 350 Special Readings (cr. arr.)** Independent readings selected in consultation with supervisory faculty member. Prerequisite: instructor's consent.
- 351 Latin American Governments (3).** Development, present status of political institutions in South America; emphasizes current political problems. Prerequisites: junior standing; 1 or 11.
- 352 The Modern Welfare State (3).** Focuses on the evolution of the modern welfare state in advanced industrial, Western societies. Designed to give students and understanding of the major policy actions. Prerequisite: junior standing or instructor's consent.
- 354 Western European Political Systems (3).** Comparison of political cultures, institutions, and processes of Britain, France, West Germany, Italy and selected smaller countries in Western Europe.
- 355 Western Europe's Foreign Policy (3).** (same as Peace Studies 355). Comparison of foreign policies of the major Western European countries; their roles within the European community. Study of institutions and functioning of the European community and its potential as an emerging world power.
- 356 Comparative Communist Systems (3).** Dynamics of communist revolutions; methods of consolidation, development-mobilization techniques, domestic problems, attempted solutions. Emphasis predominantly on Soviet and Eastern European states with some reference to Asian communist states and Cuba. Prerequisite: junior standing.
- 358 Soviet Foreign Policy (3).** Principles, problems, and evolution of Soviet foreign policy toward Western powers, developing nations, and other members of Soviet bloc. Prerequisite: junior standing.
- 360 American Political Thought (3).** Development of political thought in America from colonial period to World War II. Prerequisite: junior standing.
- 361 Recent Democratic Theory (3).** Analysis of political ideas of advanced industrial societies with emphasis on post-war U.S. Considerers problems of participation and representation, legitimacy and sovereignty, elitism and pluralism, liberty and equality, dissent, revolution, and industrial democracy. Prerequisite: junior standing or instructor's consent.
- 364 Contemporary Political Theory (3).** Development of political ideas from the late 19th century to present. Major thinkers considered: Nietzsche, Dewey, Lenin, Mao, Fromm, Sartre, Niebuhr, Spengler, Gentile. Prerequisite: junior standing.
- 370 Political Development and Social Change (3).** (same as Peace Studies 370). Interdisciplinary analysis of the dynamics of political and socioeconomic change based on an examination of theories of development and case studies from Asia, Africa, Latin America, and /or the Middle East.
- 371 Government and Politics in Southeast Asia (3).** Comparative analysis of the politics of selected Southeast Asian states, such as Indonesia, Vietnam, Malaysia, Thailand, the Philippines. Special attention given to problems of political and socioeconomic development.
- 372 International Relations in Asia (3).** Survey of recent problems in relations among Asian nations and of United States policy in the region. Prerequisite: junior standing.
- 374 Contemporary South Asian Political Systems (3).** (same as South Asia Studies 374). Contemporary political and governmental patterns of India, Pakistan, Sri Lanka, Nepal, and Bangladesh.
- 375 The Politics of Modernization: East Asia (3).** Comparative study of the evolution of national governments and policies, primarily in Japan and Korea.
- 376 Contemporary Chinese Politics (3).** Comparative study of the evolution of national governments and policies in China and Taiwan.
- 385 International Organization (3).** Forms, functions of international organizations; special reference to United Nations and International Court of Justice. Prerequisite: junior standing; 1 or 11.
- 400 Problems (cr. arr.)** For graduate students with necessary prerequisite courses. Topics in one of the fields of political science for individual study.
- 401 Topics (cr. arr.)** Organized study of selected topics. Subjects and earnable credit vary from semester to semester. Repeatable with departmental consent. Prerequisite: instructor's consent.

**402 Readings in International Relations (3).** Analysis, evaluation of some basic theories which attempt to explain international affairs.

**403 Public Administration and Policy Development (3).** Intensive study of role of administrators in determination and development of public policy. Prerequisite: 310.

**404 Seminar in International Politics (3).** Intensive study of foreign policy formulation and implementation; special emphasis on American foreign policies. Prerequisite: graduate standing or instructor's consent.

**405 Readings in American Political Parties (3).** Critical examination of literature in American party system.

**406 Research in American Politics and Legislation (3).** Directed research into one or more specific aspects of American party system, pressure groups, presidency, legislation, public opinion, and the like.

**407 Problems in Public Opinion (3).** Intensive study of public opinion theory and analysis. Prerequisite: instructor's consent.

**410 Readings in Public Administration (3).** Critical examination of literature relating to selected topics in public bureaucracies.

**411 Studies in Public Administration (3).** Directed research involving selected topics in public bureaucracies.

**415 The Urban Community (3).** Directed research into selected problems of the urban setting.

**418 Federalism and Intergovernmental Relations (3).** Analyzes relationships among American governmental units emphasizing national-state relations and metropolitan area problems. Prerequisite: instructor's consent.

**419 Logic of Political Inquiry (3).** Examines some of the assumptions underlying empirical social science. Critical analysis and comparison of some important conceptual frameworks which are also general enough to be applied to many kinds of polity.

**420 Judicial Behavior (3).** Critical examination, both conceptual and methodological, and behavioral literature in public law. Emphasizes impact of judicial decisions and relations of judiciaries to their environment systems.

**421 Research Design and Measurement (3).** Research design, social measurement and techniques for study of political phenomena. Prerequisite: 419 or instructor's consent.

**425 Seminar in Constitutional Law (3).** Reading and critical examination of significant writings in American constitutional and legal theory.

**430 Seminar in Public Policy (3).** Covers the basic theory, approaches, problems and issues relating to the scope, development and implementation of public policy.

**431 Policy Evaluation Methods (3).** Methods of evaluating public policies and legislative impacts. Emphasis on applied designs and information analysis such as sampling design, experimental design, statistical regression and operations research. Prerequisite: 326 or equivalent.

**433 Theories of Decision Making (3).** Intensive examination of decision-making theories applied to political institutions and behavior.

**434 The Individual and the Work Group (3).** Analyzes the work group as an arena of political participation and mobilization. Cross-national comparison of contemporary models of worker control and self-management.

**450 Research (cr. arr.)** Independent research not leading to thesis.

**452 Public Policies in Advanced Industrial Societies (3).** Comparative analysis of public policy in Western democracies. Emphasis on economic policy and related policy areas. Comparisons of Western European countries with United States, Japan, USSR when appropriate.

**456 Seminar in Comparative Politics (3).** Comparative study of selected aspects of political systems. Variable content. May be repeated for credit.

**459 Problems in Comparative Politics (3).** (same as South Asia Studies 459). Study of comparative approach to politics in Europe, Asia and/or Latin America. Prerequisite: instructor's consent.

**460 Early Political Thought (3).** Readings in the classics of politics, ancient and medieval. Original works read in full and analyzed; emphasis on critical evaluation of reports.

**461 Modern Political Thought (3).** Readings in the classics of early modern and modern political thought. Original works read in full and analyzed; emphasis on critical evaluation of reports.

**462 Contemporary Political Thought (3).** Readings in major works of 20th-century political thought. Original works read in full and analyzed; emphasis on critical evaluation of reports.

**463 Studies in Political Thought (3).** Intensive analysis of an individual political philosopher. Recommended for students with a special interest in political theory. Prerequisite: 361 or 362 or 460 or 461 or instructor's consent.

**465 Normative Political Theory (3).** Intensive analysis of basic concepts of political theories: political system, justice, obligation, liberty, authority, responsibility, equality and community. Problems selected vary from term to term. Prerequisite: instructor's consent.

**472 Political Economy of Rural Development in the Third World (3).** Interdisciplinary, comparative analysis of political aspects of rural development in the Third World.

**474 Problems of South Asia (3).** (same as South Asia Studies 474). Intensive study of and research in selected political problems in India, Pakistan, Sri Lanka, Bangladesh, and the Himalayan states. Prerequisite: instructor's consent.

**475 Seminar in East Asian Politics (3).** Intensive study of selected topics in the internal and external politics of China, Japan and Korea. Prerequisites: graduate standing & instructor's consent.

**480 Independent Readings for Ph.D. Comprehensive Examinations (1-6).**

**490 Research (cr. arr.)** Independent research leading to thesis.

## PORTUGUESE

**1 Elementary Portuguese I (5).** Offered only in the Fall.

**2 Elementary Portuguese II (5).** Continuation of 1. Prerequisite: grade of C or better in 1 or equivalent.

**3 Elementary Portuguese III (3).** A multi-skill course following II, centering on cultural/literary readings, and including a grammar review, practice in the spoken language, as well as some practice in written expression. Prerequisite: 2 or equivalent.

**109 Portuguese Conversation (3).** Prerequisite: 3 or equivalent.

**201 Topics (cr. arr.)** Organized study of selected topics. Subjects and earnable credit may vary from semester to semester. Repeat with departmental consent. Prerequisite: Sophomore standing.

**206 Advanced Portuguese Composition and Conversation (3).** Prerequisite: 106 or 109.

**207 Intensive Beginning Portuguese (3).** Designed for rapid acquisition of a reading knowledge of Portuguese. Cannot be taken to fulfill undergraduate language requirement. Prerequisite: Graduate standing or instructor's consent.

**209 Advanced Portuguese Conversation (3).** Prerequisite: 109 or equivalent.

**301 Topics (cr. arr.)** Organized study of selected topics. Subjects and earnable credit may vary from semester to semester. Repeatable with departmental consent. Prerequisite: Sophomore standing or instructor's consent.

**331 Survey of Brazilian Literature (3).** Survey of Brazilian literature from colonial period to present. Prerequisite: 3, 207 or equivalent.

**350 Special Readings (1-3).** Independent study through readings, conferences, reports. Prerequisite: 3 or equivalent.

**353 Readings in Portuguese (2-3).** Subjects either in Brazilian or Portuguese literature. Varies according to instructor. Prerequisite: Sophomore standing or instructor's consent.

**400 Problems (cr. arr.)** Prerequisite: Graduate standing.

## POULTRY SCIENCE

**12 Animal Science (5).** (same as Agriculture 12, Animal Science 12, Dairy Science 12).

**101 Poultry Science (3).** Basic information on the industry: reproduction, feeding and management of poultry. Introductory course for poultry science majors, and others desiring information on poultry production and related fields. Prerequisite: 12 or instructor's consent. w. cor.

**300 Problems (cr. arr.)** For senior and graduate students. Problems in poultry breeding, incubation, management, marketing, nutrition, physiology and turkey production. f.w.s.

**303 Poultry Breeding and Incubation (3).** Course is designed to provide a basic understanding of poultry breeding and incubation. Prerequisite: 101 or instructor's consent. w.

**307 Egg Technology (3).** (same as Food Science and Nutrition 307).

**309 Avian Physiology (3).** Anatomy, physiology of domestic fowl. Application of principles of physiology, recent research to growth, reproduction and environmental problems of poultry. Prerequisites: Biological Sciences 1 & 2. alt. f. odd yrs.

**390 Field Training in Poultry Husbandry (cr. arr.)** Study, observation, employment in selected fields. Planned study program, written reports, final exam required. Enrollment by permission only. Prerequisite: 101 or one or more of the following--302, 304, 307, 309. s.

**391 Field Instruction in Animal Science (1-3).** (same as Animal Science 391, Dairy Science 391).

**400 Problems (cr. arr.)** Advanced study on a selected research problem. f.w.s.

**410 Seminar (1).** Scientific literature, problems in poultry science reviewed, discussed. w.

**423 Genetics of Populations (4).** (same as Animal Science 423, Biological Sciences 423). Genetic composition of populations and conditions influencing their rate of change. Relative effectiveness of various breeding plans. Prerequisite: 3 hours genetics & 3 hours statistics.

**450 Research (cr. arr.)** Independent research not leading to a thesis. f.w.s.

**490 Research (cr. arr.)** Graduate research investigations. Presented as thesis. f.w.s.

## PRACTICAL ARTS AND VOCATIONAL-TECHNICAL EDUCATION

**F100 Foundations (1-3).** Orientation to program service areas of PAVTE, degree program planning and introduction to the professional fields within each program area of PAVTE. Prerequisite: Education Admissions Seminar S75. f.w.

**F175 Directed Occupational Experience (1-4).** Reports based on employment experience in selected occupations combined with related conferences and/or seminars. May repeat until four semester hours accumulated.

**F190 Programs and Issues in Practical Arts and Vocational Education (1).** Examination of programs, legislation and administrative framework at federal, state, local levels; issues contemporary teachers face working in areas of practical arts and vocational-technical

education. Prerequisite: junior standing.

**F299 Student Teaching in PAVTE (6-8).**

**F300 Problems (cr. arr.)** Study of professional programs and issues or technical problems related to the field of practical arts and vocational education.

**F308 Coordination of Cooperative Occupational Education (1-4).** Problems and procedures in the operation of cooperative occupational education programs. Especially designed for those who can qualify as coordinators of occupational education programs of a cooperative nature.

**F321 Vocational Guidance (2-3).** Problems, methods, procedures involved in assisting individuals in choosing, preparing for, entering upon, progressing in their vocation. For teachers, counselors, school administrators.

**F325 Field Study in Occupational Education (1-4).** Directed observation in a cross section of business and industry combined with reports, weekly seminars and/or conferences. May repeat until four semester hours accumulated.

**F360 Topics in Practical Arts and Vocational-Technical Education (cr. arr.)**

**F365 Occupational Analysis (2).** Techniques, procedures of analyzing occupations into their basic elements. Required of trade teachers, coordinators.

**F371 Vocational Education for Handicapped Students (3).** (same as Special Education L371).

**F400 Problems (cr. arr.)**

**F406 Foundations/Program Development in Adult Vocational Education (3).** The adult vocational education movement; characteristics of and learning principles applied to adult vocational students; instructional materials, methods and procedures in organizing and operating adult vocational education programs.

**F410 Seminar in Practical Arts and Vocational-Technical Education (0.5-2).**

**F411 Philosophy of the Practical Arts and Vocational Education (3).** Nature, purpose of practical arts and vocational education in modern school. For teachers of agriculture, business, home economics, industrial subjects, administrators.

**F415 Occupational Surveys (3).** Problems, methods, procedures in planning and conducting community occupational surveys. For counselors, teachers, supervisors of vocational education, school administrators, employment service personnel.

**F451 Measurement and Evaluation in Vocational Education (2-4).** Development of evaluation procedures and the construction of evaluation devices for vocational education. Emphasizes evaluation of student progress, improvement of instruction, and program evaluation. Prerequisite: course in curriculum construction or instructor's consent.

**F459 Administration and Supervision of Vocational Education (2-3).** Types of organization, approved administrative and supervisory practices of vocational, technical, and practical arts programs in secondary and post-secondary institutions.

**F460 Topics (cr. arr.)**

**F490 Research (cr. arr.)**

## AGRICULTURAL EDUCATION

**F100 Foundations of Agricultural Education (1-3).** Orientation to program service areas of PAVTE, degree program planning and introduction to the professional fields within each program area of PAVTE. Prerequisite: Education Admissions Seminar S75. f.w.

**F175 Directed Occupational Experience (1-4).** (same as Practical Arts & Vocational-Technical Education F175)

**F299 Student Teaching in Agricultural Education (6-8).** Student teaching in the secondary schools.

**F300 Problems (cr. arr.)** Studies professional programs and issues or technical problems related to the field of practical arts and vocational education.

**F303 The Teaching of Agriculture (3).** Developing instructional units, supervising individual occupational experience programs, and guidance of student organizations. Prerequisites: Educational Psychology A102 & Educational Psychology A140 or instructor's consent.

**F304 Programs for Out-of-School Groups in Agriculture (2).** Programs in agriculture for out-of-school groups; particular emphasis on young farmer and adult farmer classes. Prerequisite: F100 or instructor's consent.

**F305 Programs and Instructional Materials in Agriculture (2).** Plans programs, prepares teaching materials, and evaluates programs in agriculture in public schools. Prerequisite: Educational Psychology A140 or instructor's consent.

**F306 Teaching Agricultural Mechanics (3).** Organizing course content; conduct and management of an agricultural mechanics shop. Prerequisite: F100 or instructor's consent.

**F307 Teaching of Agricultural Management (2).** Organizing course content, developing instructional materials and preparing to teach agricultural management in high school and young/adult farmer programs of vocational agriculture. Prerequisites: Agricultural Economics 260 & 312; F100 or instructor's consent.

**F310 Agriculture in the Community Schools (2-4).** Organization of instructional program and of instruction in agriculture in the community school. Prerequisites: baccalaureate degree & instructor's consent.

**F325 Field Study in Occupational Education (1-4).** Directed observation in a cross-section of business and industry combined with reports, weekly seminars and/or conferences. May repeat until@four semester hours accumulated.

**F360 Topics (cr. arr.)**

**F400 Problems (cr. arr.)**

**F408 Seminar in Agricultural Education (1-3).**

**F420 Advanced Methods of Teaching Agricultural Mechanics**

(2-4). Determines needs, plans and administers programs, evaluates outcomes. Prerequisite: F306 or instructor's consent.

**F440 Planning Programs of Supervised Experience in Agr Occupations (2-4).** Surveys agricultural situations. Develops activities which lead to establishment. Evaluates programs with different groups.

**F444 Adult Education in Agriculture (2).** Developing program objectives, organizing and conducting classes and methods of class and program evaluation for out-of-school groups and their co-curricular affiliates in agriculture. Prerequisite: F304 or instructor's consent.

**F450 Methods of Teaching Agricultural Management (2-4).** Determines needs, selects and organizes course content, and evaluates the instructional program in farm management. Prerequisite: baccalaureate degree in agriculture or instructor's consent.

**F460 Topics (cr. arr.)**

**F470 In-Service Course in Agricultural Education (cr. arr.)**

**F490 Research (cr. arr.)**

## BUSINESS EDUCATION

**F32 Elementary Typewriting (2).** Introductory course for developing basic mastery of the keyboard, fundamental techniques of typewriting, and minimal skill in preparing letters and other typewritten communications.

**F33 Intermediate Typewriting (3).** Instruction in preparing various styles of business letters, office forms, reports, duplicating masters, etc.; development of typing speed and accuracy.

**F34 Advanced Typewriting (3).** Preparation of various personal, business, professional papers and forms, intensive practice in developing of high standards of speed and accuracy. Prerequisite: F33.

**F35 Office Machines (3).** Typewriting problems representative of various procedures in business offices; training in use of office machines: transcribing machines, electronic powertypewriters, composer, offset duplicator, microprocessors, adding-calculating machines, etc. Prerequisite: instructor's consent.

**F36 Elementary Stenography (3).** Not open to students with previous training in shorthand. Study of theory of Gregg shorthand; development of shorthand reading, writing, and transcription techniques.

**F37 Intermediate Stenography (3).** Review of Gregg shorthand theory; dictation and transcription practice. Prerequisite: grade of C or equivalent in F36.

**F38 Advanced Stenography (3).** Review of Gregg shorthand theory; intensive practice in speed dictation and transcription. Prerequisite: grade of C or better in F37.

**F100 Foundations (1-3).** Orientation to program service areas of PAVTE, degree program planning and introduction to the professional fields within each program area of PAVTE. Prerequisite: Education Admissions Seminar S75, f.w.

**F137 Business Communications (2).** Designed for the development of skill in writing business letters, memorandums, reports, and applications for employment and for the improvement of unwritten business communications. Prerequisites: 45 semester hours of credit and minimal skill in typewriting.

**F138 Touch Shorthand (3).** Theory of touch shorthand; development of proper techniques and minimal skill in the operation of the shorthand machine. Prerequisite: instructor's consent.

**F139 Secretarial Office Procedures and Administration (3).** Procedural and administrative roles of the secretary, emphasizing decision-making skills and the increased use of word processing, reprographics, and micrographics. Prerequisites: F34; grade of C or better in F38.

**F142 Filing Systems and Records Management (2).** Comprehensive study of basic filing rules, procedures, equipment, and records management.

**F150 Special Readings in Business Education (1-3).**

**F175 Directed Occupational Experience (1-4).** Reports based on employment experience in selected occupations combined with related conferences and/or seminars. May repeat until four semester hours accumulated.

**F251 Teaching Basic Business Subjects (2).** Methods, techniques, and measurement of achievement in teaching basic business subjects. Prerequisite: Educational Psychology A102.

**F252 Teaching Business Skills Subjects (2).** Instructional objectives, materials, media, methodologies, and measurement of achievement. Prerequisite: Educational Psychology A102.

**F299 Student Teaching in Business Education (6-8).** Student teaching in the secondary schools.

**F325 Field Study in Occupational Education (1-4).** Directed observation in a cross section of business and industry combined with reports, weekly seminars and/or conferences. May repeat until four semester hours accumulated.

**F360 Topics (cr. arr.)**

**F400 Problems (cr. arr.)**

**F409 Principles of Business Education (3).** Organization, curriculum, problems, and trends of business education in secondary schools and colleges.

**F414 Seminar in Business Education (1-3).**

**F421 Improvement of Instruction in Basic Business Subjects (3).** Recent developments in methods, techniques and materials of instruction in the teaching of basic business subjects.

**F422 Improvement of Instruction in Business Skills Subjects (3).** Developments and trends in the instructional program of business skills courses.

**F460 Topics (cr. arr.)**

**F474 In-Service Course in Business Education (cr. arr.)**

**F490 Research (cr. arr.)**

## DISTRIBUTIVE EDUCATION

**F25 Principles of Salesmanship (3).** Role of selling in distribution, and methods and techniques involved in selling. Emphasizes student demonstration, through simulation and role playing, of effective sales procedures.

**F75 Principles of Retailing (3).** Examines problems, opportunities and trends in retailing. Problems and cases deal with store organization, budgeting, control, personnel and operation.

**F100 Foundations in Distributive Education (1-3).** Orientation to program service areas of PAVTE, degree program planning and introduction to the professional fields within each program area of PAVTE. Prerequisite: Education Admissions Seminar S75, f.w.

**F125 Merchandising (3).** Develop basic competencies essential to successful merchandising. Studies skills essential in merchandising, and analysis of merchandising functions and activities.

**F175 Directed Occupational Experience (1-4).** Reports based on employment experience in selected occupations combined with related conferences and/or seminars. May repeat until four semester hours accumulated.

**F195 Practicum in Vocational Education (1-3).** Supervised field experience in a school setting.

**F299 Student Teaching in Distributive Education (6-8).** Student teaching in the secondary schools.

**F300 Problems (cr. arr.)** Studies professional programs and issues or technical problems related to the field of practical arts and vocational education.

**F308 Coordination of Cooperative Occupational Education (1-4).** Problems and procedures in the operation of cooperative occupational education programs. Especially designed for those who can qualify as coordinators of occupational education programs of a cooperative nature.

**F325 Field Study in Occupational Education (1-4).** Directed observation in cross section of business and industry combined with reports, weekly-seminars and/or conferences. May repeat until four semester hours accumulated.

**F360 Topics in Practical Arts and Vocational-Technical Education (cr. arr.)**

**F397 Curriculum Construction in Marketing and Distributive Education (3).** Derivation of objectives, selection and arrangement of instruction units and materials for marketing and distributive education. Construction and use of evaluative devices.

**F398 Principles of Teaching Distributive Education (3).** Development of distributive education, organization of distributive education, cooperative and project experiences, instructional materials, and the program of Distributive Education Clubs of America.

**F400 Problems (cr. arr.)**

**F460 Topics (cr. arr.)**

**F475 In-Service Course in Distributive Education (cr. arr.)**

**F490 Research (cr. arr.)**

## HOME ECONOMICS

### EDUCATION

**F100 Foundations (1-3).** Orientation to program service areas of PAVTE, degree program planning and introduction to the professional fields within each program area of PAVTE. Prerequisite: Education Admissions Seminar S75, f.w.

**F175 Directed Occupational Experience (1-4).** Reports based on employment experience in selected occupations combined with related conferences and/or seminars. May repeat until four semester hours accumulated.

**F235 Organization of Vocational Home Economics (2).** Organizing and administering curriculum and instruction, homemaking and home economics for gainful employment.

**F275 Occupational Home Economics Programs (2).** Problems, methods, procedures in planning and conducting occupational home economics programs. For prospective elementary and secondary teachers. Prerequisites: F235 & Educational Psychology A102.

**F280 Methods of Teaching Vocational Consumer-Homemaking (3).** Methods of teaching vocational consumer-homemaking programs, kindergarten-adult. Prerequisites: F235 & Educational Psychology A102.

**F299 Student Teaching in Home Economics Education (6-8).** Student teaching in the secondary schools.

**F300 Problems (cr. arr.)** Studies professional programs and issues or technical problems related to the field of practical arts and vocational education.

**F315 Current Developments in Home Economics Education (3).** Analysis of current concerns which affect home economics programs. Prerequisite: F235.

**F325 Field Study in Occupational Education (1-4).** Directed observation in a cross section of business and industry combined with reports, weekly seminars and/or conferences. May repeat until four semester hours accumulated.

**F360 Topics in Practical Arts & Vocational-Technical Education (cr. arr.)**

**F376 Homemaking Education for Adults (2-3).** Problems in organization, presentation of programs in homemaking education for adults, homemaking and gainful employment. Includes laboratory experiences. Prerequisite: F280 or instructor's consent.

**F400 Problems (cr. arr.)**

**F413 Seminar in Home Economics Education (1-3).**

**F430 Supervision of Student Teaching of Vocational Home Economics (2-3).** For those preparing to become supervisors in vocational home economics education. Prerequisites: F280 & Curriculum & Instruction T299.

**F446 Curriculum Construction in Home Economics (2-3).** For home economics teachers engaged in curriculum development or revision. Individual research study and development of curriculum materials.

**F460 Topics (cr. arr.)**

**F472 In-Service Course in Home Economics Education (cr. arr.)** Individual and group study of problems related to teaching, supervision, and administration of home economics education at secondary and post-secondary levels.

**F473 Trends in Home Economics Education (3).** Provides opportunities for experienced teachers to study selected topics and recent developments in home economics education. Conferences and guidance relative to individual research studies.

**F482 Review and Synthesis of Research in Home Economics Education (3).** Review and analysis of historical and current developments in home economics and home economics education research with implications for classroom teachers.

**F490 Research (cr. arr.)**

## INDUSTRIAL EDUCATION

**F9 Industrial Materials (3).** Classification of materials, their characteristics, properties and testing, extraction methods, selection, application.

**F10 Fundamentals of Woodwork (3).** Hand tool processes, machine operation, wood and wood products, assembling and fastening, simple finishing.

**F100 Foundations (1-3).** Orientation to program service areas of PAVTE, degree program planning and introduction to the professional fields within each program area of PAVTE. Prerequisite: Education Admissions Seminar S75, f.w.

**F101 Industrial Arts for Elementary Teachers (3).** Design, construction and finish of simple, inexpensive projects in wood, metal, leather, and other crafts appropriate for use with elementary and special education students. Prerequisite: junior standing or instructor's consent.

**F112 Introduction to Metals Processing (3).** Basic methods of bench layout, measurement and inspection, basic machining and foundry practices, welding, forging, sheet metal work. Prerequisite: F9.

**F154 Energy & Power Technology (3).** Survey of energy sources, conversion and storage; power transmission, instrumentation and control; power mechanics; introduction to alternate energy sources. Lecture plus laboratory.

**F155 Electricity/Electronics (3).** Direct current circuits; alternating current circuits; rectification and power supplies; measurements in the electronics laboratory. Lecture plus laboratory.

**F175 Directed Occupational Experience (1-4).** Reports based on employment experience in selected occupations combined with related conferences and/or seminars. May repeat until four semester hours accumulated.

**F221 Machine Woodworking (2-3).** Operation of woodworking machines, mass production methods, lumbering, cabinetmaking, upholstery and finishing. Prerequisite: F10.

**F254 Power Technology (3).** An intermediate treatment of internal and external combustion engines; power transmission; automotive systems; testing, instrumentation and control; maintenance and repair of power systems. Lecture plus laboratory. Prerequisite: F154.

**F256 Alternate Energy Technology (3).** An intermediate treatment of active and passive solar heating and cooling; wind energy; hydro-electric energy; biomass; alcohol and synthetic fuels. Lecture plus laboratory. Prerequisite: F154.

**F299 Student Teaching in Industrial Education (6-8).** Student teaching in the secondary schools.

**F300 Problems (cr. arr.)** Studies professional programs and issues or technical problems related to the field of practical arts and vocational education.

**F325 Field Study in Occupational Education (1-4).** Directed observation in a cross section of business and industry combined with reports, weekly seminars and/or conferences. May repeat until four semester hours accumulated.

**F331 Technology of Woodworking (2-3).** Design and construction of advanced-level products of wood; study of technological developments relating to wood products, processes, and related materials; laminating and bending; mass producing with jigs; experiments in woodworking. Prerequisite: F221.

**F341 Metals Processing Technology (2-3).** Principles of manufacturing cost, design and analysis, dimensional quality control, theory and technology of metal cutting, welding, and foundry processes. Prerequisite: F112.

**F350 Industrial Design (3).** Principles of structural design, contour, surface enrichment applied to three-dimensional objects; sketches, details, working drawings of shop projects.

**F355 Applied Electronics (3).** Transistor and vacuum tube characteristics and circuits; amplifiers; am and fm receivers and transmitters; introduction to digital theory; electronic circuit construction. Lecture plus laboratory. Prerequisite: F155.

**F360 Topics in Practical Arts and Vocational-Technical Education (cr. arr.)**

**F361 Architectural Drawing and Home Design (3).** Problems, procedures in planning and constructing a home. Students draw and write specifications for complete set of house plans. Prerequisite: F350.

**F375 Selection and Organization of Subject Matter (3).** Objectives, content selection and arrangements, preparation of job and informational assignments, course making. For shop teachers, coordinators.

**F385 Manufacturing Processes (2-3).** Processes involved in manufacture of ferrous and nonferrous metal products, textiles, and wood products, including paper, plastics and other synthetics, rubber, glass and chinaware, leather, lubricants, fuel, cement and clay products. Prerequisite: 9 hours in technical subjects.

**F390 Principles of Teaching Industrial Subjects (2-3).** Shop teacher's job; learning in the school shop; discipline and shop management; teaching devices and procedures; measurements of achievement; interschool, community relations. Prerequisite: Curriculum & Instruction T110.

**F400 Problems (cr. arr.)**

**F404 History of Industrial Education (2).** Development of industrial education in America; special attention to European influences, philosophical concepts, issues, motivating factors, leaders, movements, current trends.

**F412 Seminar in Industrial Education (1-3).**

**F460 Topics (cr. arr.)**

**F471 In-Service Course in Industrial Education (cr. arr.)**

**F490 Research (cr. arr.)**

## PSYCHIATRY

**A Psychiatry, Third and Fourth Years (Clinical Clerkship) (10).**

Experience in the clinical study and care of psychiatrically disordered adults and children. Under supervision, students participate with increasing responsibility in selected activities of the psychiatric inpatient, outpatient, and liaison and consultative services, including work in other departments of the hospital and in affiliated public mental hospitals and community mental health agencies. Students have the opportunity to plan a portion of the clerkship core program in accordance with their own interests. Eight weeks full time during the third or fourth year; required of all medical students.

**B Psychiatry Elective Third and Fourth Years (10).** Special work in Department of Psychiatry on a subject of the student's choice, during the elective and free periods in the junior or senior year. Such work may include experience in additional clinical clerkship service, or preceptorship under practicing psychiatrists in psychiatric hospitals or clinics or community mental health services, or laboratory or clinical research, or a combination of these. Joint programs with other clinical or basic science departments can be arranged. Open to all students in third and fourth years. Subject to approval of department chairman and staff members who will supervise student's work.

**P Postgraduate Instruction (0).** A fully approved residency program in general and child psychiatry is offered to qualified physicians, with the University of Missouri-Columbia Health Sciences Center and the Mid-Missouri Mental Health Center providing facilities for academic and clinical training in all requisite phases of psychiatry. A Master of Science program in community mental health and behavioral science is offered on an optional basis, and special third, fourth and fifth year academic fellowships are available in child psychiatry, community psychiatry, research and other sub-specialty areas. Individualized training permits flexible starting dates.

## PSYCHOLOGY

**1 General Psychology (3).** Survey of facts, principles, methods in study of human behavior. cor.

**2 General Experimental Psychology (5).** Scientific study of human behavior; emphasis on biological foundations. Lectures and laboratory.

**3 Experimental Psychology (2).** Consists entirely of laboratory work similar to that in 2. Prerequisite: 1 or equivalent. w.

**20 Psychology of Personal Adjustment (3).** Dynamic principles of human behavior; emphasizes motivation, frustration, defense against anxiety, personality organization. Prerequisite: 1 or 2.

**30 Applied Psychology (3).** Application of psychology to business; emphasizes advertising, personnel selection, efficiency. Brief reference to professional and social applications. Prerequisite: 1 or 2. w.s. cor.

**101 Topics (cr. arr.)** Organized study of selected topics in psychology. Particular topic and earnable credit may vary from semester to semester. Repeatable upon departmental consent. Prerequisite: 1 or 2.

**120 Human Sexuality (3).** Surveys of information on heterosexual behavior, sex norms, childbirth, venereal disease, homosexuality, and legal aspects of sexual behavior. Guest lecturers. Attendance at small group discussions required. Prerequisite: 1 or 2.

**130 Drugs and Behavior (3).** (same as Pharmacology 130). Basic principles of drug action on the nervous system; the effects of important psychoactive drugs; drug use and society. Prerequisite: 1 or 2.

**150 Psychology of Sleep and Dreams (3).** Survey of current research on sleep and dreams, including sleep EEG, nature of REM sleep, range and variations in normal sleep, biological rhythms, drug and deprivation effects, sleep disorders. Prerequisite: 1 or 2.

**151 The Psychobiology of Women (3).** An integrated perspective on the biology and psychology of women emphasizing both historical (evolutionary, developmental) and proximal (physiological, social) influences on the female life cycle. Prerequisite: 1 or 2 or college-level biology. f.

**170 Child Psychology (3).** Origins and development of child behavior, with emphasis on basic processes, theory and research rather than on application or guidance. Prerequisite: 1 or 2. cor.

**180 Fundamentals of Abnormal Psychology (3).** Basic survey of maladaptive human behavior and experience, including character disorder, alcohol and drug abuse, neurosis, and psychosis. Prerequisite: 1 or 2. cor.

**191 Honors Proseminar (3).** Individual research on assigned topics; class discussions of research strategies and problems. Prerequisites: senior or junior standing; overall and psychology GPA 3.3; and instructor's consent.

**194 Honors Proseminar (3).** In consultation with instructor, student works on Honors thesis. Successful completion of thesis leads to 158

degree with Honors in psychology. Prerequisite: 191.

**200 Special Problems (cr. arr.)** Research apprenticeship with a faculty member, assisting a faculty member in the development and execution of research. May be repeated to 6 hours maximum. Prerequisite: instructor's consent.

**205 Environmental Psychology (3).** Survey of the effects of environmental variables (e.g., temperature, noise, crowding, etc.) on behavior. Some coverage of techniques for modifying behavior to preserve the environment. Prerequisite: 1 or 2.

**211 Theories of Learning (3).** Considers viewpoints in learning; emphasizes classical issues and theories; considers these in contemporary form. Prerequisite: 5 hours psychology.

**212 Human Learning (3).** Factors affecting human learning, retention; basic principles of learning, forgetting. Prerequisite: 1 or 2. f.

**215 Research Methods in Psychology (3).** Rationale of scientific research; role of the experiment and other forms of information gathering in psychology; survey of research methods. Prerequisites: 1 or 2 & Statistics 31 or Statistics 31 concurrently.

**216 Advanced Experimental Psychology (3).** Individualized supervision in planning, conducting, and communicating of original research. Recommended for majors desiring opportunity to work in research areas of their interest. Prerequisite: 215 and instructor's consent.

**230 Individual Differences (2).** Surveys individual, group differences. Contributions of various factors to variations in behavior. Prerequisite: 2 or Statistics 31. f.w.

**260 Social Psychology (3).** (same as Sociology 260). Social bases of behavior and behavior of individuals in social situations. Prerequisite: 1 or 2 and/or Sociology 1. cor.

**280 Psychology of Personality (3).** Introduction to study of human personality. Prerequisite: 1 or 2. f.w.

**300 Special Problems (cr. arr.)** Independent investigation leading to a project or paper. Repeatable upon consent of department. Prerequisite: instructor's consent.

**301 Topics (cr. arr.)** Organized study of selected topics in psychology. Particular topic and earnable credit may vary from semester to semester. Repeatable upon consent of department. Prerequisites: junior standing & instructor's consent.

**302 Theories of Personality (3).** Readings in human personality theories. Prerequisite: 1 or 2. f.w.

**304 Industrial Psychology (3).** Training, efficiency, supervision, morale, group dynamics, consumer research in business and industry. Projects, field study. Prerequisite: Statistics 31. w.

**313 Physiological Psychology (3).** Survey of response systems and biological events as independent variables in behavior. Prerequisite: 8 hours psychology, or biology. f.

**316 Experimental Approaches to Personality (3).** Surveys current research in personality, emphasizes experimental evidence from human and animal studies. Prerequisite: 215 or instructor's consent.

**320 Infant Development (3).** Surveys current research and theory. Prenatal influences; motor, perceptual, cognitive and social development. Prerequisite: 170 or equivalent. w.

**321 Ethology and Human Behavior (3).** Evolutionary, comparative and naturalistic study of human behavior. Emphasis on observational techniques. Prerequisites: 8 hours psychology or biological science. w.

**330 Animal Behavior (3).** Comparative study of animal behavior. Relation of behavior to bodily structure, environment. Prerequisites: 1 or 2 plus 8 hours psychology or biological science. w.

**342 Social Motivation (3).** Study of social determinants of individual behavior including affiliation, achievement, aggression, social exchange and social comparison processes. Emphasis on theoretical integration of recent finds. Prerequisite: 260. w.

**343 Advanced Social Psychology (3).** (same as Sociology 343). Prerequisite: 260 or instructor's consent.

**344 Group Dynamics and Role Theory (3).** (same as Sociology 344). Detailed investigation of one or more theoretical and experimental areas in social psychology. Prerequisite: 260 or instructor's consent.

**345 Advanced Abnormal Psychology (3).** Intensive survey and evaluation of the psychological literature on abnormal behavior, emphasizes experimental and explanatory approaches. Prerequisite: 9 hours of psychology or graduate standing.

**346 Structure of Interpersonal Behavior (3).** (same as Sociology 346). Prerequisite: 260 or instructor's consent.

**347 Emotional Disorders in Infancy and Childhood (3).** Discusses behavioral development in childhood and factors which produce disorders of development. Prerequisites: 170 & 280 or equivalent.

**350 Special Readings (cr. arr.)** Independent readings selected in consultation with supervisory faculty member. Repeatable upon consent of department. Prerequisite: instructor's consent.

**359 Contemporary Social Issues and Psychology (3).** A seminar devoted to exploring ways of applying knowledge from psychology to current social and political issues; discusses data and theories from psychology that have created sociopolitical controversy. Prerequisite: junior or senior standing.

**360 Systematic Psychology (3).** Critical evaluation of major theoretical systems of psychology. Introduces methodological problems of theory construction, system making. Emphasizes integration of recent trends. Prerequisites: 9 hours psychology and junior standing.

**361 The History of Psychology (3).** Historical foundations of contemporary psychology. Prerequisites: senior standing & 9 hours psychology.

**365 Introduction to Clinical Psychology (3).** Role of clinical psychology in mental health rehabilitation and social welfare work. Prerequisite: senior psychology major or graduate standing in related fields. w.

**369 Advanced Physiological Psychology (3).** The psychobiology of learning, memory, motivation, attention, and emotion. Prerequisite: 313 or instructor's consent.

**371 Attitude Change (3).** (same as Sociology 371). Methods, theories, experimental findings in social attitude research. Prerequisite: 1 or 2 and junior standing.

**376 Psychological Tests and Measurements (3).** Theory, practice of testing, measurements in psychology. Prerequisite: Statistics 31. f.w.

**378 Animal Learning Laboratory (5).** Survey of principles of classical and instrumental conditioning. Most of the laboratory time is spent on an original research project with animals. Prerequisite: 215.

**379 Human Learning Laboratory (5).** Rote learning, concept learning and organization, transfer, and retention, with special reference to verbal behavior. Prerequisite: 215 and senior standing.

**380 The Human Senses (3).** Psychophysical data, sense organs, psychological attributes, and theories for vision, hearing, and the vestibular (motion) senses. Elementary aspects of psychophysics. Prerequisite: 215.

**382 Biopsychology of Response (3).** Reflex and voluntary action, motor skills, mental and physical work, fatigue, efficiency, motor theory of behavior. Prerequisite: 215 and 313.

**385 Experimental Social Psychology (3).** Experimental studies of attitudes, social interaction, person perception, and other topics of contemporary social psychology. Prerequisite: 215 and 260.

**386 Methods in Developmental Psychology (3).** Experimental studies of human and animal behavior, development, and growth. Role of early experience, cognitive and social development, and other selected topics. Prerequisites: 170 & 215. f.

**387 Psychology of Aging (3).** Surveys psychological processes in aging during middle/late adulthood. Emphasizes sensory, perceptual, physiological, memory, cognitive processes, and methodological issues in gerontological research. Prerequisites: 1 or 2 and 170 recommended.

**388 Personality and Adjustment in Later Adulthood (3).** Describes personality change in middle and later adulthood. Focuses on interaction of biological, personal and social factors. Prerequisites: 1 or 2 and 170 or instructor's consent.

**391 Animal Learning (3).** Study of experimental literature concerning such topics as habituation, classical conditioning, operant conditioning, extinction, and schedules of reinforcement. Prerequisite: 9 hours psychology.

**393 Perception (3).** Data and contemporary theories in visual perception (primarily) and auditory perception. Prerequisite: 6 hours psychology.

**394 Cognitive Psychology (3).** Thinking and language processes examined from the perspective of classical learning theory and information processing theory. Prerequisite: 6 hours psychology.

**399 Motivation (3).** Survey of historical and contemporary theory; research on motivation. Major emphasis on motivation from the perspective of learning theory. Topics: drive theory, incentive motivation, anxiety, activation-arousal theory and stimulus sampling theory. Prerequisite: Senior psychology major.

**400 Problems (cr. arr.)** Advanced studies to meet needs of individual student. Repeatable upon departmental consent. Prerequisite: instructor's consent.

**401 Topics (cr. arr.)** Organized study of selected topics in psychology. Particular topic and earnable credit may vary from semester to semester. Repeatable upon consent of department. Prerequisite: instructor's consent.

**402 Functional Neuroscience (3).** Basic techniques, data and theory in the neurosciences applied to the study of psychopathology, psychopharmacology, neural development, brain damage, memory and other areas of "behavior." Prerequisite: graduate standing or instructor's consent. f.

**405 Survey of Social Psychology (3).** Survey of historical and contemporary theory and research in affiliation, attribution, social comparison, attitude change and group dynamics. Prerequisite: graduate standing.

**406 Psychology of Development (3).** Principles, theories, research in normal human development.

**407 Psychopathology of Childhood (3).** Problems of etiology, diagnosis and treatment of maladjustment in infancy and childhood. Prerequisite: 347 or equivalent.

**408 Behavior Disorders (3).** Problems of etiology, diagnosis, treatment in psychopathology. Considers theory, research, case histories. Prerequisite: 345. w.s.

**410 Field Practice and Orientation to Psychology (1).** An orientation to graduate study in psychology, including field visits to psychology research units on and off campus. Graded S/U. Prerequisite: graduate standing.

**411 Studies in Professional Problems (2-3).** Sources for psychological literature research, techniques of scientific reporting, problems of professionalism. f.

**412 Orientations to Clinical Psychology (3).** History, current professional identities and activities. Survey of major concepts, issues, methodologies and ethical concerns involved in assessment and intervention. Prerequisites: graduate standing in psychology and instructor's consent. f.

**414 Orientations to Clinical Assessment (3).** Topics include psychometric principles, intelligence testing, objective and projective personality testing, and behavioral assessment. Prerequisites: graduate standing in psychology and 412. w.

**415 Test Theory and Development (3).** Theory of psychological measurement. Construction of one or more psychological tests. Prerequisites: 376 & 420 or instructor's consent. alt. w. even yrs.

**416 Studies in Personality (cr. arr.)** Contemporary research and theory in personality. Repeatable upon consent of department. Prerequisite: 280 or equivalent.

**417 Objective Personality Appraisal (3).** Construction, interpretation, and use of such objective instruments as the Minnesota Multiphasic



Personality Inventory, Edwards Personal Preference Schedule, Guilford-Zimmerman, etc. Prerequisite: second-year graduate standing & an introductory testing course or equivalent. w.

**418 Studies in Clinical Psychology (cr. arr.)** Contemporary research and theory for advanced graduate students in clinical psychology. Repeatable upon consent of department. w.

**419 Advanced Psychological Statistics I (3).** Theory of testing statistical hypotheses, estimation techniques, non-parametric statistics. Prerequisite: undergraduate course in statistics. f.

**420 Advanced Psychological Statistics II (3).** Complex analysis of variance; experimental design. Prerequisite: 419 or equivalent. w.

**421 Advanced Techniques in Psychological Statistics (3).** Multiple regression, covariance analysis, multivariate analysis of variance, factor analysis as applied to problems in psychology. Prerequisite: 420 or equivalent. f.

**422 Studies in Learning (cr. arr.)** Critical consideration of selected experimental work in psychology of learning and memory. Repeatable upon consent of department. Prerequisite: 378 or 379. w.

**424 Studies in Physiological Psychology (cr. arr.)** Critical consideration of recent experimental, theoretical work. Repeatable upon consent of department. Prerequisite: 313. w.

**425 Orientations in Psychotherapy (3).** Broad survey of orientation to psychological treatment, emphasizing integration of personality theory, techniques of personality and behavior change, and research findings in the area. Prerequisite: instructor's consent. f.

**426 Studies in Comparative Psychology (cr. arr.)** Critical consideration of selected experimental work in animal behavior. Repeatable upon consent of department. Prerequisite: 330. f.

**427 Studies in Visual Perception (cr. arr.)** Critical evaluation of current theories, contemporary research in visual perception. Repeatable upon consent of department. Prerequisite: 380.

**428 Studies in Psycholinguistics (3).** (same as Linguistics 428). Selected topics in psycholinguistics; emphasizes language competence versus performance, effects of syntax on memory, developmental linguistics, etc. Prerequisite: graduate standing in psychology or instructor's consent.

**429 Advanced Theories of Learning (3).** Intensive coverage of major theories of learning and evaluation of them in the context of the contemporary field of psychology.

**430 Studies in Contemporary Psychological Theory (cr. arr.)** Logic of modern psychology; emphasis on recent major methodological trends in theory construction. Repeatable upon consent of department. Prerequisite: 360. w.

**432 Medical Orientation for Clinical Psychologists (2).** Considers relationships between psychological and medical problems. Prerequisite: M.A. in psychology. w.

**433 Seminar in Social Psychology I (3).** (same as Sociology 433). Intensive review of concepts and theories of social psychology; emphasizes readings from primary sources. Ph.D. candidates only. Required for all Ph.D. candidates in social psychology program. Prerequisite: instructor's consent. f.

**434 Seminar in Social Psychology II (3).** (same as Sociology 434). Continuance of 433. Required of all Ph.D. candidates in social psychology program. Prerequisite: 433 or instructor's consent.

**437 Studies in Developmental Psychology (cr. arr.)** Principles, theories, research in normal human development. Repeatable upon consent of department. Prerequisite: 406.

**438 Trance Behavior (3).** Integrative study of hypnotic and related behavior. Prerequisites: 345 & advanced graduate standing in psychology or instructor's consent. f.

**439 Human Sexuality for Psychotherapists (3).** Background information for and methods and techniques of dealing with a variety of sexual problems that clients bring to therapists. Sexual dysfunction, homosexuality, sexual aberrations and sex crimes covered. Prerequisite: graduate standing.

**440 Use of Computers in Psychology (3).** Surveys uses of digital computing systems in psychology and other behavioral sciences. Topics: structuring data bases, language processing, simulation of mental/social processes, online facilities in research. Prerequisite: Computer Science 104 or instructor's consent.

**441 Behavior Modifications (3).** Surveys principles and research finds relative to treatment of abnormal behavior through the utilization of learning principles. Prerequisites: advanced graduate standing in psychology & instructor's consent. w.

**443 Studies in Social Psychology (cr. arr.)** Critical coverage of selected research and theory in social psychology. Repeatable upon consent of department. Prerequisite: instructor's consent.

**445 Clinical Practicum (cr. arr.)** Intensive supervised training in use and interpretation of psychological techniques and in psychotherapy. Prerequisites: 412, 414, & instructor's consent. f,w,s.

**446 Clinical Child Assessment (3).** Introduction to clinical instruments, techniques and problems in the psychological assessment of children. Prerequisite: 412.

**447 Clinical Intervention with Children (3).** Introduction to theory, research and practice in the area of behavior change with children and adolescents. Prerequisite: 446.

**448 Counseling Practicum (cr. arr.)** Supervised practice of counseling in approved counseling agency. Offered only on S/U basis. Prerequisites: 376 & Counseling & Personnel Services G397 & Counseling & Personnel Services G407. f,w.

**449 Structured Groups (3).** Intended to train students to develop and run structured groups for: 1. Life skills, e.g. anxiety management, effective parenting; 2. Life Theme, e.g. self-esteem, women's awareness; 3. Life Transition, e.g. divorce, personal loss. Instructor's consent required.

**450 Research (cr. arr.)** Experimental investigations not leading to thesis.

**454 Psychopharmacology for Psychologists (3).** Basic principles of drug action on the nervous system, the theory and clinical use of the various psychotherapeutic drugs, drug abuse and its treatment.

**456 Conceptual Approaches to Personality (3).** Evaluation of major traditional and contemporary systems of personality theory and their relationships to normal and, especially, abnormal behavior. Prerequisites: 280 & 345 or equivalent.

**458 Social Learning: Theory and Research (3).** Covers recent theoretical and research developments concerning role of social learning in personality development, functioning. Theories of Rotter, Bandura and Walters, those having to do with operant human behavior presented. Prerequisite: instructor's consent.

**460 Verbal Learning (3).** Introduces psychological literature concerning learning and use of verbal materials in experimental settings; considers methods used in such studies, along with parameters influencing learning. Transfer and forgetting not emphasized.

**462 Family and Group Process (3).** Conceptual approaches to family and group interaction considered; contemporary research and treatment. Prerequisite: 425, graduate standing in psychology, or instructor's consent.

**470 Social Interaction Research (3).** Seminar on research methods in social interaction. Prerequisites: 343 or 405 or instructor's consent.

**485 Social Psychology Methodology (3).** Advanced study of experimental methods in social psychological research. Prerequisites: 343 & instructor's consent. w.

**486 Applied Research Methodology (3).** Advanced study of methods and methodological issues associated with psychological research conducted in field or nonexperimental settings. Topics include measurement of change, structural modeling, time series, quantitative literature reviewing. Prerequisite: instructor's consent.

**487 Methods and Findings in Counseling Process and Outcome Research (3).** The course focuses on the fundamentals of research design, the counseling psychology research literature, and psychological writing. Prerequisites: 419, 448, or equivalents. f.

**490 Research (cr. arr.)** Investigations in psychology; leads to thesis.

## PUBLIC ADMINISTRATION

**201 Topics (3).** Selected topics in public administration.

**205 Managing the Public Sector (3).** Survey of the management of organizations and programs in the public sector. Prerequisite: Management 202.

**300 Problems (cr. arr.)** Intensive study of an area of public administration related to the student's special interest.

**354 Public Budgeting (3).** The politics, economics, and applied aspects of budgeting in the public sector. Examines the role of the budget in resource allocation, operations control and intergovernmental relations.

**371 Business, Society, and Government (3).** Addresses the social significance of business, the relationship of business to social change and societal values, and conflicting interpretations of the role of business in American life and politics. Explains public policy processes and examines business-government relations in some detail.

**400 Problems (cr. arr.)** Intensive study of an area of public administration related to the student's special interest.

**401 Scope and Theory of Public Administration (3).** History, premises, theories and structure of public administration; professional norms and standards, ethical and public interest implications of public service.

**402 Research Methods in Public Affairs (3).** General principles of research in the social sciences; research methods most commonly used in public administration; information resources and efficient use thereof.

**403 Topics (3).** Select current topics in public administration. Prerequisite: instructor's consent.

**451 Administrative Organization Theory (3).** Examines major theories of how organizations behave, as well as how individuals behave within organizations; applications of such theories to problems of public organization design, maintenance, and development.

**452 National and Subnational Policy Processes (3).** Processes through which public demands are generated, converted into formal policy, and implemented. Focuses on role of administrator, and institutional-organizational contexts in which administrator functions.

**453 Public Policy Analysis (3).** Systematic approaches in policymaking. Application of systems analysis, operations analysis, and other analytic techniques to selected policy decisions of state, local, and national governments.

**454 Public Budgeting and Taxation (3).** Intensive study of the institutions, processes, politics, and social and economic impact of public taxation and expenditures.

**455 Public Financial Administration (3).** Nature and environment of public financial administration. Principles of accountability for management of public funds; management and investment of cash balances; special problems related to long- and short-term debt.

**456 Program Review and Evaluation (3).** Applies systematic, objective methods for evaluating effectiveness of public programs; means for determining extent to which program administration facilitates achievement of program objectives. To be taken during student's last semester in the program.

**457 Public Personnel Administration (3).** Basic functions, processes and problems of personnel administration in the public service.

**470 Urban Management and Service Delivery (3).** Organization and division of service responsibilities among governments in urban areas.

Problems of managing delivery of services with special emphasis upon program implementation, productivity, planning, responsiveness to citizens and intergovernmental relations. Prerequisite: 401.

## RADIOLOGIC SCIENCES

**22 Introduction to Radiography (1).** Overview of radiography through small group discussions and onsite visitations in radiology departments. S/U.

**251RS Radiologic Anatomy and Physiology (5).** Normal structure and function of human body; emphasizes topographic and radiographic anatomy.

**252RS Radiologic Physics I (3).** Fundamentals of physics of electricity and radiant energy; principles of generation of electromagnetic radiations and applicable equipment.

**253RS Principles of Radiographic Exposure I (3).** Theory and principles of X-ray technique; correlation of factors with application.

**254RS Radiographic Positioning I (2).** Instruction in radiographic positioning of and for all structures and organs of the body.

**255RS Fundamentals of Radiography (1).** Orientation to radiology department, ethics, basic nursing procedures and radiation safety procedures.

**256NM Clinical Nuclear Medicine I (2).** Orientation, history and administrative procedures in a nuclear medicine service. Patient handling, nursing and emergency procedures. Prerequisite: instructor's consent.

**256RS Basic Radiographic Skills (2).** Medical terminology and radiographic technique.

**260 Techniques of Radioreceptor Analysis in Nuclear Medicine (2).** Prerequisite: Radiology 227 or equivalent or concurrent with Radiology 227 & senior standing.

**261RS Radiologic Physics II (3).** Basic nuclear physics includes introduction to instrumentation and clinical application of radionuclides, as well as various types of radiation therapy devices, their application to disease.

**262RS Principles of Radiographic Exposure II (2).** Continuation of the theory and principles of X-ray technique, plus the principles behind and experiments for establishing a complete quality assurance program.

**263NM Morphological Correlations in Nuclear Medicine (3).** Anatomy, physiology and pathology of the human body pertinent to studies performed in nuclear medicine. Prerequisites: a course in anatomy or physiology, & instructor's consent.

**263RS Radiographic Positioning II (3).** Advanced positioning techniques; emphasizes pediatrics, cineradiography, neuroradiography, cardiovascular radiography, other special procedures.

**264RS Clinical Education I (2).** Supervised clinical rotation in basic radiography areas at the University Hospital, Film Critique II. Must complete one category competency.

**265NM Clinical Education in Nuclear Medicine in Vivo (5).** Practical experience in the clinical setting with imaging procedures performed in nuclear medicine. Ultrasound and CAT instrumentation also discussed. Prerequisites: Radiology 227, senior standing, & instructor's consent.

**265RA Clinical Education in Radiation Therapy I (3).** Principles involved in the delivery of a prescribed treatment plan: positioning, immobilization, shielding, the use of other treatment techniques and aids such as wedges, cone and bolus.

**265RS Clinical Education II (2).** Supervised clinical rotations in basic radiographic areas at the different clinical affiliates, must complete one category competency.

**266NM Clinical Education in Nuclear Medicine in Vitro (6).** Practical experience in the clinical setting with all routine radioassay procedures performed in nuclear medicine. Includes lectures describing clinical application. Prerequisites: 260, Radiology 227 or equivalent, & instructor's consent.

**266RA Treatment Planning I (3).** Principles involved in the selection of modality; treatment techniques, time dose relationship, therapy aids.

**267RA Radiation Therapy Physics (5).** Radiation physics, therapy equipment and circuits, calibration, quantity and quality of radiation, radiation units, essentials of dose calculations. Prerequisite 142 or equivalent.

**268NM Clinical Nuclear Medicine II (2).** In vivo clinical nuclear medicine procedures are discussed in detail. Includes pathology, instrumentation, radiopharmaceuticals, and methodologies and techniques of procedure performance. Prerequisite: 256NM.

**269NM Clinical Nuclear Medicine III (2).** In-depth review of clinical nuclear medicine studies and detailed instruction on specific uses of computers in these studies. Prerequisite: 268NM.

**300 Problems in Nuclear Medicine Technology (1-3).** Supervised investigation in an aspect of nuclear medicine technology, usually culminating in a written report. Prerequisite: instructor's consent

**327 Nuclear Medicine Instrumentation (3).** (same as Nuclear Engineering 327). Radionuclide imaging systems and the use of computers with this instrumentation. Topics include ultrasound and emission tomographic imaging systems. Laboratory included. Prerequisites: Radiology 227 or equivalent and instructor's consent.

**329 Radiopharmaceuticals in Nuclear Medicine (2).** Introduces concepts of radiopharmacy, generator systems, labeling of materials, quality control procedures and FDA regulations concerning radiopharmaceuticals. Prerequisites: Chemistry 361 or Radiology 227 & instructor's consent. f.

**371RS Clinical Education III (2).** Progression from basic to more

advanced rotations at one of three clinical CENTERS; Departmental Administration and Film Critique III; must complete one category competency.

**372RS Radiation Hazards and Protection (2).** Principles involved in biologic effects of radiation; hazards and protection for ionizing radiations, DOE regulations, state regulations, recommendations of national council on radiologic protection and measurement.

**373RT Administration of an Educational Program in Radiologic Technology (3).** Seminar dealing with various facets involved in directing an educational program in radiologic technology, e.g. A.M.A. essentials, J.R.C. guidelines, accreditation procedure and student records. Prerequisites: senior standing, consent of program.

**374RA Radium Therapy (2).** Introduction to radioactive sources used in brachytherapy; particular emphasis on radium and cesium. Dose calculations, source types, standard applicators and their preparation and handling are covered.

**375RA Radiation Therapy Pathology (2).** Basic cell construction to include growth, function, mitosis, division. Tumors to include types, growth and spread.

**376RA Clinical Education in Radiation Therapy II (3).** Refinement of principles involved in 265RA. Fundamentals of nursing procedures; emphasizes problems related to cancer patients. Prerequisite 265RA.

**377RA Treatment Planning II (2).** Continuation of 266RA.

**381RS Clinical Education IV (2).** Advanced clinical rotations at one of three clinical centers; medical and surgical diseases; must complete one category competency.

**382RS Clinical Education V (2).** Advanced clinical rotations at one of three clinical centers; Film Critique IV; must complete one category competency.

**383RS Clinical Education VI (2).** Advanced clinical rotations at one of three clinical centers; Registry Review; must complete final competency.

**256IRT Basic Radiographic Skills (2).**

## RADIOLOGY

**A Radiology Elective (10).** A nine-week elective assignment to the diagnostic section of the Department of Radiology to provide a clinical experience in the principles of radiographic examination and interpretation. Elective experiences are also provided in radiation therapy and nuclear medicine.

**B Radiology Block (0).** One-week assignment to department for practical experience on radiotherapy ward and in clinical radiotherapy practice, with optional time in diagnostic radiology.

**P Postgraduate Instruction (0).** Advanced graduate instruction of three years duration (with an elective fourth year) in radiology is available to qualified physicians. Instruction includes diagnostic, nuclear medicine and therapeutic radiology; radiopathology; and radiation physics. Special experience is provided for those interested in pursuing careers in teaching and research. Research Training Fellowships in academic radiology and its basic sciences also offered.

**152 Treatment Planning (5).** Principles involved in the selection of modality; treatment techniques, time dose relationship, therapy aids.

**153 Clinical Education in Radiation Therapy I (3).**

**154 Radium Therapy (2).**

**155 Radiation Therapy Pathology (2).**

**156 Clinical Education in Radiation Therapy II (3).**

**186 Radiation Therapy Physics (5).**

**201M Radiology (1).** Correlative radiologic pathology for second-year medical students. Radiographic perspective of diseases of organ systems. Demonstrations with comparable material in basic pathology. Six lectures related to cellular, tissue, organ effects of radiation, effects of whole body radiation.

**227 Radioisotopes in Medicine and Biology (4).** Survey of radiotracer applications in nuclear medicine, including basic principles of radioactive decay and radiation detection equipment used in nuclear medicine. Prerequisites: Chemistry 11 & Physics 11 & instructor's consent. f.

**328 Introductory Radiation Biology (3).** (same as Biological Sciences 328, Nuclear Engineering 328, Veterinary Medicine & Surgery 328). Concepts of ionizing radiations, their actions on matter through effects on simple chemical systems, biological molecules, cell, organisms, man. Prerequisite: junior standing sciences/engineering; one course in biological sciences & physics/chemistry; or instructor's consent.

**400 Problems in Radiological Science (1-3).** Supervised investigation in an aspect of radiological science usually culminating in a written report.

**410 Seminar (1).** Reports and discussion of recent investigations pertinent to radiological science.

## RECREATION AND PARK ADMINISTRATION

**10 Introduction to Leisure Studies (3).** History of recreation and leisure movement; theories and philosophies of play, recreation and leisure. Developmental stages of leisure services to contemporary status. cor.

**11 Career Orientation in Recreation, Parks and Leisure Service (1).** Orientation to the field and analysis of career opportunities in leisure services. Academic planning leading to B.S. in recreation and 160

park administration. S/U only. Prerequisite: RPA major.

**107 Organization of Aquatic Programs (2).** History; evaluation of leadership training methods, facilities, pool and beach control and management procedures. Prerequisite: sophomore standing. w.

**111 Introduction to Planning and Evaluating Leisure Environments (3).** Presentation of basic planning principles. Evaluation of existing areas and facilities based upon planning guidelines. Consideration of park plan, standards, terminology, map preparation and evaluation. Prerequisite: 10 or instructor's consent.

**115 Consortium Field Experience (1-3).** An organized undergraduate experiential learning opportunity. S/U only. Prerequisite: instructor's consent. w.

**120 Adaptive Equipment/Therapeutic Recreation Applications (1).** Identification, application and techniques of adapted equipment associated with the delivery of therapeutic recreation services. The course uses demonstration, application, lecture and media. Prerequisites: RPA major and instructor's consent.

**140 Camp Leadership and Management (3).** Organization and administration of camps; program planning; selection and training of staff; camp site selection and development; health and safety; camp history, standards, trends; practical application of campcraft skills. Prerequisite: instructor's consent.

**142 Leadership of Social Recreation (2).** Study and practice in techniques of leading social activities suitable for various social settings.

**144 Organization and Conduct of Recreation Centers (2).** Problems of operation, management of playgrounds, recreation centers.

**151 Introduction to Leisure Service Management (3).** An introduction to public recreation in local government. Prerequisite: 10, 11, 111 or instructor's consent. f,w. cor.

**191 Topics in Leisure Studies (1-3).** Selected topics in leisure and leisure delivery systems at the undergraduate level. Specific content varies semester to semester depending on faculty resources and student needs. Course content announced in advance. Prerequisite: instructor's consent.

**205 Personnel Management and Leadership in Leisure Services (3).** Considers theories and practices of leadership and management in leisure services employment. Topic presentation in relationships, attitudes, supervision, motivation and group functioning. Prerequisite: 10, 11, 111 or instructor's consent.

**206 Program Development in Leisure Services (3).** Fundamental principles and techniques of program development; seasonal, year round, specialty areas and total agency program planning. Prerequisite: a course in human growth and development, 10, 11, 151 or instructor's consent.

**212 Planning Recreation and Leisure Environments (3).** Practical application of basic planning principles and design. Layout and design of various leisure-oriented areas and facilities. Site planning and analysis. Prerequisite: professional core or instructor's consent.

**226 Introduction to Leisure & Special Populations (3).** Principles, concepts and historical development of recreation and leisure services to specific populations. Explanation of attitudes, issues, practice and barriers related to leisure fulfillment. Prerequisite: 10, 11, 111 or instructor's consent.

**230 Introduction to Parks and Outdoor Recreation Services (3).** An overview of parks and outdoor recreation, natural environment, supply-demand-need relationships, interpretative programming, management philosophies/practices will be studied. Prerequisite: 10, sophomore standing or instructor's consent. f,w.

**231 Principles of Interpretive Outdoor Recreation (3).** Interpretive principles and techniques employed to communicate values, natural history and cultural features to the recreation user. Prerequisite: RPA major, completion of professional core or instructor's consent.

**289 Recreation and Park Administration Field Experience (12).** Supervised experience in an approved organization concurrent with seminars related to individual field assignments. Prerequisites: upper-class standing, 10, 11, 305, 306 & instructor's consent.

**300 Problems (3).** cor.

**315 Senior Seminar in Leisure Services (3).** Presentation of professional principles and issues in leisure services. Seminar study resulting in presentations and discussions. Prerequisite: RPA majors, professional core or instructor's consent.

**316 Administration of Leisure Services (3).** Theoretical foundations of the organization and administration of leisure services in both community and institutional settings. Emphasis on the roles of the administrator. Prerequisite: RPA major, completion of professional core or instructor's consent.

**327 Operation of Therapeutic Recreation: Procedures and Principles (3).** Theories and principles of leadership and programming as they apply to recreation services for the ill, handicapped, and aged. Prerequisite: 326 & instructor's consent. W.

**328 Leisure and Aging (3).** Basic understanding of problems/needs of later maturity in relation to recreation. Characteristics/capabilities of aged, program settings, financial support, planning guidelines emphasized. Objectives: provide fundamentals for recreation planning with aged individuals/groups. Prerequisite: instructor's consent.

**331 Administration of Outdoor Recreation-Education Programs (3).** Philosophies, essential principles, methods, techniques, resources, administrative and program practices for outdoor recreation and education. Prerequisites: RPA major and completion of professional core. f,s.

**333 Park Management (3).** Basic principles, practices and problems involved in managing public park systems. Consideration given to local, district, county, state, federal and foreign park systems. Prerequisite: instructor's consent. w.

**340 Advanced Recreation Land Management (3).** (same as Forestry, Fisheries and Wildlife 340).

**342 Principles & Practices of Fund Raising/Evaluation for Hum Srv Org (3).** (same as Community Development 382).

**355 Private and Commercial Recreation Principles and Practice (3).** Considers principles, practices, influences in public/private leisure services; influence of tourism/travel on public/private recreation services. Prerequisite: RPA major and completion of professional core or instructor's consent.

**391 Topics in Leisure Studies (1-3).** Specialized topics in leisure and leisure delivery systems. Subjects and earnable credit vary semester to semester. Specific content varied depending upon available faculty resources and student needs. Course content announced in advance. Prerequisite: instructor's consent.

**400 Problems (1-6).** Independent research on special projects. Prerequisites: adviser's consent; open to recreation majors and minors only.

**401 Foundations of Recreation (3).** Basic theories and philosophies of recreation and leisure time as they apply to the recreation movement in modern society. Prerequisites: 10 & 11 or equivalent or instructor's consent. f.

**402 Organization of Recreation Programs within the Community & Region (3).** Assesses recreation needs within community through study of organization and structure of organized recreation as related to public agency programs, leadership, facilities, services. Prerequisite: instructor's consent. f,s.

**403 Research Methods in Recreation and Park Administration (3).** Review, analysis of research completed in recreation field. Prerequisites: graduate standing in department & elementary course in statistics or test and measurements approved by instructor. f.

**404 Readings in the Field of Recreation (1-3).** Selected readings based on student's needs. Emphasis may be placed on a student's area of interest. Prerequisites: adviser's consent; open to students majoring in recreation. cor.

**410 Seminar (2).** Contemporary problems in field of recreation. Prerequisite: graduate standing in recreation field.

**416 Administration of Public Parks and Recreation (3).** Study in depth of the basic principles in administration of parks and recreation as governmental services. Prerequisites: 316 or equivalent & instructor's consent. w.

**426 Analysis of Leisure with Special Populations (3).** Survey of the delivery of leisure services to special populations in institutional, transitional and community based settings. Emphasis in the etiology, characteristics and treatment of various disabling conditions and concomitant leisure facilitation techniques.

**427 Contemporary Issues in Therapeutic Recreation (3).** The course will include new issues and ideas in the field of therapeutic recreation, such as registration, insurance, liability, licensure, assessment, etc., and how they relate to practitioners and services to clients.

**481 Field Instruction (1-6).** Supervised student practice in recreation, park or related settings under qualified instructor. Prerequisites: 289 or equivalent & graduate departmental standing.

**490 Thesis Research (1-6).** Research leading to thesis in field of recreation. Prerequisites: graduate standing & 481 or equivalent.

## RELIGIOUS STUDIES

**1 Introduction to Religion (3).** Engages students in reflection on the religious questions which human existence poses, and introduces them to conceptual tools for understanding and evaluating answers which have emerged in human history.

**101 Topics (3).**

**102 History of Christianity (3).** (same as History 116). History of the Christian church from its origins through its development in the Mediterranean world, in medieval Europe, in the period of Protestant and Catholic reformation, into the modern period. Prerequisite: sophomore standing.

**104 Contemporary Religious Thought (3).** Survey of currents of religious thought that have cut across denominational lines in the 20th century: existentialism, personalism, social gospel, death of God, phenomenology, fundamentalism, theology of hope, etc. Prerequisite: sophomore standing.

**105 History of Religion in America (3).** Historical analysis of the development of American Protestantism, Catholicism and Judaism from their colonial origins to present. Emphasizes changes within these traditions resulting from contact with the shifting American environment. Prerequisite: sophomore standing.

**111 Ways of Understanding Religion (3).** A survey of theories of religion and methods in its interpretation from Max Muller to Levi-Strauss. Prerequisite: sophomore standing.

**120 Introduction to Judaism (3).** A religio-historical introduction to Judaism: religion, culture and philosophy in antiquity, medieval Islam and medieval Europe; Jewish thought. Prerequisite: sophomore standing.

**124 Judaism in the Modern World (3).** Impact of secularization on Jewish groups and communities in Eastern and Western Europe; anti-semitism in the modern period; the Holocaust and current theological reflection; varieties of Judaism in the modern world. Prerequisite: sophomore standing.

**126 The Holocaust and Reflections on Genocide (3).** Examines the nature of genocide as an historical phenomenon using the Holocaust as the primary case study. Prerequisite: sophomore standing.

**128 Introduction to Jewish Mysticism and the Kabbalah (3).** Introduction to Jewish mystical literature, including gnostic mysticism, the Zohar, Lurianic kabbalah and the mysticism of Hasidism. Prerequisite: sophomore standing.

- 130 Major World Religions (3).** Study of the differing ways in which the great world religions interpret life and reality. Survey of the basic ideas of the major world religions. Prerequisite: sophomore standing.
- 131 Tribal Religions (3).** Stories and rituals of traditional tribes, both archaic and contemporary. Provides insight into basic religious symbols and the place of religion in organizing the tribal world. Prerequisite: sophomore standing.
- 132 Hinduism (3).** Origin and development of central themes of traditional Hinduism from earliest times to the modern period. Topics include: the Vedic tradition, rituals and practice, varieties and practice, varieties of yoga and meditation, Indian religious thought, and devotional Hinduism. Prerequisite: sophomore standing.
- 133 Buddhism of India and Tibet (3).** (same as South Asian Studies 133). Historical introduction to Buddhist concepts, scriptures, practices, and institutions. Studies early accounts of the life of Gautama and his teachings, Theravada Buddhism, the Mahayana, and Tantric Buddhism in India and Tibet. Prerequisite: sophomore standing.
- 134 Religions of China and Japan (3).** Surveys scriptures, beliefs, and history of the major religious traditions of China and Japan. Includes study of folk traditions, Taoism, Confucian and neo-Confucian thought, East Asian Buddhism and Shinto. Prerequisite: sophomore standing.
- 135 Iranian Religion (3).** Historical survey of Iranian religion from its origins through the rise of Islam. Examines the religious background of ancient Iran, Zoroastrianism and his religion, Zoroastrianism, Manichaeism, Mithraism, and the Islamic literature of Persia. Prerequisite: sophomore standing.
- 136 The Islamic Tradition (3).** Examines the historical and theological development of Islamic scripture and belief, noting the manner in which various sects and factions understand religion, man, and God. Prerequisite: sophomore standing.
- 137 Manifestations of Sacred space and Time (3).** Religious experience of space and structure of holy sites; experience of sacred time in seasonal feasts, calendars, concepts of history, male and female life-cycles. Prerequisite: sophomore standing.
- 138 Myth and Religious Symbolism (3).** Emphasizes the comparison of one theme; e.g., a divine figure (TICKSTER, High God), memory and forgetting, creation, fertility, origins of death, etc. Prerequisite: sophomore standing.
- 139 Comparative Religious Practices (3).**
- 140 Ancient Near Eastern Religions (3).**
- 141 Introduction to Old Testament (3).** An introduction to the literature, history, institutions, and thought contained in the Hebrew Bible and to the methods and principles necessary for the scholarly study of scripture. Prerequisite: sophomore standing.
- 142 Introduction to the New Testament (3).** An introduction to the literature of the New Testament and the methods and principles guiding its interpretation, with particular attention to its structure and thought. Prerequisite: sophomore standing.
- 143 Gospels of Matthew, Mark, and Luke (3).** Reconstruction of the life and teachings of Jesus of Nazareth, with reference to the Jewish cultural and religious milieu and in connection with the primitive church's understanding and interpretation of his significance. Prerequisite: sophomore standing.
- 149 Rabbinic Hebrew II (2).** Continuation of 148. Prerequisite: 148 or equivalent.
- 160 Religion and Culture (3).** The study of religion as expressed in art, literature, music, dance, drama, architecture.
- 162 Religious and Philosophical Themes (3).**
- 163 Women and Religion (3).** A study of the symbolism and history of religious representations of women from prehistoric times to the present. Prerequisite: sophomore standing.
- 168 Continuity and Change: Judeo-Christian Tradition in Modern Lit (0).**
- 190 Honors Seminar in Religion (3).** To be arranged with instructor.
- 191 Religion and Contemporary Social Issues (3).** Study of basic problems in social ethics: violence and war, racial and ethnic exclusion, economic inequality, technology, government and law, personal morality. Understanding and possible modes of resolution through resources of Western religious tradition.
- 201 Topics (3).** To be arranged. Prerequisite: instructor's consent.
- 202 Early Christianity (3).** History of Christian origins and of the patristic period of the church: study of the beliefs and practices of Christianity, as reflected in its literature, art, music, architecture. Prerequisite: 102 or equivalent.
- 203 Medieval Christianity (3).** Study of the doctrinal developments, major theologians and schools, institutional formation and dissolution, mysticism, and liturgical expression within the context of cultural and political history. Beginning with Augustine and concluding with the 15th century. Prerequisite: 102 or 202.
- 204 History of Christianity, 1500-Present (3).** Protestant and Catholic Christianity in age of European expansion; enlightenment; 19th and 20th century challenges and responses. Prerequisite: 102 or 203.
- 212 Development of Christian Theology (3).** Study of doctrinal definitions of the Councils and Confessions in conjunction with major theologians and schools. From the early church through the 19th century. Prerequisite: 102.
- 213 History of Christian Ethics (3).** Study of basic concepts and specific ethical teachings of the Christian Church, highlighting the thought of major theologians and movements. From the early church through the 20th century. Prerequisite: 102 or equivalent.
- 215 Modern Religious Thought (3).** Examination of the theological systems of major Christian thinkers and movements of the 19th and 20th centuries in relation to historic religious traditions and modern cultural challenges. Prerequisite: 102.
- 220 Origins of Rabbinic Judaism (3).** Examination of the sources of Rabbinic Judaism and its doctrines of God, man, Israel and Torah. Prerequisite: 120 or instructor's consent.
- 221 Judaism in Late Antiquity (3).** The emergence and formation of Rabbinic Judaism; post-Biblical literature; the Second Temple Period, Judaism and Christianity. Prerequisite: sophomore standing.
- 222 Judaism in the Middle Ages through the Enlightenment (3).** Origin, structure and theology of fourth gospel. In-depth study of some passages, including those that allow a comparison with synoptic passages on same material. Prerequisite: 122.
- 225 Contemporary Jewish Literature (3).** Examination of contemporary Jewish literature, as a means of elucidating religious, social and cultural conditions of Judaism in the contemporary world, using such authors as Sholom Aleichem, Peretz, Roth, Singer, Agnon, Malamud and Bellow. Prerequisite: 120 or instructor's consent.
- 227 Modern Jewish Thought (3).** The life and ideas of major modern Jewish thinkers: Moses Mendelssohn, Nachum Krochmal, Hermann Cohen, Martin Buber and Franz Rosenzweig; their impact on European history of ideas. Prerequisite: sophomore standing.
- 230 Mythology of South Asia (3).** In-depth survey of Hinduism, Buddhism, Jainism, Sikhism and other religions in India, concentrating on the way they understand religion, man, world and salvation. Prerequisite: 130 or equivalent.
- 231 Images of Evil (3).** Surveys scriptures, beliefs, history of religions of China-Japan from ancient origins to modern times. Chinese and Japanese understandings of religion, man, and the world through various systems and popular cults of each tradition. Prerequisite: 130 or equivalent.
- 232 God and Goddess: Male and Female Images of Divinity (3).** An examination of the representations of deity as male or females or both in oriental and Western religions. Prerequisite: sophomore standing.
- 233 Key Religious Ideas (3).** Comparative and historical study of a systemic concept important to a variety of religious traditions: e.g., death and after-life, structures of the soul, significance of dreams, dualism, sacred language, salvation, etc. Prerequisite: sophomore standing.
- 234 Archaic Religious Life (3).** A study of the evidences of prehistoric life: paleolithic, neolithic, megalithic. Critical evaluation of their interpretation. Prerequisite: sophomore standing.
- 235 Religious Biography (3).** The social history and religious experiences of religious founders, prophets, reformers and spiritual leaders. Selection varies. Prerequisite: sophomore standing.
- 236 Religious Arts and Artisanship (2).**
- 237 Area Studies in Religion (3).**
- 238 Magic and Occult Religion (3).** Examines magico-religious beliefs and practices as well as esoteric traditions. Topics may include: alchemy, astrology, secret societies, divination, and witchcraft. Prerequisite: sophomore standing.
- 239 Mysticism (3).** Comparative investigation of selected mystical writings from Western and Eastern religious traditions, consideration of contemporary psychological, philosophical, and phenomenological interpretations of mystical experience. Prerequisite: sophomore standing.
- 240 The Pentateuch (3).** An interpretive seminar applying modern literary critical theory to the interpretation of the narrative literature of the books of Genesis through Deuteronomy. Prerequisite: sophomore standing.
- 241 The Prophets (3).** Study of the prophetic writings of the Hebrew Scriptures, with consideration of the origin and nature of Israelite prophecy. Includes the narratives of the period of prophetic activity and study of the classical prophets. Prerequisite: sophomore standing.
- 242 The Psalms and Wisdom Literature (3).** Detailed interpretation of the Psalms, Proverbs and related writings of the broad wisdom tradition, with critical attention to the literary style and structure of the writings. Prerequisite: sophomore standing.
- 243 The Gospels of Matthew, Mark, and John (3).** Examination of the Gospels of Matthew, Mark, and Luke as literarily related compositions. Interpretation focuses on the literary form of passages and the theological and ethical themes expressed. Prerequisite: sophomore standing.
- 244 Life and Letters of Paul (3).** Reconstruction of the life and letters of the Apostle Paul: examination of his thought in relation to Jesus of Nazareth and to earliest Christianity. Prerequisite: 142 or equivalent.
- 245 The Gospel and Epistles of John (3).** Study of the Johannine literature in respect to the origins and significance of this school of thought in the development of early Christianity; some comparison of the Gospel of John with the Synoptic Gospels. Prerequisite: 142 or equivalent.
- 246 Revelation and Apocalyptic Literature (3).** A study of Jewish and Christian apocalyptic literature with an emphasis on the Revelation of St. John. Prerequisite: sophomore standing.
- 248 Biblical Ethics (3).** An examination of the major ethical themes found in the Pentateuch, Prophets, and Writings of the Old Testament and the New Testament. Prerequisite: 142 or sophomore standing.
- 249 Non-Biblical Literature of Early Judaism and Christianity (3).** Study of representative texts of the major blocks of literature written between 200 BCE and 200 CE. Prerequisite: 141 or 142 or sophomore standing.
- 250 Directed Readings in Religion (3).** Independent readings selected in consultation with supervisory faculty member. May not be repeated. Prerequisite: instructor's consent.
- 260 Religion and Contemporary Social Issues (3).** Study of the social ethics of Jewish and Christian theologians and movements of the 19th and 20th centuries and an examination of selected social problems in light of these systems. Prerequisite: sophomore standing.
- 271 Religious Themes in Modern Literature (3).** Literary study of religious views and themes expressed in 20th-century poetry, fiction and drama; Eliot, Camus, Kazantzakis, O'Connor, Wiesel, Updike and others. Prerequisite: 102 or equivalent.
- 272 Religion in Afro-American Literature (3).** Examination of Afro-American fiction, poetry and drama which present significant racial attitudes toward the Christian religion. Prerequisite: 131 or equivalent.
- 273 Parables (3).** Comparative investigation of parables or rabbinic authors, Jesus of Nazareth and selected modern authors; delineating parables as a linguistic genre as an instance of "figurative" languages. Prerequisite: 142 or equivalent.
- 274 The Modern Short Story and the Crisis of Belief (3).** An in-depth study of selections of short fiction concerned with the question of faith in the modern world.
- 301 Topics (3).**
- 302 Major Issues in Christian History (3).** Concentrated study of selected events, movements, recurring problems, or continuing developments within the life or thought of the church. Prerequisite: 102 or equivalent.
- 312 Major Religious Thinkers (3).** Concentrated study of one or more selected theologians, such as Augustine, Aquinas, Luther, Calvin, Buber, Tillich, and Rahner. Prerequisite: 102 or equivalent.
- 321 Hassidism and Jewish Mysticism (3).** Study of the symbols and myths which present the nature and power of evil. Includes examination of the art and literature of both ancient religious and the major scriptural traditions. Prerequisite: sophomore standing.
- 331 Studies in History of Religions (3).** Advanced study of problems and theories in the history of religions, with emphasis on the application of working constructs. Prerequisites: 1 and one course in history of religion or equivalent.
- 332 The Vedas (3).** This course studies the range of Vedic literature from the hymns of the Rigveda through the ritual interpretations of the Brahmanas to the mysticism of the Upanishads. Prerequisite: junior standing.
- 342 Non-Canonical Literature of Judaism and Christianity (3).** Analysis of a selected class of non-canonical writings, including such diverse categories as Jewish Apocrypha and Pseudepigrapha, the Dead Sea Scrolls, the Coptic Gnostic library of Nag Hammadi and Christian apocryphal writings. Prerequisite: 141 or 142.
- 346 New Testament Christology (3).** A study of the biblical titles of Jesus. Prerequisite: 142 or equivalent, or junior standing.
- 350 Directed Readings in Religion (1-6).** Independent readings selected in consultation with supervisory faculty member. May be repeated up to 6 hrs. Prerequisite: instructor's consent.

## RESPIRATORY THERAPY

- 135 Teaching Practicum for Allied Health Sciences (3).** (same as Curriculum & Instruction T245, Clinical Laboratory Sciences 135, Occupational Therapy 135, Physical Therapy 135, Radiologic Technology 135).
- 211RT Equipment and Techniques I (4).** History, development and organization of respiratory therapy. Manufacture, supply, storage and piping of gases; pressure regulation, flow control, humidification. Cleaning, sterilizing, maintenance, safety. Equipment for pressure breathing, oxygen, aerosol therapy.
- 213RT Clinical Practice I (2).** To be taken concurrently with 211RS for which it serves as an extension of the laboratory time and an opportunity for structured clinical experience exposures.
- 215RT Normal Respiratory Function (3).** Mechanics, control, blood gas transport, work of breathing, and respiratory therapy aspects of acid-base balance.
- 222RT Equipment and Techniques II (4).** covers airway management, ventilators, function testing, blood gas analysis and chest physiotherapy.
- 224RT Clinical Practice II (2).** To be taken concurrently with 222RS, for which it serves as an extension of the laboratory time, and an opportunity for structured clinical experience exposures.
- 226RT Cardiopulmonary Pathology (2).** An introductory course into the study of disease, specifically emphasizing the relationship between structure and function of the diseased lung and related organ systems.
- 228RT Cardiopulmonary Pharmacology (2).** General principles of drug dosage, absorption, action and excretion. Specific attention to general anesthetics and other central nervous system depressants, muscle relaxants autonomic drugs (especially bronchodilators and vasoconstrictors), narcotics and cardiac drugs.
- 230RT Clinical Practicum (2).** Clinical practicum in respiratory therapy in which the student practices the basic arts of respiratory therapy learned during the junior year. Patients are assigned each week for case history studies.
- 331RT Clinical Practice III (2).** Structured and supervised clinical experience based on work completed in 211RS, 213RS, 222RS and 224RS, which are prerequisites.
- 333RT Clinical Respiratory Therapy I (3).** Rounds, case studies and extended clinical practice. Specific applications of respiratory therapy in emergency medicine, surgery, obstetrics, pediatrics, etc.
- 335RT Respiratory Therapy Aspects of Neonates (2).** General survey of respiratory physiology, diseases and treatment of the neonate. Evaluation and immediate care, X-ray interpretation, and pharmacology. Covers respiratory therapy and management of the high-risk infant.
- 337RT Introduction to Research (2).** An interdisciplinary course designed to promote respiratory therapy research at the undergraduate level; exercises in formulating relevant questions and learning to systematically search for answers; methods for searching the literature, identifying and designing research problems.
- 340RT Clinical Practice IV (2).** An extension of the supervised practicum begun in 331RS.

**342RT Clinical Respiratory Therapy II (3).** Continuation of 333RS. Clinical rounds, case presentations and advanced study.

**344RT Organization and Administration (3).** Studies ways to set up and operate respiratory therapy service departments and educational programs. Quarters, facilities, personnel procedures, record systems, ethics, medico-legal aspects, interdepartmental relations and curriculum development.

**346RT Research (2-6).** Selected research projects guided by a senior staff member.

## ROMANCE LANGUAGES

**100GH (0).**

**103 (0).**

**350 Special Readings (1-3).** Prerequisites: 372 or equivalent & instructor's consent.

**371 Introduction to General Linguistics (3).** (same as Anthropology 371, Linguistics 371). Fundamentals of linguistic theory; collateral readings, problems. Prerequisite: Sophomore standing.

**372 Techniques in Linguistic Analysis (3).** (same as Anthropology 372, Linguistics 372). Problems in analyzing data from various languages. Prerequisite: introductory course in linguistics or instructor's consent.

**373 Linguistic Phonetics (3).** Description and transcribing of the full range of sound types found in the languages of the world. Ear training and production practice. Distinctive feature theory. Prerequisite: 371 or equivalent. w.

**374 Issues in Linguistic Analysis (3).** (same as Anthropology 374, Linguistics 374). Survey of syntactic and semantic theory, with emphasis on transformation-generative notions; problems. Prerequisite: 371 or equivalent.

**400 Problems (cr. arr.)** Prerequisites: 372 or equivalent & instructor's consent.

**490 Research (cr. arr.)** Prerequisite: Graduate standing.

**493 Phonology (3).** (same as Anthropology 493, Linguistics 493). Examination of current theory and methods of describing sound patterns of language; particular attention to the generative model and distinctive features. Prerequisites: 374 or equivalent.

## RURAL SOCIOLOGY

**1 Rural Sociology (3).** Introduction to the sociology of rural society and small towns: structure, functioning, trends, and interrelations with the larger society. (NO credit for both Rural Sociology I and Sociology I)

**101 Topics in Rural Sociology (1-3).** Organized study of selected topics. Subjects and earnable credit vary from semester to semester. May be repeated. Prerequisites: 1 or Sociology 1.

**120 Population and Ecology (3).** (same as Sociology 120). Changes in the structure and characteristics of population groups and their relationship to both human and non-human aspects of the biophysical environment. Prerequisite: 1 or Sociology 1.

**150 The Amish Community (3).** Examines historical antecedents and contemporary culture and social structure of the Amish. Topics in clude cultural symbols, life ceremonies, the family, counter-cultural pressures, stresses, social change. Prerequisite 1, Sociology, or Anthropology.

**155 Structure of Agricultural Production in Collective Settings (3).** Comparative analysis of various groups and societies with special attention given to Hutterites, Israeli kibbutz and moshav, the Soviet Union and China, and others.

**170 Sociological Aspects of Poverty (3).** Social characteristics of poverty as reflected in rural and urban settings. Analyzes causes and consequences of poverty, and attempts to alleviate this problem. Prerequisite: 1 or Sociology 1.

**175 Ownership and Control of American Farms (3).** Examines current structures in agricultural production systems, forces for change possible social consequences of alternative structures. Assumes a basic understand of the food production/distribution system. Prerequisite: 1 or Sociology 1.

**180 Social Research I (3).** (same as Sociology 180).

**181 Social Research II (3).** (same as Sociology 181).

**182 Senior Seminar (3).** (same as Sociology 182). Senior majors only.

**185 Contemporary Rural Social Problems (3).** Social problems of major concern to rural society, including technological change, employment, health care, crime, environmental concerns, energy, poverty, education, and/or natural resources. Prerequisite: 1 or Sociology 1.

**201 Organization and Leadership in Modern Society (3).** (same as Sociology 201). Examination of dynamics of group leadership in voluntary community organizations; study of how leader's behavior is related to success or failure of organization's program. Prerequisites: 1 or Sociology 1.

**214 The Family (3).** (same as Sociology 214).

**216 Urban Sociology (3).** Urbanism as world phenomenon; ecological, demographic characteristics of cities; organization of urban society including status systems, occupational structure, formal and informal associations, racial and cultural relations, forms of communications: housing, city planning. Prerequisites: 1 or Sociology 1.

**225 Social Processes of Communication and Diffusion (3).** (same as

Sociology 225). Overview of the social process of effective interpersonal communication, mass media impact and strategies for implementing the acceptance of new ideas and practices within social systems or societal sectors. Prerequisite: 1 or Sociology 1.

**255 Youth in Today's World (3).** (same as Sociology 255). Study of what factors influence the development of youth in today's society. Examined are types of behavior such as mating, deviance and the role of schools, parents, TV and friendship groups. Prerequisite: 1 or Sociology 1.

**270 The Sociology of Religion (3).** (same as Sociology 270).

**284 Social Impact Analysis (3).** (same as Sociology 184). Procedures for predicting the social consequences of energy and water resources development, industrial plants, highways and housing projects. Introduction to use of sociological materials in preparing social impact reports. Prerequisite: 1 or Sociology 1.

**290 Practicum (3).** (same as Sociology 290). Independent research or professional experience under faculty supervision. Projects must be arranged by student and faculty member prior to registration. Prerequisites: junior standing, consent required.

**299 Recent Theories in Sociology (3).** (same as Sociology 299).

**300 Problems (cr. arr.)** Prerequisites: Written consent of instructor.

**301 Topics in Rural Sociology (2-3).** Organized study of selected topics. Subjects and earnable credit vary from semester to semester. May be repeated. Prerequisite: six hours Rural Sociology or Sociology, or junior standing.

**305 Social Demography (3).** (same as Sociology 305).

**306 Applied Demographic Methods (3).** (same as Sociology 306). Description of sources of population data and methods of practical application for businesses and public organizations. Primarily for people going into planning or development. Prerequisite: 120 or 305.

**310 Rural Social Organization (3).** (same as Sociology 310). Overview of current issues in the study of rural society. Emphasis is on how rural social organization affects agriculture, the introduction of technology, and rural development throughout the world. Prerequisite: junior standing.

**311 Evaluation and Program Analysis (3).** (same as Sociology 311).

**335 Social Change and Trends (3).** (same as Sociology 335). Nature of social change. Emphasis on sociological theories and models of social change and their application in analysis and implementation of change in social structures. Prerequisite: 1 or Sociology 1 and junior standing.

**338 Seminar in Developmental Perspectives and Third World Realities (3).** An interdisciplinary approach to the problems of underdevelopment with special reference to the problems of the rural poor in Africa, Asia and Latin America. Prerequisite: junior standing.

**340 Community Social Structure (3).** (same as Sociology 340).

**375 Social Statistics (3).** (same as Sociology 375). Descriptive statistics and bivariate quantitative analysis techniques commonly used by social scientists. Includes coverage of parametric and non-parametric methods. Introduction of computer applications.

**376 Advanced Social Statistics (3).** (same as Sociology 376). Introduction of multivariate analysis for social scientists. Emphasis on non-experimental applications of analysis of variance and correlation-regression. Computer applications emphasized. Prerequisite: 375 or equivalent course.

**400 Problems (cr. arr.)** Research for student capable of semi-independent work. Prerequisites: Written consent of instructor required.

**406 Seminar in Social and Economic Development (3).** (same as Sociology 406).

**421 Seminar in Population and Human Ecology (3).** (same as Sociology 421). Topical seminar on demographic theory, human ecology, migration, underdeveloped areas, fertility, or labor force. One topic per semester. May be taken more than once. Prerequisite: 120 or 305.

**425 Communication and the Diffusion of Information (3).** (same as Sociology 425). Factors conditioning communication and diffusion of ideas and practices; exercise of personal influence; role of change agents and agencies in the process of change. Prerequisite: graduate standing or instructor's consent.

**430 Research Methodology (3).** (same as Sociology 430). Sample selection, questionnaire construction, interviewing, machine tabulation, analysis and report writing. Two lectures, one hour lab weekly. Required for M.A. in sociology.

**431 Seminar in Multivariate Analysis Techniques (3).** (same as Sociology 431).

**432 Seminar in Qualitative Methods in Sociology (3).** (same as Sociology 432).

**444 The Social Organization of Agriculture (3).** Various perspectives and theoretical orientations for examining the sociology of agriculture. Theoretical issues of social development are traced through the literature to contemporary research in the causes and consequences of change in agriculture.

**445 Seminar on Issues in the Sociology of Agriculture (3).** Issues in current research in the sociology of agriculture of developing and industrial nations. Links sociological theory with research in agriculture, examining contributions of applied research to sociological knowledge.

**446 Seminar in Comparative Rural Population (3).** Comparison of rural populations, causes and consequences of changes in rural populations in the United States and other countries. Prerequisite: 305 or consent of instructor.

**447 Seminar on Contemporary Issues in Rural Sociology (cr. arr.)**

**450 Research (cr. arr.)** Research not expected to terminate in thesis or dissertation. Prerequisite: instructor's written consent. f, w, s.

**480 Special Topics in Sociological Research Methods (1-3).** (same as Sociology 480.)

**490 Research (cr. arr.)** Research leading to dissertation.

## RUSSIAN

**1 Elementary Russian I (3).** Offered only in the Fall.

**1B Intensive Introductory Russian (2).** Covers the same materials as 1 (first five chapters of Alexander Lipson's A Russian Course), but in an abbreviated (2 hour), intensive (2 week) format.

**2 Elementary Russian II (3).** Prerequisite: C or better in Russian I or equivalent.

**3 Elementary Russian III (3).** Prerequisite: Russian 2 or equivalent.

**4 Elementary Russian IV (3).** Practice in the spoken and written language, as well as reading and grammatical review. Prerequisite: 3 or equivalent.

**106 Russian Composition and Conversation (3).** Prerequisite: 4 or equivalent.

**110 Russian Civilization (3).** Survey of the arts and social thought in Russia, with emphasis on the modern period. Films/recordings. No foreign language credit. Prerequisite: Sophomore standing or instructor's consent.

**195 Honors Proseminar (1-3).** Special topics in Slavic literature or linguistics. Prerequisite: admission to departmental Honors program.

**203 Advanced Russian Reading (3).** Prerequisite: Russian 103 or equivalent or instructor's consent.

**251 Russian Literature From the Beginnings to Turgenyev (3).** Surveys Russian literature in English from its beginnings to 1880. Analyzes major works by such authors as Pushkin, Lermontov, Gogol, Goncharov, Turgenyev. Readings and lectures in English. Prerequisite: sophomore standing.

**252 Tolstoy and Dostoevsky (3).** Analyzes major works of Tolstoy and Dostoevsky. Readings and lectures in English. Prerequisite: sophomore standing.

**253 Russian Modernism (3).** Reads and analyzes selected works from Russia's modernist period, 1895-1930, including works by such authors as Chekhov, Mayakovsky, Pasternak, Babel, Zamiatin, and Olesha. Readings and lectures in English. Prerequisite: sophomore standing.

**254 Contemporary Russian Literature (3).** Surveys Russian literature from 1930 to present. Analyzes works by such authors as Nabokov, Pasternak, Bulgakov and Solzhenitsyn. Readings and lectures in English. Prerequisite: sophomore standing.

**275 Russian Classics I (3).** Read and discuss selected works by major Russian writers. Course conducted in Russian. May be taken after Russian 276. Prerequisite: Russian 203.

**276 Russian Classics II (3).** Read and discuss selected works by major Russian writers. Course conducted in Russian. Russian 275 is not prerequisite. Prerequisite: Russian 203.

**301 Topics in Russian (cr. arr.)** Organized study of selected topics. Subjects and earnable credit may vary from semester to semester. May be repeated with departmental consent. Prerequisites: junior standing & instructor's consent.

**315 Russian Poetry (3).** Survey of readings in Russian poetry from its beginnings to present. Prerequisite: Russian 203 or equivalent.

**316 Russian Drama (3).** Survey of and readings in Russian drama from its beginnings to present. Prerequisite: Russian 203 or equivalent.

**350 Special Readings (1-3).** Prerequisite: Junior standing and chairman's consent.

**366 Structure of the Russian Language (3).** (same as Linguistics 366). Examines the phonological, morphological and syntactic structure of contemporary standard Russian. Emphasizes both practical and theoretical aspects. Prerequisite: Russian 203 or equivalent or instructor's consent.

## SOCIAL WORK

**101 Topics in Social Work (1-3).** Special and emerging topics in social work and social welfare. Subject, content and credit varies depending on available faculty and student interest. For undergraduate students only.

**125 Social Welfare and Social Work (3).** Examines the nature of social welfare institutions, social work and the relationship between them. Focuses on policy issues with special reference to poverty, racism and sexism. Required for BSW majors as sophomores or juniors.

**225 Medical Social Problems (2).** Interrelations of biological, psychological, social factors in understanding people with common physical illnesses. Prerequisites: junior standing & instructor's consent.

**300 Problems in Social Work (1-3).** Research and independent study projects offered on a tutorial basis to undergraduate social work students. Prerequisites: adviser's and instructor's consent.

**301 Topics in Social Work (1-3).** Special and emerging topics in social work and social welfare. Subject, content and credit varies depending on available faculty and student interest. For undergraduate and graduate students.

**303 Social Justice and Social Policy (3).** Based on the concepts of human need and social justice, an historical and analytical approach to social welfare policies and programs. Prerequisite: 125 or graduate standing in social work.

**304 Introduction to Community and Organizational Processes (3).** Introduction to contextual framework of social work practice with particular emphasis on community and organization as social systems. Prerequisites: junior standing in social work and 125.

**306 Introduction to Social Work Practice (3).** Introductory, generic practice theory course promoting student's understanding of professional social work practice as holistic, identifiable, unique configuration of knowledge, values and skills. Prerequisite: junior standing in social work.

**308 Comparative Social Policy (2-3).** (same as South Asia Studies 308). A comparative study of social policy aspects in the framework of international development. Policy areas include South Asia, as well as other regions relevant to such study. Prerequisite: instructor's consent.

**309 Social Work Practice (3).** This course develops the generalist approach to social work knowledge, values, systems and processes with emphasis upon the generic aspects of intervention at several levels of social organization. Prerequisite: graduate standing in social work. f.

**312 Research Methods for Social Work (3).** Survey of research methods germane to the development of the knowledge base of social work practice. Prerequisite: senior or graduate standing in social work. f, w.

**313 Community and Organization Dynamics (3).** Examination of social environment in which social work is practiced with particular emphasis on development of analytic framework for understanding formal organizations and communities. Prerequisite: graduate standing.

**315 Dynamics of Interviewing (3).** Analysis of interviewing techniques employed in communication for securing reliable, valid data to modify behavior in accordance with professional objectives. Prerequisites: junior standing & instructor's consent.

**319 Social Statistics (3).** No credit for graduate social work students. Descriptive, analytic techniques applied to qualitative and quantitative social data. Prerequisite: senior standing.

**320 Social Psychological Perspectives in Human Development for Soc Wk (3).** Substantive sources from behavioral sciences used in social work toward understanding the biosocial processes and constraints of human development. Prerequisites: 125 and course in personality or human development.

**321 Social Deviance (3).** Basic concepts and principles regarding psychological/social dynamics of deviance; implications for social welfare policy and social interventions. Prerequisite: senior or graduate standing or instructor's consent.

**323 Behavioral Foundations for Social Work Administration (3).** Examination of relevant theoretical and behavioral foundations in order that students can acquire the knowledge to function more rationally and at a higher level as a social work administrator. Prerequisite: graduate standing.

**325 Alcoholism: Treatment and Prevention (3).** Provides knowledge generic to social work and other disciplines involved in alcoholism treatment. Integrated services approaches to problems of alcoholism will be emphasized. Didactic and experiential methods employed; development of self-awareness is stressed.

**326 Rural Human Services (3).** A study of the effect of rural and small community environments on the planning and delivery of social and health services. Emphasis on policy and program analyses relevant to rural issues and concerns.

**327 Women and Health Care (3).** Provides a study of the role of women as health care providers and an analysis of the impact of value systems and the women's movement on the organization and delivery of health services to women.

**328 Working with Minority Youth (3).** Develops awareness and understanding of social/psychological/ cognitive realities influencing the behavior of black youth. Content draws upon theories, research, and practice skills relevant to understanding black youth. Minority groups included.

**330 Interaction Skills Workshop (3).** Interaction skills for generalist practice at individual, group and community levels. Group communication and social influence theories address generic and unique aspects of interaction across systems. Uses laboratory instruction. Prerequisite: junior or graduate standing in social work.

**345 Ethical Issues in Social Service (3).** Provides an overview of ethical issues and dilemmas that arise in work with individuals, families, organizations, and communities; in the design of social welfare policy; and in relationships among professionals.

**350 Special Readings (1-3).** Extensive readings in selected area or intensive reading in a special field. Prerequisites: adviser's & instructor's consents.

**360 Strategies of Direct Practice (3).** Examines social structures, processes: underlying assumptions/concepts of social change, client constellation, organizational arrangements, role relationships by which social workers define professional intervention. Prerequisite: senior or graduate standing in social work.

**361 Strategies of Clinical Social Work Intervention (3).** Strategies of social treatment with individuals and small groups with emphasis on processes of supportive counseling used in public service agencies. Prerequisites: senior standing in social work; 306, 330; concurrent with 390.

**363 Fundamentals of Social Work Administration (3).** Basic managerial skills which social workers need for supervision, planning, staff development and administrative positions in social agencies; focus on individual management functions and skills associated with them. Prerequisite: graduate standing.

**370 Law and Social Work Practice (3).** Legal processes and law relevant to social policy and social work practice. Legal procedures, court testimony, case method, study of decisions affecting major social problems. Prerequisite: senior or graduate standing in social work.

**375 Helping Strategies with Older Persons (3).** Methods of assessment and group and individual strategies in social work and other helping professions for working with older persons and their families. Prerequisite: senior or graduate standing.

**380 Social Work Practice With Minorities: Afro-American Emphasis (3).** Provides students with an appreciation of the black experience in the United States on a knowledge and feeling level. Prerequisite: instructor's consent.

**385 Helping Strategies With Children and Adolescents (3).** Major approaches in theory and practice to direct work with children and

adolescents including historic and contemporary psychoanalytic treatment, nondirective counseling and social learning applications. Prerequisite: senior or graduate standing.

**390 Interventive Processes I (6).** Supervised social work practice in a school-approved agency focusing on development of direct practice skills. Fall semester, three days per week. Prerequisites: BSW senior standing. 125, 303, 304, 306, 320, 330. Corequisite: 361.

**391 Interventive Processes II (6).** Supervised social work practice in a school-approved agency providing a full range of interventive experiences. Winter semester, three days per week. Graded S/U. Prerequisites: admission to MSW program, 303, 309, 313, 320, 330. Corequisite: 360.

**394 Senior Professional Seminar (3).** Integrative professional practice seminar for BSW students focusing on the principles of generic social work and their application to direct practice in diverse fields, career planning and responsibilities. Prerequisites: 360 and 391.

**400 Problems (1-6).** Intensive study of an area of social welfare related to special interest of student. Prerequisites: adviser's & instructor's consents.

**401 Topics in Social Work (1-3).** Special and emerging topics in social work and social welfare. Subject, content, and credit varies depending on available faculty and student interest. For graduate and doctoral students only.

**402 Advanced Social Policy for Planning and Administration (3).** Focus on integration of cognitive and skill components of policy development, analysis and change with special emphasis on utility by social work administrators and planners. Prerequisite: 323.

**405 Social Work Practice in the Health Field (3).** Focus is on the unique aspects of social work processes in the context of physical and mental health service organizations. Prerequisite: graduate standing.

**406 Health Policies and Programs (3).** Graduate seminar on policies and programs relevant to social work in the health field, including physical health, rehabilitation and mental health. Prerequisite: graduate standing.

**407 Social Work Practice in the Family and Child Welfare Field (3).** Focus is on the unique aspects of social work practice in the family and child welfare service organizations with sub-focus on aging. Prerequisite: graduate standing.

**408 Family and Child Welfare Policies and Programs (3).** Graduate seminar on policies and programs relevant to social work practice in the family and child welfare field, including policies on aging. Prerequisite: graduate standing.

**410 Professional Practice Seminar I (3).** Provides integrative learning experience in social work practice in an area of beginning specialization in autonomous social work practice. Prerequisites: graduate standing in social work & 360 & 391.

**412 Research Design in Social Work (3).** Examines research methodology and design as applied to the study of social work techniques and problems. Emphasizes differential uses of scientific observation and techniques for developing knowledge and improving practice. Prerequisite: graduate standing.

**431 Advanced Social Group Work (3).** An intensive exposure to the theories and models of social group work practice through cognitive, affective and experiential (laboratory) methods of teaching/learning. Prerequisites: graduate standing, 330 and instructor's consent.

**432 Family Treatment (3).** Comparative study of theories and methods required for work with problems of family functioning. Both conjoint and subsystem approaches to family treatment are examined. Prerequisite: graduate standing.

**440 Supervision, Consultation and Staff Training (3).** Philosophy, objectives, principles and methods of social work supervision, staff development and consultation with emphasis on the commonality of the teaching-learning-evaluating functions. Prerequisite: graduate standing.

**450 Independent Study (1-6).** Intensive investigation of phenomena germane to area of concentration carried out with guidance of faculty. May include data collection and leads to a written report in publishable format. Prerequisites: graduate status and 412 or equivalent.

**481 Professional Development Workshop (8).** Field practicum under intensive faculty instruction for eight weeks prepares the student for entry into the accelerated graduate degree program. Prerequisites: BSW degree and dean's consent. s.

**490 Research (1-6).** Independently conducted research which includes concept development, data collection, statistical analysis and social policy implications prepared in a format suitable for publication. Prerequisites: graduate standing and 412.

**491 Professional Leadership Practice (10).** Field instruction tailored to concentrating interests, developing depth in clinical skills in direct service or in administration, staff development, and/or supervision. With few exceptions students leave the Columbia area. Prerequisite: 391. Corequisite: 410.

**492 Practicum in Cultural Diversity I (1).** A practicum conducted on a workshop format with content focused on racial, cultural and gender dynamics in social work practice. Required first year graduate students. S/U only.

**493 Practicum in Cultural Diversity II (1).** Continuation of 492. A practicum conducted on a workshop format with content focused on racial, cultural and gender dynamics in social work practice. Required for first year graduate students. S/U only.

## SOCIOLOGY

**1 Introduction to Sociology (3).** Nature of organization and activities of human groupings—family, community, crowd, social class, etc.; structure, function of institutions; social influences shaping personality,

behavior, social change. No credit for both Sociology I and Rural Sociology I. cor.

**40 Crisis in American Society (3).** Structural changes taking place in the economy, class structure, politics, education and life styles in post-industrial America. No credit for both 40 and 1.

**50 Social Deviance (3).** Survey of approaches to the study of behaviors commonly regarded as deviant such as crime, sexual abuse, substance abuse, mental illness, etc. Prerequisite: 1 or 40. cor.

**60 The Female Experience: Body, Identity, Culture (3).** (same as Women Studies 60).

**101 Topics in Sociology (3).** Organized study of selected topics. Particular topics may vary from semester to semester. Repeatable with departmental consent. Prerequisite: 1 or 40.

**110 Social Inequalities (3).** Survey of inequalities based upon criteria such as race, ethnicity, sex, age, religion and social class in contemporary societies. Focus on dynamics by which privilege and inequality are structured. Prerequisite: 1 or 40 or instructor's consent.

**120 Population and Ecology (3).** (same as Rural Sociology 120).

**130 Social Perspectives on Aging (3).** Survey of basic knowledge in social gerontology, aging and old age in American society. Analysis of changes as individuals age, differences among old people, social problems of the aged. Prerequisite: 1 or 40.

**139 The Black Americans (3).** Analysis of history of blacks in the United States. Assessment of contemporary black community in terms of its institutions, style of life, patterns of work and intergroup relations. Prerequisite: 1 or 40 or instructor's consent.

**140 Culture and Mass Media (3).** Sociological study of modern folk, local, popular and mass cultural production and consumption; mass media, diffusion, change, differentiation. Prerequisite: 1 or 40 or instructor's consent.

**160 Social Bases of War and Peace (3).** (same as Peace Studies 160). Social conditions associated with and preceding war and peace; war as a social institution; international images and stereotypes; proposals for preventing war and reducing international hostilities. Prerequisite: 1 or 40.

**180 Social Research I (3).** (same as Rural Sociology 180). Introduction to principles of methodology; theory and research; survey of basic research designs and perspectives; preparation for understanding and conducting social research. Prerequisite: 1 or 40 or Rural Sociology 1.

**181 Social Research II (3).** (same as Rural Sociology 181). Seminar using various research methods on selected topics and problems. Conduct of complete research project from problem formation to data analysis and presentation. Prerequisite: 180 or instructor's consent.

**184 Social Impact Analysis (3).** (same as Rural Sociology 184).

**185 Social Problems (3).** Trends in modern societies: urbanization, occupational structure, technological change, etc. as these have produced alienation and legitimacy problems. Political, economic, health, welfare, military, justice institutions may be considered. Countermovements and policy issues. Prerequisite: 1 or 40.

**198 Honors in Sociology (3).** Intensive work in a selected field within sociology, including readings and research. Repeatable up to 6 hours with departmental approval. For Honors candidates.

**200 Class, Status, and Power (3).** Study of the structure of wealth, poverty, prestige, and power in relationship to societal, interpersonal, and individual opportunities, constraints and outcomes. Prerequisite: 1 or 40.

**210 Public Opinion and Communication (3).** Nature of public opinion; processes of opinion formation; special publics, pressure groups; effects of communication through personal contacts and mass media; propaganda, censorship; opinion surveying.

**211 Criminology (3).** Sociology of law; constitutional, psychological, sociological theories of criminal behavior; process of criminal justice; treatment of corrections; control of crime.

**212 Contemporary Corrections (3).** Development of concepts of punishment, treatment. Contemporary penal and correctional institutions; problems of custody, classification, education, industry and treatment program; probation, parole. Prerequisite: 211 or instructor's consent.

**214 The Family (3).** (same as Rural Sociology 214). Families, kin and households as interacting groups; roles, socialization, problems, structural change; family in relation to other social institutions; historical, cultural and class variations. Prerequisite: 1 or 40 or Rural Sociology 1.

**215 Collective Behavior (3).** (same as Peace Studies 215). Analysis of crowd behavior and related phenomena: rumors, disasters, fashions. Social responses to unclear, dangerous or unjust conditions. The dynamics of conflict, consensus and change. Prerequisite: 1 or 40.

**216 Urban Sociology (3).** (same as Rural Sociology 216).

**217 The Sociology of Sport (3).** The role of sport in modern society. Includes violence in sport; politics and economics of sport; male, female, and racial inequalities; and international comparisons of sport structures. Prerequisite: 1, or instructor's consent.

**219 Organization and Institutions (3).** Social organization of modern societies with focus on complex organizations (corporations, bureaucracies) within institutional arrangements (economy, polity, education, religion); organizational structure; interorganizational networks; interrelations of institutional sectors. Prerequisite: 1 or 40.

**236 Social Movements and Conflicts (3).** Survey of approaches and research on social movements and social change. Historical and contemporary social movements in the United States; collective protest and violence; political revolutions. Prerequisite: 1 or 40 or consent of instructor.

**252 Occupations and Professions (3).** Analysis of occupational, professional aspects of American society. Division of labor; occupational mobility; work and the self; collegiality and informal organizations of work. Prerequisite: 1 or 40.

**255 Youth in Today's World (3).** (same as Rural Sociology 255).

**260 Social Psychology (3).** (same as Psychology 260).

**262 Sociology of Sex Roles (3).** Examinations of females and males in contemporary society as they are affected by culture; various institutional arrangements, including the labor market; interactive relationships; socialization; and sexism. Prerequisite: 1 or 60.

**270 The Sociology of Religion (3).** Sociology of religious experience, action, organization, movements and social change; contemporary trends, including mainline and new religions, civil religion, secularization. Prerequisite: 1 or 40 or Rural Sociology 1.

**282 Senior Seminar (3).** Integrates perspectives, methods, substantive foci of undergraduate courses. Analysis of sociology as a discipline and profession. Discussion of opportunities for graduate study, employment. Prerequisite: senior sociology major.

**284 Social Impact Analysis (3).** (same as Rural Sociology 284).

**290 Practicum (1-9).** (same as Rural Sociology 290). Independent research or professional experience under faculty supervision. Project must be arranged by student and faculty member prior to registration. Prerequisites: junior standing and instructor's consent.

**298 The Rise of American Sociology (3).** Historical survey of significant 19th- and early 20th-century developments in American sociology; emphasis on emergence of sociology in American universities. Prerequisite: 12 hours sociology.

**299 Recent Theories in Sociology (3).** (same as Rural Sociology 299). Introduction to major theoretical positions and issues in contemporary American sociology. Primary attention directed to logical and intellectual structure of major theoretical schools: functionalism, conflict, exchange, symbolic interaction, phenomenological/ethnomethodological theories. Prerequisite: 12 hours sociology.

**301 Topics in Sociology (cr. arr.)** Organized study of selected topics. Subjects and earnable credit may vary from semester to semester. May be repeated with departmental consent. Prerequisites: junior standing & instructor's consent.

**302 Social Studies of Science (3).** Effects of social, political, economic and cultural factors on science. Organization of science into work groups and disciplines. Communication patterns in science. Influences on problem choice and discovery. Ethics in scientific research. Prerequisite: 1 or 40.

**305 Social Demography (3).** (same as Rural Sociology 305). General demographic theories; age, sex, and ethnic composition of population; fertility, mortality and migration as components of population change; social, economic and political implications of demographic trends. Prerequisites: 1 or Rural Sociology 1 and junior standing.

**306 Applied Demographic Methods (3).** (same as Rural Sociology 306).

**310 Rural Social Organization (3).** (same as Rural Sociology 310).

**311 Evaluation and Program Analysis (3).** (same as Rural Sociology 311). Development of analytic skills for diagnosis of social problems and formation, implementation, evaluation of public policy. Prerequisite: 375 or equivalent.

**322 Sociology of Aging (3).** Sociological research and theories of aging and old age; historical, demographic, comparative, social psychological and structural topics and studied in depth. Prerequisites: 6 hours of sociology and junior standing. cor.

**323 Death and Dying (3).** Death and dying explored from demographic, sociological and social psychological perspectives. Topics: trends and differentials; definitions of death; dying as a social process; funerals and survivors; cultural solutions to problems of death. Prerequisite: instructor's consent. w.

**324 Sociological Concepts and Health (3).** Examination of sociological concepts and data as related to health field; introductory analysis of field of medical sociology. Prerequisite: junior, senior, or graduate standing. f, w.

**325 Sociology of Health Problems (3).** Distinguishes disease (physiological), illness (psychological) and sickness (social) as dimensions of health problem. Identification of social factors which pattern the presence, identification and consequences of each in populations. Prerequisite: junior, senior, or graduate standing.

**326 The Sociology of Health Care Systems (3).** Focus on the study of the organization of health care services at the community and national level. Elements of health care systems. Evaluations of system effectiveness. Prerequisite: junior, senior, or graduate standing.

**327 Sociology of Health Occupations and Organization (3).** Organizational basis of health care agencies; recruitment, socialization, professionalization, structure of health occupations. Comparison of bureaucratic and professional models; continuity, crisis, and charisma; occupational autonomy; functional interdependence. Prerequisite: junior standing.

**333 Social Organization (2-3).** Survey of approaches to the analysis of social organization emphasizing complex organizations, division of labor, social inequality, politics and the state, social change. Prerequisite: 219 or graduate standing.

**335 Social Change and Trends (3).** (same as Rural Sociology 335).

**337 Race and Ethnic Relations (3).** The experience of racial and ethnic minorities; inequality, assimilation, ethnic and racial conflict, accommodation. Prerequisite: 1 or 40 and junior standing.

**340 Community Social Structure (3).** (Same as Rural Sociology 340). Study of the nature and function of the community as a social system. Prerequisites: 1 or Rural Sociology 1 and junior standing.

**343 Advanced Social Psychology (3).** (same as Psychology 343). Major theoretical fields and their application to human problems. Prerequisite: 260 or instructor consent.

**344 Group Dynamics and Role Theory (3).** (same as Psychology 344).

**346 Structure of Interpersonal Behavior (3).** (same as Psychology 346). Patterns and processes of social interaction and interpersonal relationships. Analysis of such topics as communication, non-verbal

behavior, empathy, impression management, love, intimacy, life cycle of relationships. Prerequisite: 260 or instructor's consent.

**350 Special Readings (cr. arr.)** Extensive reading in selected area or special field. Prerequisites: 12 hours sociology & departmental approval.

**353 Sociology of Education (3).** Structural and social psychological analyses of contemporary institutionalized educational patterns within the context of professional community and societal organization. Prerequisite: 1 or equivalent.

**354 Political Sociology (3).** (same as Peace Studies 354). Social bases of power and politics, economic and political elites and their perpetuation, bases of power in the economy and politics, sources of political conflict and change.

**369 Comparative Family Study (3).** Families and relationships studied in historical and crosscultural perspective. Societal and community contexts, kinship, household structure, marital and change examined through comparative inquiry. Prerequisite: 214 or instructor's consent.

**371 Attitude Change (3).** (same as Psychology 371).

**375 Social Statistics (3).** (same as Rural Sociology 375).

**376 Advanced Social Statistics (3).** (same as Rural Sociology 376). Introduction to multivariate analysis for social scientists. Emphasis on non-experimental applications of analysis of variance and correlation-regression. Computer applications emphasized. Prerequisite: 375 or equivalent course.

**400 Problems (cr. arr.)** Directed research not leading to thesis or dissertation. Prerequisites: 12 hours sociology & departmental approval.

**403 Professional Problems (1-3).** Problems of training, teaching, non-academic employment, professional organization, ethics. Prerequisite: graduate standing in sociology or rural sociology.

**405 Theories of Society (3).** Fundamental theoretical developments in modern sociology seen as an empirical discipline. Required for M.A. students. Prerequisite: Graduate standing or instructor's consent.

**406 Seminar in Social and Economic Development (3).** (same as South Asia Studies 406). Analysis of world economy and societal development; assessment of contemporary and historical bases of international economic and political stratification.

**409 Seminar in State and Economy (3).** Analysis of public policy and economic change in contemporary political-economic systems; growth of welfare state, capitalist planning, state socialist economics.

**410 Seminar in Comparative Social Institutions (3).** Analysis of selected social institutions such as agriculture, family, economy, education, health care, law, polity, religion. Inter-institutional and international comparisons. Prerequisite: 333 or instructor's consent.

**411 Seminar in Sociology of Work (2).** Recent developments in the sociological study of occupations and professions. Surveys alternative theoretical perspectives and methodological approaches. Deals with rationalization, alienation, class consciousness, self-management.

**412 Seminar in Sociology of Organizations (3).** Recent developments in the sociological analysis of complex organizations, including corporations, public bureaucracies, educational organizations, religious organizations, etc. Surveys alternative theoretical perspectives and methodological approaches.

**415 Seminar in Family Sociology (3).** Research and theory on family structure and family life; in-depth study of a selection of topics and issues. Prerequisite: 369 or 322 or 346 or instructor's consent.

**420 Independent Readings in Preparation for Comprehensive Examinations (1-6).** Independent readings for PhD comprehensives. Open only to PhD candidates who have passed qualifying examinations. Prerequisite: consent of major advisor.

**421 Seminar in Population and Human Ecology (3).** (same as Rural Sociology 421). Prerequisite: graduate standing.

**425 Communication and the Diffusion of Information (3).** (same as Rural Sociology 425).

**429 Seminar in Criminology and Deviant Behavior (3).** Survey of empirical research and sociological theory in criminology and deviant behavior. May be repeated once with instructor's consent. Prerequisites: 211 & graduate standing or instructor's consent.

**430 Research Methodology (3).** (same as Rural Sociology 430). Meta-theoretical and conceptual issues at the core of design decision-making; questionnaire construction, qualitative field techniques, interviewing, scaling, panel analysis, computer applications to qualitative data; experimental, survey, and case study designs, ethics.

**431 Seminar in Multivariate Analysis Techniques (3).** (same as Rural Sociology 431) Examination of various quantitative techniques of data analysis. Prerequisite: 430 or instructor's consent.

**432 Seminar in Qualitative Methods in Sociology (3).** (same as Rural Sociology 432). Examination of various qualitative methods of research, including problem-formulation, access and interpretation of data, theory-generation, and preparation of research reports. Prerequisite: 430 or instructor's consent.

**433 Seminar in Social Psychology I (3).** (same as Psychology 433).

**434 Seminar in Social Psychology II (3).** (same as Psychology 434).

**438 Seminar in Sociological Theory I (3).** Traces development of sociological theory from the "generation of 1890" through the 1940s, including the work of Durkheim, Weber, Parsons and others. Prerequisite: 405 or equivalent.

**439 Seminar in Sociological Theory II (3).** Theoretical developments in sociology in Europe and United States since 1950. Recent formulations, controversies. Prerequisite: 405 or equivalent.

**440 Topical Seminar in Contemporary Sociological Theory (3).** Critical evaluation of selected points of view in current sociological theory. May be repeated with departmental consent. Prerequisite: 405 or equivalent.

**441 Topical Seminar in Historical Sociology (3).** Methodological approaches to sociological explanation of historical phenomena;

related sociological theories of historical development, including Weberian, Marxist and other perspectives applied to a topical historical problem. Prerequisite: 405 or equivalent.

**442 Seminar in Sociological Theory Construction (3).** Philosophy and structure of science, critical examination of selected methods, models and theories with special concern for theory construction. Prerequisite: 405 or equivalent.

**450 Research (1-6).** Research not expected to terminate in thesis or dissertation. Prerequisite: instructor's consent.

**456 Seminar on the Sociology of Health and Sickness (3).** Identification of major sociological issues being addressed in the sociology of health and sickness. In-depth exploration of theoretical stances and research addressing those issues. Prerequisite: advance graduate standing.

**458 Practicum in Health Care Research (1-18).** Practice experiences in the application of sociology to teaching, research, planning in health field. May be repeated to a maximum of 18 hours. Prerequisites: graduate student in sociology and instructor's consent.

**468 Seminar in Social Gerontology (2-3).** Analysis of selected topics in the sociological study of age; critical issues; research literature and methodologies; development of theory. Prerequisite: 322 or instructor's consent.

**470 Social Interaction Research (3).** (same as Psychology 470).

**480 Special Topics in Sociological Research Methods (1-3).** (same as Rural Sociology 480). Organized study of selected research topics. Subjects and earnable credit may vary across semesters. May be repeated with departmental consent. Prerequisite: 430 or equivalent.

**490 Research (cr. arr.)** Advanced work leading to thesis or dissertation. Prerequisite: consent of major advisor.

## SOUTH ASIA STUDIES

**1 Elementary Hindi I (3).** Oral-aural and structural approach. Devanagari script. Offered only in the Fall. f.

**2 Elementary Hindi II (3).** Continuation of 1. w.

**3 Elementary Hindi III (3).** Continuation of 2. f. Prerequisite: 2 or equivalent.

**4 Elementary Hindi IV (3).** Continuation of 3. w. Prerequisite: 3 or equivalent.

**110 Civilization of India (3).** (same as Anthropology 110, History 110).

**115 Philosophy: East and West (3).** (same as Philosophy 115).

**132 Hinduism (3).** (same as Religious Studies 132).

**133 Buddhism of India & Tibet (3).** (same as Religious Studies 133).

**171 Geography of Asia (3).** (same as Geography 171).

**181 Asian Civilizations (3).** (same as History 181, Political Science 181).

**203 Advanced Hindi Readings I (4).** Directed readings in the literature of the student's area of concentration, and advanced conversation. f.

**204 Advanced Hindi Readings II (4).** Continuation of 203. w.

**230 Mythology of South Asia (3).** (Same as Religious Studies 230)

**301 Topics (cr. arr.)** Organized study of selected topics. Subjects and earnable credit may vary from semester to semester. May be repeated with departmental consent.

**332 The Vedas (3).** (Same as Religious Studies 332)

**350 Special Readings in South Asian Languages (1-6).** Individual advanced study of desired South Asian language. Prerequisite: two years of South Asian languages.

**360 Asian Philosophy (3).** (same as Philosophy 360).

**362 Philosophy of India (3).** (same as Philosophy 362).

**371 Southeast Asia (3).** (same as Geography 371).

**372 Geography of South Asia (3).** (same as Geography 372).

**374 Contemporary South Asian Political Systems (3).** (same as Political Science 374).

**384 Religion and Politics in Modern India, 1857-1947 (3).** (same as History 384).

**400 Problems (3).** (same as History 400).

**474 Problems of South Asia (3).** (same as Political Science 474).

## SPANISH

**1 Elementary Spanish I (5).** cor.

**2 Elementary Spanish II (5).** Continuation of 1. Prerequisite: grade of C or better in 1 or its equivalent. cor.

**3 Elementary Spanish III (3).** A multi-skill course following II, centering on cultural/literary readings, and including a grammar review, practice in the spoken language, as well as some practice in written expression. Prerequisite: 2 or equivalent.

**103 Spanish Reading (3).** Prerequisite: 2 or equivalent. cor.

**106 Intermediate Spanish Composition and Conversation (3).** Prerequisite: 3 or equivalent.

**109 Spanish Conversation (3).** Prerequisite: 3 or equivalent.

**110 Spanish Civilization (3).** Survey of Spanish history, arts and culture. Open to any student interested. No knowledge of Spanish required. Prerequisite: Sophomore standing.

**111 Spanish Literature in Translation (3).** May not be included in area of concentration in Spanish. Subject varies with instructor. Prerequisite: Sophomore standing.

**112 Latin American Civilization (3).** Survey of Latin American history, arts and culture. Open to any student interested. No knowledge of Spanish required. Prerequisite: Sophomore standing.

**196 Honors Readings in Spanish (1).** Directed readings in area of Honors thesis. Prerequisite: admission to departmental Honors program.

**197 Honors Thesis in Spanish (3).** Required of Honors candidates.

**201 Topics (cr. arr.)** Organized study of selected topics. Subjects and earnable credit may vary from semester to semester. Repeatable with departmental consent. Prerequisite: Sophomore standing.

**203 Introduction to Hispanic Literature I (3).** Selected prose fiction and nonfiction prose of Spain and Spanish America. Prerequisite: 106 or equivalent.

**204 Introduction to Hispanic Literature II (3).** Selected plays and poetry of Spain and Spanish America. Prerequisite: 106 or equivalent.

**206 Advanced Spanish Composition (3).** Prerequisite: 106 or equivalent.

**207 Intensive Beginning Spanish (3).** Designed for rapid acquisition of a reading knowledge of Spanish. Cannot be taken to fulfill undergraduate language requirement. Prerequisite: Graduate standing or instructor's consent.

**208 Commercial Spanish (3).** Business terminology and forms. Translate and compose business letters and documents for advertising and promotion, trade and commerce, imports and exports, money and banking. Prerequisite: 106 or equivalent.

**209 Advanced Spanish Conversation (3).** Prerequisite: 106 or equivalent.

**211 Intensive Beginning Spanish I (5).** Intense approach designed for rapid advancement in acquisition of multiskills of the language. Prerequisite: Sophomore standing or instructor's consent.

**212 Intensive Beginning Spanish II (5).** Intense approach designed for rapid advancement in acquisition of multiskills of the language. Prerequisite: 211 or equivalent.

**223 Mexican Culture and Civilization (2).** Study of Mexican culture and civilization through field trips, excursions and selected readings in Mexican history and literature. No knowledge of Spanish required. Open only to participants in UMC's summer study program in Mexico. Prerequisite: Sophomore standing or instructor's consent.

**256 Stylistics (3).** Prerequisite: 206 or equivalent.

**301 Topics (cr. arr.)** Organized study of selected topics. Subjects and earnable credit may vary from semester to semester. Repeatable with departmental consent. Prerequisite: Junior standing.

**309 Spanish Medieval Literature (3).** Prerequisite: 3 or equivalent. Recommended: 203 & 204.

**310 Renaissance and Golden Age Poetry (3).** Prerequisite: 3 or equivalent. Recommended: 203 & 204.

**311 Renaissance and Golden Age Prose (3).** Prerequisite: 3 or equivalent. Recommended: 203 & 204.

**312 Spanish Theatre in the Golden Age (3).** Prerequisite: 3 or equivalent. Recommended: 203 & 204.

**313 Don Quijote (3).** Prerequisite: 3 or equivalent. Recommended: 203 & 204.

**317 Spanish Poetry in the Nineteenth and Twentieth Centuries (3).** Prerequisite: 3 or equivalent. Recommended: 203 & 204.

**318 Nineteenth-Century Spanish Drama (3).** Prerequisite: 3 or equivalent. Recommended: 203 & 204.

**319 Nineteenth-Century Spanish Novel (3).** Prerequisite: 3 or equivalent. Recommended: 203 & 204.

**320 Twentieth-Century Spanish Drama (3).** Prerequisite: 3 or equivalent. Recommended: 203 & 204.

**321 Twentieth-Century Spanish Novel (3).** Prerequisite: 3 or equivalent. Recommended: 203 & 204.

**323 Advanced Mexican Culture and Civilization (2).** Study of Mexican culture and civilization through supervised field work experience. Prerequisite: 103 or equivalent. Open only to participants in UMC's summer study program in Mexico.

**325 Techniques of Literary Translation (3).** Introduces the history, theory and practice of literary translation. Emphasizes practice. Student is expected to produce a brief, publishable translation. Prerequisite: advanced reading knowledge of Spanish.

**331 Survey of Spanish American Literature I (3).** From beginning to 1880. Prerequisite: 3 or equivalent. Recommended: 203 & 204.

**332 Survey of Spanish American Literature II (3).** From 1880 to present. Prerequisite: 3 or equivalent. Recommended: 203 & 204.

**341 Argentine Literature (3).** Prerequisite: 3 or equivalent. Recommended: 203 & 204.

**345 Modernista and Contemporary Poetry (3).** Prerequisite: 3 or equivalent. Recommended: 203 & 204.

**350 Special Readings (1-3).** Independent study through readings, conferences, reports. Prerequisite: 3 or equivalent. Undergraduates must have department chairman's consent.

**353 Readings in Spanish (2-3).** Subject varies according to instructor. Prerequisite: 3 or equivalent. Recommended: 203 & 204.

**355 The Spanish American Theatre (3).** Prerequisite: 3 or equivalent. Recommended: 203 & 204.

**360 Phonetics (3).** (same as Linguistics 360). Prerequisites: 3 & 109 or equivalent.

**361 History of the Spanish Language (3).** (same as Linguistics 361). Diachronic analysis of phonological, morphological, and syntactical systems of Spanish, from Vulgar Latin to contemporary dialects. Prerequisite: Graduate standing.

**400 Problems (cr. arr.)** Prerequisite: Graduate standing.

**401 Literary Research in Hispanic Studies (3).** Principles and aims of literary scholarship; systematic study of bibliographic resources for research. Prerequisite: Graduate standing.

**410 Seminar (2-3).** Subject varies according to instructor. Prerequisites: 203 & 204 or equivalent.

**412 Studies in Spanish Literature of the Medieval Period (3).** Prerequisites: 203 & 204 or equivalent. Recommended: 460.

**415 Studies in Spanish Literature of the Renaissance (3).** Prerequisites: 203 & 204 or equivalent. Recommended: 310.

**416 Studies in Spanish Literature in the Golden Age (3).** Prerequisites: 203 & 204 or equivalent. Recommended: 311, 312, or 313.

**419 Studies in Nineteenth-Century Spanish Literature (3).** Prerequisites: 203 & 204 or equivalent. Recommended: 317, 318, 319, or 322.

**420 Studies in Twentieth-Century Spanish Literature (3).** Prerequisites: 203 & 204 or equivalent. Recommended: 317, 320, 321, or 322.

**425 Techniques of Literary Translation (3).** Student should demonstrate familiarity with basic theories of translation and produce a cohesive unit of publishable translations (several short stories, a group of poems, a play, etc.). Prerequisite: 325.

**430 Studies in Spanish-American Poetry (3).** Prerequisites: 203 & 204 or equivalent.

**431 Studies in Spanish-American Fiction (3).** Prerequisites: 203 & 204 or equivalent.

**460 Old Spanish--Phonology, Morphology and Syntax (3).** Prerequisite: knowledge of Latin, to be demonstrated by passing departmental written examination or by completing Latin 201 with grade of B or better.

**480 Readings (3-6).** Independent readings in preparation for Ph.D. comprehensive examination in Spanish. Prerequisite: Graduate standing.

**490 Research (cr. arr.)** Prerequisite: Graduate standing.

## SPECIAL EDUCATION

**L40 Advisory Seminar in Special Education (1).** Orientation to the departmental programs, degree program planning and introduction to the professional field of special education. Required course for departmental majors. S/U only.

**L50 Freshman Readings in Special Education (1).** Introduction to special education through small discussion groups that read and review books relating to lives of exceptional children. Prerequisite: departmental consent.

**L101 Survey of Special Education (3).** Historical orientation, prevalence of problems, current concepts and educational programming in special education. f,w.

**L150 Special Readings (1-3).** Directed study of literature and research reports in special education.

**L160 Field Experiences: Early Childhood Special Education (1-3).** Supervised observational and instructionally-related activities in early childhood special education. f,w,s.

**L162 Field Experiences: Primary Special Education (1-3).** Supervised observational and instructionally-related activities in primary special education. f,w,s.

**L163 Field Experiences: Intermediate Special Education (1-3).** Supervised observational and instructionally-related activities in intermediate special education. f,w,s.

**L164 Field Experiences: Secondary Special Education (1-3).** Supervised observational and instructionally-related activities in secondary special education. f,w,s.

**L299 Student Teaching in Special Education (cr. arr.)** Hours, credit must be arranged before preregistration. Application should be made in term preceding registration. Prerequisite: curriculum/ methods course(s) in area of specialization.

**L321 Introduction to Mental Retardation (3).** Overview of field of mental retardation through study of certain historical developments, concepts, problems, issues, definitions, and nomenclature basic to its understanding. Prerequisites: L101 & Educational Psychology A102; or L339.

**L322 Secondary Methods in Mental Retardation (3).** Characteristics, needs and programs unique to mentally retarded adolescents and adults. Emphasis on vocational and community-based services. Appropriate course content for those planning to work with retarded adults in vocational/educational settings. Prerequisites: L339, L321.

**L323 Curriculum for Severely & Trainable Mentally Retarded (3).** Practices, problems in curriculum development for trainable and severely mentally retarded children and youth; identification of needs, goals; content determination; material and classroom organization; instructional methods. Prerequisites: L321 & L339.

**L324 Assessment of Functional Skills of Severely Handicapped Students (3).** Trains prospective teachers in standardized and criterion-referenced methods of assessment on various curriculum areas for moderately and severely handicapped students. Opportunities to apply various assessment techniques. Prerequisites: L321, L339.

**L330 Teaching the Mentally Retarded (2).** Study of learning characteristics, evaluation, teaching techniques, and methods and curriculum adaptations for mentally retarded. Prerequisite: Educational Psychology A102.

**L334 Introduction to Education of the Crippled and Health Impaired (3).** An overview of crippled and health-impaired youth through a study of historical developments, concepts, problems, issues, causes, definitions, nomenclature basic to its understanding. Prerequisites: L101 & Educational Psychology A102.

**L335 Medical Lectures Relating to Physical Disabilities (3).** Provides prospective educators, recreation specialists and rehabilitation personnel with medical information on orthopedic disabilities found in handicapped populations. Medical experts offer information on characteristics, implications and management techniques.

**L336 Education of the Multihandicapped (2).** Study of the many problems associated with the education of multihandicapped children and youth, with specific attention directed to needs of the cerebral palsied. Prerequisites: L334 & L339.

**L337 Methods in Teaching the Gifted and Talented (3).** Study of the unique learning characteristics, teaching techniques, curriculum and methods adaptations, and evaluation approaches appropriate with gifted and talented students.

**L338 Introduction to Education of the Gifted (3).** Overview of field of gifted education through study of historical developments, concepts, problems, issues, definitions and nomenclature basic to its understanding.

**L339 Education of Exceptional Children (3).** Study of special educational and psychological problems of the child who deviates from the normal.

**L342 Introduction to Learning Disabilities (3).** Overview of field of learning disabilities through study of certain historical developments, concepts, problems, issues, definitions, and nomenclature basic to its understanding. Prerequisites: L101 & L339 & Educational Psychology A102.

**L346 Language Development of Exceptional Children (3).** Language acquisition and development, standardized and informal assessment methods and instruments, language remediation programs, linguistic research methodology, and specific intervention strategies for exceptional children. Prerequisite: L101 or L339. f,w,s.

**L351 Introduction to Education of Behaviorally Disordered Children (3).** Provides overview of field of education of emotionally disturbed children/youth through study of certain historical developments, concepts, problems, issues, definitions, nomenclature basic to its understanding. Prerequisite: L339 or Educational Psychology A102.

**L352 Teaching the Behaviorally Disordered (3).** Study of educational practices specific to teaching behaviorally disordered children. Consideration is given to the extension of information acquired in methods courses and alternatives in management of behavior. Prerequisite: instructor's consent. f,w,s.

**L353 Educational and Behavioral Intervention Procedures in Special Ed (2-3).** Acquaints students with historical background, developments, concepts, definitions, terminology and techniques of educational and behavioral intervention, as well as practical application of these procedures. Prerequisite: Educational Psychology A102.

**L360 Topics in Special Education (cr. arr.)** In-depth study of certain developments, findings, trends and issues in one or more areas of special education. Prerequisite: Educational Psychology A102.

**L361 Psychoeducational Assessment of Exceptional Children (3).** Study of assessment procedures and instruments used in the evaluation of exceptional children, including both standardized and informal measures of intellectual capacity, academic achievement, language, social-emotional behaviors, and correlate areas. Prerequisites: L339 and junior standing.

**L362 Psychoeducational Assessment of Exceptional Children-Laboratory (2).** Structured experience in administration and interpretation of observation techniques and assessment instruments with the exceptional child. Prerequisite: L361, or concurrently.

**L363 Behavioral Management with Exceptional Children (3).** Acquaints students with psychosocial determinants of behavior and procedures for effective behavioral intervention in the education of exceptional children. Prerequisites: L339 and junior standing.

**L364 Behavioral Management with Exceptional Children-Laboratory (2).** An opportunity to gain practical experiences in application of behavioral management and intervention procedures with exceptional children. Prerequisite: L363, or concurrently.

**L365 Instructional Programming for Exceptional Children (3).** Orientation to theoretical and pragmatic aspects of curriculum development and instructional programming with the exceptional child. Prerequisites: L339 and junior standing.

**L366 Instructional Programming for Exceptional Children-Laboratory (2).** Simulated and actual experiences relative to curriculum development and instructional programming. Prerequisite: L365, or concurrently.

**L367 The Use of Instructional Materials With Exceptional Children (3).** Identification, development, evaluation of materials and media appropriate for instruction of exceptional children. Prerequisites: L339 and junior standing.

**L368 Instructional Materials with Exceptional Children-Laboratory (2).** Exposure to materials and media in an instructional materials center and special education programs. Prerequisite: L367, or concurrently.

**L371 Vocational Education for Handicapped Students (3).** (same as Practical Arts and Vocational-Technical Education F371). Provides a non-categorical orientation to secondary and post-secondary level vocational programming for handicapped students. Prerequisite: L339.

**L381 Introduction to Early Childhood Special Education (3).** An overview of theoretical perspectives, issues underlying education of young handicapped children (birth to five years). Rationale, scope, theoretical foundations for early intervention and legislative issues. Prerequisites: L339 and junior standing. f,w.

**L400 Problems in Special Education (cr. arr.)**

**L410 Seminar in Special Education (1-3).**

**L415 Practicum in Special Education Area of Handicapped (2-8).** Provides graduate practicum experience relevant to the education of exceptional children. Prerequisites: L339 & instructor's consent.

**L420 Trends and Issues in Special Education (3).** A study of the historical developments and related trends, issues and problems associated with the education of exceptional children. Prerequisites: admission to graduate study & instructor's consent.

**L421 Research With Exceptional Children (3).** Explores historical, significant, and current research in special education. Emphasizes the application of research, methodology, and findings relative to problems facing the practitioner. Prerequisites: admission to graduate study & instructor's consent.

**L422 Assessment and Remediation of Learning Disabilities (3).** Provides further study of the methods, materials, and current research on psychoeducational assessment and program planning for the disabled learner. Prerequisites: L342 or Instructor's consent. f, w, s.

**L423 Modules on Curriculum and Instruction for Exceptional Children (3).** Emphasizes development of skills needed by educators who serve as consultants or resource persons in special education programs. Prerequisites: admission to graduate study & instructor's consent.

**L424 Programmatic Approaches to Educ. of Child. with Behav. Disorders (3).** Course provides an in-depth study of the major educational treatment programs for behavior disordered children. Prerequisites: admission to graduate study & instructor's consent.

**L425 Psychological and Sociological Aspects of Mental Retardation (3).** Explores basic psychological and sociological factors in mental retardation. Learning characteristics of the mentally retarded and mental retardation as a social problem. Prerequisites: admission to graduate study & instructor's consent.

**L490 Research in Special Education (cr. arr.)**

## SPEECH AND DRAMATIC ART

**2 Voice and Articulation (2).** Techniques for improving speaking voice; theories underlying techniques. Attention to student's articulation, pronunciation, voice quality, general expressiveness. f, w.

**3 Television and Radio in Modern Society (2-3).** Introduction to the historical, social, economic and artistic aspects of broadcasting. f, w.

**4 Stage Movement for the Actor (2).** Basic work in the techniques that comprise movement training for the actor. Prerequisite: instructor's consent.

**6 The Theatre in Society (2).** Examines the role and scope of the theatre in the modern world community. f, w.

**20 Principles of Technical Theatre Production (2).** Practical experience in executing theatrical designs for scenery, properties, lighting, costumes, etc., including construction and crew assignments.

**43 Stage Makeup (1).** Character analysis, facial anatomy, color for stage and television makeup. Practice in application. f, w.

**60 Principles of Script Analysis (2).** Methodologies of script analysis for theatrical purposes.

**75 Introduction to Speech Communication (3).** Principles, process of speech communication in conversational, small group, public speaking situations. One large assembly, two small task-oriented group meetings per week.

**90 Black Theatre Workshop (2).** Performance-oriented course which explores the Black Experience through study of voice, movement, and application of acting theory. May repeat to 6 hours maximum.

**105 Basic Audio Production and Performance (3).** Radio speaking in varied types of programs; console operations, tape editing, microphone techniques. Prerequisite: instructor's consent.

**110 Great Speakers (2).** Analysis of masterpieces of British, American oratory. Audience, occasion, speaker, subject. Prerequisite: sophomore standing. f, w.

**120 University Theatre Workshop (1).** Credit earned in performance and technical project under faculty supervision in or in support of University Theatre productions. May be repeated to total of 3 hours. Prerequisite: instructor's consent. f, w.

**141 Nonverbal Communication (3).** Analysis of form and content of nonverbal communication. Emphasis on role of nonverbal cues in interpersonal communication. Prerequisite: 75.

**143 Acting for Non-Majors (3).** Basic theory and practice of acting for the nontheatre major.

**161 Interpersonal Communication (3).** Principles of interpersonal speech communication in development of societal, educational and vocational relationships. Prerequisite: 75.

**171 Group Communication (3).** (same as Peace Studies 171). Procedures and techniques of interpersonal communication in small groups.

**173 Argument and Advocacy (3).** Principles of argument, strategies in advocacy, evidence, fallacies; designed for prelaw students.

**196 Honors in Speech (2).** Special work for Honors candidates in speech. f, w.

**197 Honors in Speech (2).** Special work for Honors candidates in speech. f, w.

**205 Performance in the Visual Media (3).** Basic styles and presentational skills necessary in performing for film and television. Prerequisite: instructor's consent.

**206 Advanced Audio Production (3).** Principles, practices of audio production in varied program formats: laboratory work at KBIA. Prerequisites: 105, instructor's consent.

**210 Introduction to Radio, TV, Film Writing (3).** Styles and functions of various script formats for radio, television, and film productions. Prerequisite: 105 or instructor's consent.

**220 Technical Theatre Practicum (1).** Credit earned in a technical project of significant scope undertaken in support of a University Theatre production. May be repeated to total of 3 hours. Prerequisite: 20. f, w, s.

**233 Oral Interpretation of Literature (3).** Analysis, oral reading of prose, poetry, drama. Planned to meet needs of prospective teachers of English or speech or those interested in public speaking, theatre, broadcasting. Conferences, classroom presentation. f, w.

**243 Acting I (3).** Basic theory, practice of acting, stage movement. f, w.

**244 Acting II (3).** Play analysis for the actor. Theories of characterization. Individual and group rehearsal, performance. Prerequisite: 243 or instructor's consent. f, w.

**251 Beginning Theatrical Costume Design (3).** Basic practice in costume rendering using charcoal, crayon, ink, watercolor and other media. Costume history, both theatrical and general, will be surveyed. Basic problems of theatre design will be considered. Prerequisite: 20.

**252 Stagecraft (3).** Fundamentals of properties and scenic construction, stressing terminology and practical production experience. Prerequisite: 20.

**253 Design Techniques (2).** Studio course, including scene painting, drafting and perspective drawing for the theatre. Prerequisite: 20. alt. f.

**261 Theatrical Directing (4).** Theory and practice of play directing: script selection, casting, play analysis, rehearsal and performance. Prerequisite: 60. f, w.

**266 Musical Theatre Performance (3).** (Same as Music 266). A practical study for the actor of theatrical songs through character analysis, lyric interpretation and movement. A performance course. Prerequisite: instructor's consent.

**270 Culture and Communication (3).** (same as Anthropology 270).

**273 Communication in Campaigns (3).** Study of role and impact of communication in political and marketing campaigns; historical and contemporary study of influence by communication; case studies and practicum.

**275 Business and Professional Speech Communication (3).** Principles and practice of speech communication in business and professional settings. Emphasis on interviews, group conferences and personal presentations. Prerequisite: sophomore standing.

**276 Persuasive Speaking (3).** Principles, techniques of persuasive speaking. Prerequisite: 75 or instructor's consent. f, w.

**283 Contemporary American Speakers (3).** Criticism and analysis of speakers and speeches from 1950 to present. Emphasis on contemporary issues. Prerequisite: sophomore standing. w.

**301 Topics (cr. arr.)** Organized study of selected topics. Subjects and earnable credit may vary from semester to semester. May be repeated with departmental consent. Prerequisites: junior standing & instructor's consent.

**302 Experimental Film and Video (3).** An historical and theoretical overview of experimental film and video which examines sample productions from the beginning of the form through contemporary trends.

**303 Film Production (3).** An introduction to 16mm film techniques and structures, requiring student construction of brief individual films. Prerequisites: 302 or 310 and instructor's consent. f, w.

**304 Media Programming and Management (3).** Analysis and evaluation of program scheduling, audience research methodologies, and issues related to management of media facility. Prerequisite: 105 and/or instructor's consent.

**305 Television Studio Production (3).** Operation of television studio production equipment; processes and procedures of producing and directing. Prerequisites: 206 and/or instructor's consent. f, w.

**307 Broadcast Regulation and Responsibility (3).** Federal, state regulations affecting programming, operating policies of American broadcast stations; administrative authority of Federal Communications Commission; responsibility of broadcast license. Prerequisite: instructor's consent. w.

**308 Television Program Analysis and Criticism (3).** Development of critical viewing skills including analysis of program conventions, genres, and television aesthetics. (Will count as partial fulfillment of the requirement in humanistic studies.) Prerequisites: instructor's consent and junior standing.

**310 Film and Television Documentary (3).** An historical and theoretical overview of the international actuality film from the early work of Flaherty and Grierson through contemporary television documentaries.

**311 Beginning Playwriting (3).** (same as Linguistics 310). Analysis of sounds of Midwestern American dialect. Standards of pronunciation, feature analysis, transcription, articulatory mechanics in assimilation, coarticulation.

**320 Theatre Practicum (1-3).** Credit earned in advanced juried projects in acting, directing, and theatrical design. Prerequisite: instructor's consent. f, w.

**325 Television Field Production (3).** Theory and practice of TV field production, including preproduction, production with portable equipment, and electronic editing. Prerequisites: 206 and/or instructor's consent.

**330 Professional Practicum (6).** Directed professional experience within and outside the University in communications-related fields or organizations. Prerequisites: junior standing and instructor's consent. f, w, s.

**335 Television Technology (3).** Introduction to television hardware systems including reproduction and recording systems, emphasis on proficient operation of and understanding of common causes of problems within those systems. Prerequisites: 305 or 325 and/or instructor's consent.

**336 Contemporary Issues in Telecommunications (3).** Introduction to current issues and trends and relationship among the new technologies, policies, and potential impact on society. Prerequisites: 206 and/or instructor's consent.

**340 Summer Repertory Theatre (cr. arr.)** Seminar, participation, laboratory in Summer Repertory Theatre. May be repeated. Prerequisite: instructor's consent. s.

**341 Development of American Theatre I (3).** Development of the American theatre from the beginning to 1915. Prerequisite: upper division or graduate standing.

**342 Development of American Theatre II (3).** Development of American theatre from 1915 to the present. Prerequisite: upper division or graduate standing.

**343 Studies in Dramatic Theory (3).** Analysis of history, meaning and function of selected concepts of contemporary dramatic and performance theory. Prerequisite: 6 hours dramatic literature. f. alt. years.

**344 Studies in Dramatic Criticism (3).** Survey of methods of criticism of scripts and performances. Prerequisite: 6 hours dramatic literature. w. alt. years.

**347 Acting III (3).** Acting styles, period, modern. Special projects in interpretation, rehearsal, creation of roles. Prerequisite: 244 or instructor's consent.

**350 Directed Reading (1-3).** Independent reading, reports. Prerequisite: instructor's consent.

**352 Scenic Design (3).** Theory and practice of scenic design for the theatre, with particular attention to design theory and rendering. Prerequisite: 252.

**353 Advanced Theatrical Costume Design (3).** Theory and practice of costume design for the theatre. Prerequisite: 251.

**354 Stage Lighting Design (3).** Theory and practice of lighting for theatre production. Prerequisite: 252.

**362 Advanced Directing (3).** Advanced principles of theatrical directing; emphasizes stylistic variations. May be repeated once. Prerequisite: 361. w.

**363 Development of Dramatic Art I (3).** Comparative study of major dramas and their production from the Greeks to 1875. Prerequisites: 60 and junior standing or instructor's consent.

**364 Development of Dramatic Art II (3).** Comparative study of major dramas and their production from 1875 to present. Prerequisites: 60 and junior standing or instructor's consent.

**367 Theatre History I (3).** Development of the theatre, dramatic literature from classical Greek to Restoration. Prerequisites: 3-hour history course and junior standing or instructor's consent. f.

**368 Theatre History II (3).** Major dramatic movements from Restoration to present. Prerequisites: 3-hour history course and junior standing or instructor's consent.

**374 Persuasion (3).** Studies the persuasive process, attitude formation, modification. Prerequisite: 276.

**376 Communication in Organizations (3).** Theories of communication systems and processes in organizational structures; study of communication behavior in formal and informal organizational settings. Prerequisite: 171 or instructor's consent.

**377 Senior Performance Seminar (1).** Participation in group and individual performance activities with demonstrated mastery of public communication skills. Required for all speech communication majors. Prerequisite: senior standing.

**381 Principles of Rhetoric (3).** Development of rhetoric from time of Corax with emphasis on Aristotle; derivation, application of standards for judging effectiveness in communication. Prerequisite: 75 or instructor's consent. f.

**382 Process of Speech Communication (3).** Modern theories of persuasion; behavioral, experimental studies of speaker, subject, audience, occasion. Prerequisite: instructor's consent. f.

**395 Professional Seminar in Television Production (3).** Application of principles to advanced television production, direction. Prerequisites: 305 and instructor's consent.

**396 Professional Seminar in Film Production (3).** Advanced cinematography, scripting, direction, and editing of individual and group sound films. Prerequisite: 303 and instructor's consent.

**400 Problems (cr. arr.)** Individual study not leading to thesis or dissertation. Prerequisite: instructor's consent.

**401 Topics (cr. arr.)** Study of selected topics in speech and dramatic art. Topic and credit may vary semester to semester. Repeatable upon consent of department. Prerequisite: instructor's consent.

**402 Theories of Speech Communication (3).** Quantitative methods of speech research; studies of speaker, subject, audience, occasion. Prerequisite: 382, 441, or instructor's consent. w.

**403 Seminar in Speech Communication (3).** Directed research on selected topics concerning theories of speech communication. May be repeated. Prerequisite: instructor's consent. w.

**404 History and Criticism of Broadcasting (3).** Cultural, technical development of broadcasting with emphasis on responsible criticism. Prerequisite: instructor's consent. w.

**405 Seminar in Film Theory (3).** An historical survey of major film theory writings which include examination of both transformational and reproductive schools as well as more contemporary approaches like semiotics. Prerequisite: instructor's consent. w.

**406 International Broadcasting (3).** Comparative systems of broadcasting: influence, purposes of international propagandistic broadcasting; importance of international networks and satellite communication. Prerequisite: instructor's consent. w.

**407 Educational Television (3).** Uses, design, production, evaluation, technical aspects and management of educational television. Prerequisite: instructor's consent. f.

**408 Seminar in Radio-TV-Film (1-6).** Directed research in radio, television and film. Prerequisites: 9 hours radio-tv-film courses or equivalent and instructor's consent. f, w.

**410 Studies in Broadcasting (1-6).** Directed readings in current philosophical, historical, social, political, economic aspects of broadcasting. Prerequisite: instructor's consent.

**441 Introduction to Graduate Study (3).** Introduction to research methods in speech; research problems. f.

**450 Research (cr. arr.)** Independent research of advanced nature leading to report. Prerequisite: instructor's consent.



- 451 Seminar in Speech Education (3).** Directed research on selected problems in instruction and research methods in the field of speech. Prerequisite: instructor's consent. May be repeated. w.s.
- 460 Seminar in Theatre History (3).** Selected problems in theatre history. May be repeated.
- 462 Backgrounds of Modern Theatre Practice (3).** Survey of outstanding contemporary theatricians, their aesthetics and practice. Emphasis on European theatre since 1875.
- 466 Seminar in Dramatic Theory and Criticism (3).** Directed research on selected topics in dramatic theory and criticism. Prerequisite: instructor's consent.
- 483 Seminar in American Rhetoric and Public Address (1-6).** Directed research on selected topics in American rhetoric and public address. Prerequisite: instructor's consent. w.
- 485 Rhetorical Criticism (3).** Principles, practice of rhetorical theory from 16th century to present. Prerequisite: 381 or instructor's consent. f.
- 486 Seminar in Theories of Rhetoric and Criticism (1-6).** Directed research on selected topics in rhetorical theory and criticism. Prerequisite: instructor's consent. f.s.
- 487 Philosophic Foundations of Speech (3).** Examines evaluates research and trends in theories, practices in representative areas of speech. w.
- 490 Research (cr. arr.)** Research leading to thesis or dissertation. Prerequisite: instructor's consent.

## SPEECH PATHOLOGY/ AUDIOLOGY

- 22 Introduction to Speech Pathology-Audiology (1).** Types of speech, language hearing disorders; preparation of speech pathologists, audiologists; professional settings, requirements, ethics.
- 101 American Phonetics (3).** (Same as Linguistics 102)
- 120 Communication Disorders - A Survey (3).**
- 202 The Development of Spoken Language (3).** Acquisition of oral language by preschool child; attention to developmental stages. Prerequisite: English 319 or equivalent.
- 210 Speech Science (3).** (Same as Linguistics 212). Introduction to anatomical, functional aspects of speech mechanism. Prerequisite: Physiology 201.
- 215 Introduction to Clinical Practice (1-3).** Students taking this course function as junior clinicians, involved in activities such as charting, counting, behavior, and assisting senior clinicians during practicum. Prerequisite: 101, 120.
- 220 Communicative Disorders - Management and Diagnostic Techniques (3).** Basic therapeutic, diagnostic and case management techniques related to varying communication disorders. Includes 10 hours of clinical observation. Prerequisite: 120 or equivalent.
- 222 Communicative Disorders in the Classroom (3).** Not open to speech pathology-audiology majors. Survey of defects of speech, remedial approaches to elementary, secondary, special classrooms. Emphasis on articulatory disorders.
- 230 Hearing Science (3).** Physical acoustics, anatomy, physiology and psychology related to hearing. Prerequisite: 120
- 301 Topics (cr. arr.)** Organized study of selected topics. Subjects and earnable credit may vary from semester to semester. May be repeated with departmental consent. Prerequisite: junior standing & instructor's consent.
- 320 Articulation Disorders (3).** In-depth investigation of articulation disorders, including their description, diagnosis and remediation. Application of current clinical approaches to articulatory disorders. Includes a minimum of 5 hours of clinical observation. Prerequisite: 220.
- 325 Clinical Practice in Speech Pathology (1-3).** Application in clinical practice of diagnostic and remedial techniques for speech, language disorders. May be repeated for credit. Prerequisites: 215, 220.
- 330 Introduction to Audiology (3).** Hearing sciences, evaluation, conservation, aural rehabilitation. Prerequisite: 230.
- 334 Auditory Rehabilitation (3).** Speechreading, principles, and techniques of auditory training for hearing impaired children and adults. Prerequisites: Speech Pathology/Audiology 330.
- 341 Introduction to Graduate Studies on Communication Disorders (3).** Research practices in communication disorders, statistical inference based upon parametric and non-parametric tests. Prerequisite: Education R370 or equivalent.
- 350 Directed Reading (1-3).** Independent reading, reports. Prerequisite: junior standing. f.w.s.
- 400 Problems (cr. arr.)** Individual study not leading to thesis or dissertation.
- 401 Topics (cr. arr.)** Study of selected topics in Speech and Dramatic Art. Topic and credit may vary from semester to semester. Repeatable upon consent of department. Prerequisite: instructor's consent.
- 402 Developmental Linguistic Disorders (3).** Disorders of oral language; linguistic retardation, acquired aphasia. Prerequisite: 202 or instructor's consent.
- 403 Acquired Linguistic Disorders (3).** Nature, etiology, management of dysphasias. Prerequisite: 402 or equivalent or instructor's consent.
- 410 Acoustic Phonetics (3).** (Same as Linguistics 410). Research methodologies in analysis of acoustic features underlying speech, language processes, and perceptual correlates. Prerequisite: 210, 230 or equivalent.

- 411 Physiological Phonetics (3).** (same as Linguistics 411). Research methodologies in analysis of physiological features underlying speech, language processes; theories of encoding and encoding control mechanisms. Prerequisite: 210 or equivalent.
- 412 Laboratory Instrumentation in Communication Disorders (3).** Theory, research, practice in use of instruments for evaluation of normal/abnormal voice, articulation. Prerequisite: 210, 410, or 411 or instructor's consent.
- 420 Motor Speech Disorders (3).** Description, etiology, diagnosis and remediation of speech and language problems resulting from neurological and/or myogenic impairments. Prerequisite: 210, 220 or equivalent; or instructor's consent.
- 421 Fluency Disorders (3).** Identification and remediation of fluency disorders in children and adults. Prerequisite: 210, 220 or equivalent; or instructor's consent.
- 422 Voice and Cleft Palate (3).** Communication disorders associated with vocal pathologies and craniofacial anomalies. Prerequisite: 210, 220 or equivalent; or instructor's consent.
- 425 Clinical Practice in Speech Pathology (1-3).** Supervised clinical practice in speech pathology for graduate students. May be repeated for credit. Prerequisite: 325 or equivalent.
- 426 Diagnostics in Speech Pathology (3).** Supervised diagnostic experiences with children and adults having speech and/or language disorders. Prerequisite: instructor's consent.
- 431 Pathology of Hearing (3).** Etiology, nature and rehabilitative implications of specific hearing impairments. Prerequisite: 330
- 432 Advanced Audiology I (3).** Advanced pure tone and speech audiometry; special tests, exploratory techniques; principles, procedures for hearing aid selection. Prerequisite: 330.
- 433 Advanced Audiology II (3).** Advanced principles of diagnostic audiology; central auditory assessment; audiometric standards in calibration; electrophysiologic techniques; acoustic impedance measurements. Prerequisite: 432.
- 435 Clinical Practice in Audiology (1-3).** Supervised; integrated with diagnostic and rehabilitation programs. May be repeated for credit. Prerequisite: 330.
- 450 Research (cr. arr.)** Research of an advanced nature leading to a report.
- 490 Research (cr. arr.)** Research leading to a dissertation or thesis.

## STATISTICS

- 31 Elementary Statistics (3).** Collection, presentation of data; averages; dispersion; introduction to statistical inference, regression and correlation. Prerequisite: Mathematics 10. f.w.s. cor.
- 150 Introduction to Probability and Statistics I (3).** Designed primarily for students in College of Business & Public Administration. Probability theory; random variables; expectation; probability distributions; descriptive statistics; sampling distributions. Prerequisite: Mathematics 61. f.w.
- 198 Honors (2).** Special work for Honors candidates in statistics.
- 199 Honors (2).** Special work for Honors candidates in statistics.
- 207 Statistical Analysis (3).** For graduate students and superior seniors with no previous training in statistics. Intensive study of concepts, techniques of statistical analysis, and their applications. Prerequisite: Mathematics 10 or equivalent. f.w.
- 234 Intermediate Statistics (3).** Probability concepts; elements of sampling; tests of hypotheses; methods of estimation; regression and correlation. Prerequisite: 31. f.w.s.
- 250 Introduction to Probability and Statistics II (3).** Continuation of 150. Estimation; hypothesis testing; regression; correlation; statistical decision theory; Bayesian inference. Prerequisite: 150. f.w.
- 300 Problems (1-3).** Independent investigations. Reports on approved topics. Prerequisite: instructor's consent. f.w.s.
- 301 Topics (cr. arr.)** Organized study of selected topics. Subjects and earnable credit may vary from semester to semester. Repeatable with departmental consent. Prerequisites: junior standing and instructor's consent.
- 302 Statistical Methods in the Health Sciences (3).** Basic inference methods, both parametric and non-parametric, appropriate for answering questions arising in health sciences research. Computer exercises involving data from real experiments from health science area. Prerequisite: Mathematics 10 and graduate standing or instructor's consent.
- 304 Statistical Computing (3).** Acquaints students with requisite computing tools for organizing, summarizing, and manipulating large data sets, applying various statistical procedures, and simulation. Prerequisite: 207 or 234 or 320 or instructor's consent.
- 307 Nonparametric Statistical Methods (3).** Statistical methods when the functional form of the population is unknown. Applications emphasized. Comparisons with parametric procedures. Goodness of-fit, chi-square, comparison of several populations, measures of correlation. Prerequisite: 207 or 234 or equivalent.
- 320 Introduction to Mathematical Statistics (3).** (same as Mathematics 320). Introduction to theory of probability and statistics using concepts and methods of calculus. Prerequisite: Mathematics 201 or instructor's consent. f.w.s.
- 325 Introduction to Probability Theory (3).** (same as Mathematics 325). Probability spaces; random variables and their distributions; repeated trials; probability limit theorems. Prerequisite: Mathematics 201 or instructor's consent. f.w.s.
- 326 Statistical Inference I (3).** (same as Mathematics 326). Sampling; point estimation; sampling distribution; tests of hypotheses; regression and linear hypotheses. Prerequisite: 325.
- 328 Introduction to Stochastic Processes (3).** Study of random processes selected from: Markov chains, birth and death processes,

- random walks, Poisson processes, renewal theory, Brownian motion, Gaussian processes, white noise, spectral analysis, applications such as queuing theory, sequential tests. Prerequisite: 325.
- 329 Applied Probability (3).** Probability in its applied context. Designed for seniors and beginning graduate students. Construction of probability models. Examples in physical and behavioral sciences. Multivariate normal and exponential distributions, extreme value distributions, stochastic processes, queuing. Prerequisite: 325 or equivalent.
- 370 Sampling Techniques (3).** Theory of probability sampling designs. Unrestricted random sampling. Stratified sampling. Cluster sampling. Multistage or subsampling. Ratio estimates. Regression estimates. Double sampling. Prerequisite: 207 or 234 or 250 or 320 or 326. w.s.
- 375 Operations Research (3).** Study of mathematical and statistical models employed in operations research. Prerequisite: 207 or 234 or 250 or 320 or 326. f.
- 380 Statistical Forecasting (3).** (same as Management 380, Marketing 380, Finance 380).
- 385 Regression and Correlation Analysis (3).** Measurement of relationships among variables including multiple regression, partial correlation, and some nonparametric methods. Prerequisites: 207 or 234 or 250 or 320 or 326 & Mathematics 80. f.w.
- 395 Analysis of Variance (3).** Problems of measuring separate and joint effects of two or more factors on results of an experiment. Prerequisite: 207 or 234 or 250 or 320 or 326. f.w.
- 400 Problems and Special Readings (cr. arr.)** Approved reading and study, independent investigations, and reports on approved topics. Prerequisites: graduate standing & instructor's consent. f.w.s.
- 403 Statistical Inference II (3).** Multivariate distribution functions. Multivariate normal. Asymptotic methods. Asymptotic distributions of maximum likelihood estimators and chi-square goodness-of-fit statistic. Optimal statistical procedures. Statistical decision theory. Prerequisites: 326, Mathematics 310 or Mathematics 302, & Mathematics 331.
- 411 Statistics Seminar (cr. arr.)**
- 416 Statistical Consulting (3).** Participation in statistical consulting under faculty supervision. Formulation of statistical problems. Planning of surveys and experiments. Statistical computing. Data analysis. Interpretation of results in statistical practice. Prerequisites: 326; 464 or 385 & 395; instructor's consent.
- 420 Bayesian Statistics (3).** Bayes theorem, subjective probability as a measure of belief, likelihood principle, noninformative priors, conjugate priors, nuisance parameters, statistical decision, backwards induction, stable estimation, Bayesian hypothesis testing, applications. Prerequisites: 326, Mathematics 302 and Mathematics 331.
- 423 Experimental Design (3).** Examination and analysis of modern statistical techniques applicable to experimentation in social, physical or biological sciences. Prerequisite: 395 or instructor's consent.
- 430 Life Testing and Reliability (3).** Statistical failure models. Parametric procedures. Robustness considerations. Nonparametric life test procedures. Bayes methods in reliability. System reliability. Accelerated life testing. Prerequisite: 403 or instructor's consent.
- 440 Advanced Probability (3).** (same as Mathematics 440). Measure theoretic probability theory. Characteristic functions; conditional probability and expectation; sums of independent random variables including strong law of large numbers and central limit problem. Prerequisites: 325 or 401, & 406; or instructor's consent.
- 452 Special Topics in Statistics (cr. arr.)** Prerequisite: instructor's consent.
- 460 Theory of Estimation and Hypothesis Testing (3).** Theory of both estimation and test of hypotheses including sufficient statistics, exponential family, likelihood, minimax and Bayes estimates, Neyman-Pearson lemma, locally best tests, confidence ellipsoids and sequential tests and estimates. Prerequisite: 326.
- 461 Advanced Inference (3).** General proof of optimality of Neyman-Pearson lemma, similar region tests, optimality of sequential tests, likelihood ratio tests, likelihood estimation, proof of consistency, admissibility and Bayes rule. Prerequisites: 460, and Mathematics 302 or 310, or instructor's consent.
- 464 Linear Models I (3).** Elementary regression (curve fitting) and analysis of variance (crossed classification, blocking, analysis of covariance) applied to scientific examples. Various numerical examples provided. Prerequisites: calculus & a first course in statistical inference. f.
- 465 Linear Models II (3).** Mathematically more mature study and application of the general linear model. Other related regression and analysis of variance models. Prerequisite: 464. Corequisite: 326, Mathematics 302 or 310, Mathematics 331. w.
- 466 Multivariate Analysis (3).** Distribution of sample correlation coefficients. Derivation of generalized T-squared and Wishart distributions. Distribution of certain characteristic roots, vectors. Test of hypotheses about covariance matrices and mean vectors. Discriminant analysis. Prerequisite: 403 or instructor's consent.
- 470 Theory of Nonparametric Statistics (3).** Estimation, hypothesis testing, confidence intervals, etc., when functional form of the population distribution is unknown. Prerequisite: 403 or instructor's consent.
- 490 Research (cr. arr.)**

## SURGERY

- A Surgery Clerkship Block I (10).** A required surgical clerkship of 12 weeks is offered to third year students throughout their junior year. The students spend six weeks on two of the surgical specialties. Emphasis is placed upon the principles of diagnosis and treating common surgical disorders. Students are an integral part of the surgical

team and participate in the preoperative examination and evaluation of patients, assist in surgical procedures, and aid in the postoperative management. The student is expected to function as a member of the surgical team. Clinical responsibilities are increased in proportion to the student's knowledge and ability. Teaching rounds are supplemented by lectures seminars and conferences.

**B Surgery Clerkship Block II (5).** Students spend the entire time on general surgery. During which emphasis is placed upon surgical physiology and anatomy and upon the principles of diagnosis and treating common surgical disorders. Students are an integral part of the surgical team and participate in the preoperative examination and evaluation of the patients, assist in the surgical procedures, and aid in the postoperative management. Teaching rounds are supplemented by lectures, seminars, and conferences.

**C Surgical Electives (10).** Each of the surgical divisions offers electives in clinical and investigational surgery. These electives offer the student an opportunity to obtain an in-depth experience with close supervision.

**P Postgraduate Instruction (0).** Formal training programs are established in the following divisions of surgery: general surgery, 5 years; genito-urinary surgery, 5 years; neurosurgery, 4 years; orthopaedic surgery, 5 years; otolaryngology, 4 years; plastic surgery, 2 years; and thoracic surgery, 2 years.

## VETERINARY ANATOMY

**202V Veterinary Anatomy (8).** Correlative study of the anatomy of domestic and laboratory animals in which microscopic, developmental and gross anatomy are integrated. Attention given to medical nomenclature, connective tissues, muscular, respiratory and circulatory systems.

**203V Veterinary Anatomy (10).** Continuation of 202V. Particular attention given to the nervous, urogenital, and digestive systems, endocrine glands, skin and its derivatives.

**219 Elements of Veterinary Anatomy (3).** For agriculture and other students desiring basic knowledge of anatomical terminology and the comparative functional anatomy (developmental, microscopic and gross) of domestic animals. Prerequisite: 5 hours biological sciences (zoology) or equivalent.

**303 Cytology, Histology and Microscopic Anatomy of Domestic Animals (5).** Detailed study of cytology, histology and microscopic anatomy, including an examination of organology of domestic animals through lecture and laboratory activities. Prerequisites: graduate standing, background in biological sciences, instructor's consent.

**305 Histological and Anatomical Techniques (cr. arr.)** Detailed study and practice of techniques used in preparation of specimens for microscopic and macroscopic study. Prerequisites: background in chemistry & anatomy; instructor's consent.

**307 Embryology and Development of Domestic Animals (2).** Developmental anatomy of domestic animals. Special written report and/or review required. Prerequisites: background in biological science & departmental consent.

**311 Canine Dissection (6).** Study of gross anatomy of the dog by lecture, dissection, discussion. Special written report and/or review required. Prerequisites: background in biological science & departmental consent.

**312 Anatomy of Common Domestic Animals (5).** Gross anatomy of horse, ox, sheep, pig, cat, chicken; particular attention to areas of veterinary medical importance. Special written report and/or review required. Prerequisites: 311 or equivalent, biological science background & departmental consent.

**409 Advanced Microscopic Anatomy (cr. arr.)** Advanced microscopic study of selected topics in vertebrate microscopic anatomy. Special report required. Prerequisites: graduate standing, 303 or equivalent, instructor's consent.

**418 Correlative Neuroanatomy (4).** Comprehensive study of neuroanatomy of common domestic and laboratory animals. Prerequisite: graduate standing and/or instructor's consent.

## VETERINARY ANATOMY- PHYSIOLOGY

**200 Problems (cr. arr.)** Assignment of problems for training in research.

**300 Problems (cr. arr.)** Assignment of special problems or topics for training in research.

**328 Principles of Toxicology (3).** (same as Pharmacology 328).

**400 Problems (cr. arr.)** Selected problems and/or topics for advanced study in special areas to meet needs of individual students.

**410 Seminar (1).** Presentation and discussion of investigations and topics in veterinary anatomy-physiology or related fields, by qualified students, instructors, and guests. Prerequisite: departmental consent.

**450 Research (cr. arr.)** Open to graduate students with requisite preparation. Research not expected to terminate in thesis.

**490 Research (cr. arr.)** Open to graduate students with requisite preparation. Research expected to be presented as a thesis.

## VETERINARY MEDICINE AND SURGERY

**200V Problems (cr. arr.)** Studies in specific areas of veterinary medicine and surgery.

**251V Food Animal Medicine and Surgery I (10).** Technical, diagnostic and therapeutic procedures common to the practice of large animal medicine and surgery. Experience in the operation of a large animal hospital and farm outpatient practice. Offered six times yearly.

**252V Food Animal Medicine and Surgery II (1-10).** Continuation of 251V, with opportunity for concentrated study and experience. Available as part of continuing education program. Prerequisite: 251V.

**253V Small Animal Medicine I (10).** Practical discussion of medical diseases of dogs, cats and exotic pets as they affect body systems. Practical experience in the operation of a small animal hospital and outpatient practice. Offered six times yearly.

**254V Small Animal Medicine II (1-10).** Continuation elective offered to 3rd- and 4th-year students. Opportunity for concentrated study and experience in medical areas. Enrollment subject to approval of course coordinator. Available to veterinarians under continuing education program. Prerequisite: 253V or equivalent.

**255V Equine Medicine and Surgery I (10).** Technical, diagnostic and therapeutic procedures common to equine practice. Emphasis on fundamental principles. Offered six times yearly.

**256V Equine Medicine and Surgery II (1-10).** Open to 3rd- and 4th year students, subject to approval of course coordinator. Continuation of 255V, with opportunity for concentration in specific area of interest. Available to veterinarians under continuing education program.

**257V Small Animal Surgery I (10).** Diagnostic procedures and surgical techniques applicable to companion animal surgery. Practical experience in the operation of a small animal surgical practice. Offered six times yearly.

**258V Small Animal Surgery II (1-10).** Continuation of 257V, with opportunity for concentrated study and advanced surgical experience. Available to veterinarians under continuing education program. Prerequisite: 257V or equivalent.

**259V Theriogenology I (10).** Diseases of the male and female reproductive system. Manipulative and surgical techniques applicable to normal and abnormal parturition. Practical experience in reproductive diagnostic techniques, breeding soundness examination and herd reproductive health programs. Offered six times yearly.

**260V Theriogenology II (1-10).** Continuation of the prerequisite 259V, with opportunity for concentrated study and experience. An elective, subject to approval of course coordinator and faculty member(s) who supervise student's work. Available to veterinarians as a continuing education program.

**261V Medical Services I (10).** Fundamentals of radiology and anesthesiology: indications for use, techniques, pathophysiological alterations, interpretation of results, patient aftercare, protective measures against radiation hazards. Practical experience provided under hospital and outpatient practice conditions. Offered six times yearly.

**262V Medical Services II (1-10).** Continuation of the prerequisite 261V, with opportunity for concentrated study and experience. An elective, subject to approval of course coordinator and faculty member(s) who supervise student's work. Available to veterinarians as a continuing education program.

**265V Laboratory Animal Medicine and Management I (10).** Principles of veterinary medicine applied to animals used as experimental subjects in biomedical research. Consideration of procurement, husbandry, facilities, handling techniques and diseases of these animals. Offered twice yearly.

**266V Laboratory Animal Medicine and Management II (1-10).** Elective offered 3rd- and 4th-year students, subject to approval of course coordinator and supervising faculty. Concentrated study/experience in laboratory animal disease(s)/colony management. Available to veterinarians as a continuing education program.

**267V Herd Health Management and Nutrition I (1-10).** Experience in feed lot, dairy, calf/cow and swine herd veterinary practice. Stresses nutrition, herd health management, and contractual and preventive veterinary practice. Offered two times yearly.

**268V Herd Health Management and Nutrition II (1-10).** Elective offered 3rd- and 4th-year students, subject to course coordinator approval. Concentrated study/experience in feed lot, dairy, cow/calf, swine herd agribusiness enterprises applicable to veterinary practice. Prerequisite: 251V & 259V.

**271V Introduction to Clinical Sciences (7).** Integrates preclinical sciences with a systems offered in the ninth instructional period only-oriented approach to medicine and surgery.

**272V Small Animal Surgery (2.5).** Lectures (fundamental through advanced) on small animal surgery. Practical laboratory involvement in soft and hard tissue procedures. Offered in the tenth instructional period only.

**273V Radiology (2).** Introduces through lectures and demonstrations the principles of radiographic examination and interpretation of disease processes of domestic animals. Offered in the ninth instructional period only.

**274V Small Animal Medicine (2.5).** Didactic presentations regarding pathophysiology, diagnosis and therapeutic management of organ system diseases in small animals. Offered in the tenth instructional period only.

**275V Food Animal Medicine and Surgery (3.5).** Introduction to medical and surgical diseases of food-producing animals. Diagnostic and therapeutic procedures related to bovine, porcine and ovine disorders are emphasized. Offered in the tenth instructional period only.

**276V Laboratory Animal Medicine (1.5).** Principles of veterinary medicine applied to laboratory animals as pets and in research. Husbandry, handling and clinical techniques, diseases, and use as disease models are discussed. Offered in the tenth instructional period only.

**300 Problems (cr. arr.)** Studies in specific areas of veterinary medicine and surgery.

**328 Introductory Radiation Biology (3).** (same as Radiology 328, Nuclear Engineering 328, Biological Sciences 328).

**351 Advanced Surgical Techniques (cr. arr.)** Special application to large, small animals. Prerequisite: D.V.M.

**355 Advanced Techniques in Radiology (cr. arr.)** Special application to domestic animals. Prerequisite: D.V.M.

**356 Advanced Studies of Poisonous Plants and Toxicology (cr. arr.)** Prerequisite: D.V.M.

**400 Problems (cr. arr.)** Advanced studies to meet needs of individual student.

**410 Seminar (1).** Discussion of current research.

**450 Research (cr. arr.)** Open to graduate students with requisite preparation.

**487 Nuclear Medicine (3).** Degrees equivalent to D.V.M. acceptable. Principles of radiation detection instrumentation, monitoring radiological safety and diagnostic procedures used on veterinary nuclear medicine. Prerequisites: one year college physics, D.V.M. degree, & departmental consent.

**488 Radiation Therapy (3).** Radiobiological basis for radiation therapy, principles of dosimetry, and radiological safety and treatment. Designed for conditions common in veterinary medicine. Prerequisites: one year college physics, D.V.M. degree, & departmental consent.

**490 Research (cr. arr.)** Open to graduate students with requisite preparation.

## VETERINARY MICROBIOLOGY

**241V Veterinary Immunology (2).** Fundamentals of immunology as applied to domestic animals. Instructional period 4.

**242AV Veterinary Bacteriology I (3).** Classification and properties of pathogenic bacteria and fungi of animals; relationship to public health; considers pathogenesis, immunology of infection. Prerequisite: enrollment in College of Veterinary Medicine. Instructional period 5.

**242BV Veterinary Bacteriology II (2).** Continuation of 242AV. Prerequisite: same as 242AV. Instructional period 6.

**243V Veterinary Virology (3).** Classification and properties of viruses. Considers the etiologic, pathologic and immunologic aspects of viral diseases of animals. Prerequisite: enrollment in the College of Veterinary Medicine. Instructional periods 6 & 7.

**245AV Veterinary Parasitology I (3).** Parasites and parasitic diseases of ruminants, horses, swine, dogs, cats, poultry and other animals. Includes classification, morphology, and bionomics of protozoa, helminths, and arthropods. Prerequisite: enrollment in the College of Veterinary Medicine. Instructional period 5.

**245BV Veterinary Parasitology II (3).** Continuation of 245AV. Prerequisite: same as 245AV. Instructional period 6.

**246V Introduction to Epidemiology and Infectious Disease (2).** Introduces and applies epidemiologic methodology. Considers the multifactorial causes of infectious disease. Instructional period 7.

**247V Veterinary Clinical Epidemiology and Preventive Medicine (4).** Epidemiology, food hygiene control, ecology and interrelationships of disease in populations of animals and man. Primary prevention stressed. Instructional period 8.

**269V Public Health and Epidemiology (10).** Epidemiology, ecology and interrelationships of disease in populations of animals and man; food hygiene control, environmental influences on health and disease; primary prevention stressed. Offered two or three times yearly.

**270V Epidemiology and Community Health (1-10).** Elective covering advanced aspects of epidemiology and community health. Emphasizes problem solving and is designed to meet needs of the individual student. Prerequisite: instructor's consent. Instructional period arranged.

**300 Problems (cr. arr.)** f.w.s.

**340 Microbial Physiology (3).** Microbial structure and function, with biochemistry of life processes at cell and subcellular levels emphasized. Demonstration laboratories on basic instrumental methods. For microbiology students. Prerequisite: one course in microbiology & one in general biochemistry. alt. f. odd yrs.

**343 Animal Virology (4).** Lectures and laboratories on properties, host cell and disease relationships of animal viruses and on methods for their detection and study. Prerequisites: general microbiology, general biochemistry. alt. f., odd yrs.

**345 Veterinary and Human Parasitology (4).** Protozoa and helminths of veterinary and human importance; 3 one-hour lectures, 1 two-hour lab per week. Advanced undergraduate or graduate standing in biological, veterinary or medical sciences. Prerequisites: Biological Sciences 210 or equivalent and instructor's consent. w. even yrs.

**347 Clinical Epidemiology and Environmental Health (1-10).** Ecologic basis of health and disease and cause-effect relationships. Evaluation of control programs. Includes epidemiology of important acute and chronic animal diseases. Prerequisite: enrollment in a professional medical, dental or public health curriculum.

**348 Epidemiology of Zoonotic Diseases (1-10).** Zoonotic diseases of major public health importance in North America. Includes epidemiology and transmission of these diseases, with particular emphasis on control/eradication methods. Prerequisite: enrollment in a professional medical, dental or public health curriculum.

**410 Seminar (1).** Open to graduate students in veterinary microbiology and allied biological sciences. Study and discussion of current knowledge and research in microbiology, infectious diseases and epidemiology. w.

**421 Advanced Epidemiology (3).** (same as Family & Community Medicine 421).

**441 Topics in Veterinary Microbiology (1-3).** Subjects appropriate to veterinary microbiology and/or epidemiology, taught on a one-time basis or infrequently. May include highly specialized topics. Specific course must be approved by departmental faculty. Prerequisites: graduate standing & instructor's consent.

**442 Advanced Veterinary Pathogenic Bacteriology (3).** Study of pathogenic bacteria causing animal disease. Pathogenic bacteria causing animal disease. Pathogenic mechanisms and host-parasite relationships are emphasized. Laboratory procedures for isolation and identification of pathogens are included. Prerequisites: graduate standing and instructor's consent. alt. f., odd yrs.

**443 Viral Infection and Immunity (3).** Study of virus infection at the level of the intact animal. Includes immunology of domestic animal species. Prerequisites: graduate standing & instructor's consent. alt. w. even yrs.

**445 Advanced Veterinary Parasitology (3).** Parasitic diseases of domestic and exotic animals and those of public health significance. Prerequisites: one course in general parasitology & graduate standing. alt. w. odd yrs.

**446 Cellular Function in Immunity (2).** Study of the immune system at the level of the intact animal. Includes a discussion of immunity-infectious diseases. Prerequisites: Microbiology 304, graduate standing and instructors consent. alt. f. even yrs.

**447 Oncogenic Animal Viruses (3).** Biology of RNA- and DNA-containing animal tumor viruses and their in vitro and in vivo interactions with host cells. Prerequisites: 343 or Microbiology 405, or equivalent, general biochemistry or instructor's consent. alt. w. odd yrs.

**449 Epidemiology of Zoonoses (3).** (same as Family & Community Medicine 449). Detailed study of epidemiology and ecology of zoonotic diseases including control and prevention. Prerequisites: epidemiology & medical microbiology or instructor's consent. alt. f. odd yrs.

**490 Research (cr. arr.)** Nutrition, metabolism, and pathogenicity of microorganisms; host resistance mechanisms, epidemiology or preventive medicine.

## VETERINARY PATHOLOGY

**200 Problems (cr. arr.)** Assignment of special topics for research training in veterinary pathology.

**230 Animal Sanitation and Disease Prevention (3).** Preventative measures for diseases and parasites of farm animals. Prerequisite: Veterinary Anatomy-Physiology 219 or Veterinary Anatomy-Physiology 222.

**231V General Pathology (3).** Fundamental biochemical and anatomical alterations of disease. Includes disturbances in metabolism, circulation, growth and cell differentiation. Also includes the pathology of tumors. f.

**232AV Systemic and Special Pathology I (3).** Pathologic manifestations of disease in the organ systems. Includes changes caused by infectious agents and metabolic disturbances. Stresses the gross and microscopic criteria by which definitive diagnoses are made. w.

**232BV Systemic and Special Pathology II (3).** Continuation of 232AV.

**263V Diagnostic Pathology and Special Species Medicine I (10).** Application of laboratory techniques used to diagnose disease by macroscopic, microscopic, biochemical, microbiologic, and toxicologic findings. Case method of teaching. Domestic avian species and laboratory animals included. Six times yearly.

**264V Diagnostic Pathology and Special Species Medicine II (1-10).** Third- and fourth-year students. Elective. Approval of coordinator and supervisory staff. Continuation of 263V with more depth. Available to D.V.M.'s as part of continuing education program. Prerequisite: 263V or equivalent.

**300 Problems (cr. arr.)** Prerequisites: D.V.M. & departmental consent.

**335 Techniques in Pathology (cr. arr.)** Methods and techniques in fixing, preparing, staining pathological specimens.

**410 Seminar (1).** Presentation of research and topics in animal diseases. Section 1: for students in the pathology area program. Section 2: for students not in the area program. For students in veterinary medicine and allied biological fields. f,w.

**430 Comparative Pathology (3).** (same as Plant Pathology 430, Pathology 430). Biochemical and morphologic lesions related to the mechanism of disease expression in plants and animals.

**431 Advanced Veterinary Pathology (3-5).** Specific assignments on diagnostic methods including surgical pathology, necropsies, toxicology. Prerequisite: departmental consent.

**432 Advanced Histopathology (5).** Advanced microscopic study of pathological tissues. Prerequisite: departmental consent.

**433 Veterinary Oncology (3).** Study of animal neoplasms. Prerequisite: departmental consent.

**434 Advanced Clinical Pathology (4).** Laboratory techniques; application to diagnosis of animal diseases. Prerequisite: departmental consent. alt. f. even yrs.

**437 Pathology of Laboratory Animals (3).** (same as Laboratory Animal Medicine Area 437). Gross and microscopic study of spontaneous and naturally occurring diseases in laboratory animals. Prerequisite: departmental consent. alt. w. even yrs.

**438 Primatology (3).** (same as Laboratory Animal Medicine Area 438). Diseases and pathology of primates. Prerequisite: departmental consent. alt. f. even yrs.

**450 Research (cr. arr.)**

**451 Electron Microscopy (1).** (same as Plant Pathology 451). w.

**452 Transmission Electron Microscopy Laboratory (4).** (same as Plant Pathology 452). s.

**453 Scanning Electron Microscopy Laboratory (3).** (same as Plant Pathology 453). Second half winter.

**490 Research (cr. arr.)** Open to graduate students with requisite preparation. Research on specific animal diseases, prevention and treatment.

## VETERINARY PHARMACOLOGY AND TOXICOLOGY

**226V Veterinary Pharmacology (3).** General principles of pharmacology. Particular emphasis on pharmacodynamics.

**227V Veterinary Pharmacology/Anesthesiology (3).** Systemic study of drugs commonly employed in veterinary practice. Particular emphasis on pharmacotherapy, anesthetics and drugs affecting the central nervous system.

**228V Veterinary Toxicology (3).** Biological responses to foreign chemicals, especially those not discussed in nutrition and pharmacology. The principles and molecular basis of intoxication are presented.

**326 Veterinary Pharmacology (3).** General principles of pharmacodynamics in domesticated animals.

**328 Principles of Toxicology (3).** Essentials of toxicology and survey of major toxicant groups, including poisonous plants, and the industrial and agricultural chemicals. Prerequisite: biochemistry or instructor's consent.

## VETERINARY PHYSIOLOGY

**220V Veterinary Physiology (5).** Physiology of muscle, nervous, circulatory, respiratory systems. Lecture, lab designed to emphasize principle important to practice of veterinary medicine.

**221V Veterinary Physiology (6).** Continuation of 220V. Digestion, excretion, endocrinology, and reproduction.

**222 Fundamentals of Animal Physiology (3).** For students not enrolled in the professional veterinary medicine curriculum. Relationship of structure and function in the common domestic animals. Study of intercellular material, cells, tissues, organs and systems.

**224V Veterinary Physiological Chemistry (5).** Chemistry of carbohydrates, lipids, proteins, other physiologically important chemical systems. Basic intermediary metabolism with special attention to areas of importance to veterinary medicine.

**420 Veterinary Physiology (5).** Systematic physiology for graduate students with primary interest in animals other than man. Function of nerve, muscle, circulatory and respiratory systems. Prerequisites: Biochemistry 270 & Biochemistry 272, or equivalent.

**421 Veterinary Physiology (5).** Continuation of 420. Digestion, excretion, endocrinology, reproduction.

## WOMEN STUDIES

**60 The Female Experience: Body, Identity, and Culture (3).** (same as Sociology 60). Study of the experience of being female in American Culture. Course will focus on development of Women's identities through such topics as: sexuality, reproduction, self-image, rape and health care.

**101 Topics (1-3).** Organized study of selected topics in women studies. Subjects and earnable credit may vary from semester to semester. Repeatable up to 6 hours with consent. Prerequisite: sophomore standing.

**105 Feminism: The Basic Questions (3).** Introduction to the basic issues of Western feminist thought through a study of classical and contemporary sources. Course will consider images, conditions, activities and visions of women as they vary historically and socially. Prerequisite: sophomore standing.

**201 Topics (1-3).** Organized study of selected topics in women studies. Subjects and earnable credit may vary from semester to semester. Repeatable up to 6 hours. Prerequisite: junior standing and/or 105.

**215 American Feminism (3).** (same as History 215). Study of the American feminist movement from its roots in the 19th century to the present. First and second waves of feminism will be analyzed from historical and social movement perspectives. Prerequisite: junior standing and/or 105.

**220 Comparative Feminist Ideologies (3).** (same as Philosophy 220). Study of feminist theories concerning women's relationships to the social, economic and political world. Course will consider descriptions and explanations of women's past as well as prescriptions for the future. Prerequisite: junior standing and/or 105.

**301 Topics (3).** Problems, topics, issues or review of research in any area of women studies and/or experimental development of new content areas. Repeatable up to 6 hours. Prerequisite: junior standing and/or 105.

**350 Special Readings (3).** Independent readings in women studies for highly qualified and motivated students. Topic selected in consultation with supervisory faculty member. Repeatable up to 6 hours. Prerequisite: junior standing and/or 105.

**390 Senior Research Seminar (3).** Seminar for senior students engaged in some area of research in women studies. Students will compare and evaluate their individual projects and/or collaborate on a common theme. Prerequisite: instructor's consent.



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# ACADEMIC CALENDAR

## Winter Semester 1985

Th Jan 17 Registration & orientation  
F Jan 18 Registration  
M Jan 21 Classwork begins  
Sa Mar 16 Spring recess begins  
M Mar 25 Classwork resumes  
Th May 9 Classwork ends at close of day  
F May 10 Stop Day  
Sa May 11 Final exams begin  
F May 17 Semester ends  
Sa May 18 Annual commencement

## Summer Session 1985

### 8-week session

M Jun 10 Registration & orientation  
Tu Jun 11 Classwork begins  
Th Jul 4 Independence Day recess  
F Aug 2 Session ends

### First 4-week session

M Jun 10 Registration & orientation  
Tu Jun 11 Classwork begins  
Th Jul 4 Independence Day recess  
F Jul 5 First 4-week session ends

### Second 4-week session

M Jul 8 Registration, classwork begins  
F Aug 2 Second 4-week session ends  
F Aug 2 Summer commencement

## Fall Semester 1985

M Aug 26 Registration & orientation  
Tu Aug 27 Registration  
W Aug 28 Classwork begins  
M Sep 2 Labor Day recess  
Tu Nov 26 Thanksgiving recess begins at  
close of day  
M Dec 2 Classwork resumes  
Th Dec 12 Classwork ends  
F Dec 13 Stop Day  
Sa Dec 14 Final exams begin  
F Dec 20 Semester ends

## Winter Semester 1986

Th Jan 16 Registration & orientation  
F Jan 17 Registration  
M Jan 20 Classwork begins  
Sa Mar 15 Spring recess begins at 12:30  
p.m.  
M Mar 24 Classwork resumes  
Th May 8 Classwork ends  
F May 9 Stop Day  
Sa May 10 Final exams begin  
F May 16 Semester ends  
Sa May 17 Commencement

## Summer 1986

### 8-week session

M Jun 9 Registration & orientation  
Tu Jun 10 Classwork begins  
F Jul 4 Independence Day recess  
F Aug 1 Session ends

### First 4-week session

M Jun 9 Registration & orientation  
Tu Jun 10 Classwork begins  
F Jul 4 Independence Day recess  
Th Jul 3 Session ends

### Second 4-week session

M Jul 7 Registration, classwork begins  
F Aug 1 Session ends  
F Aug 1 Summer commencement

## Fall 1986

M Aug 25 Registration & orientation  
T Aug 26 Registration  
W Aug 27 Classwork begins  
M Sep 1 Labor Day recess  
Tu Nov 25 Thanksgiving recess begins at  
close of day  
M Dec 1 Classwork resumes  
Th Dec 11 Classwork ends  
F Dec 12 Stop Day  
Sa Dec 13 Final exams begin  
F Dec 19 Semester ends

## Winter 1987

Th Jan 15 Registration & orientation  
F Jan 16 Registration  
M Jan 19 Classwork begins  
Sa Mar 14 Spring recess begins at 12:30  
p.m.  
M Mar 23 Classwork resumes  
Th Apr 30 Classwork ends  
F May 8 Stop Day  
Sa May 9 Final exams begin  
F May 15 Semester ends  
Sa May 16 Commencement

## Summer 1987

### 8-week session

M Jun 8 Registration & orientation  
Tu Jun 9 Classwork begins  
F Jul 3 Independence Day recess  
F Jul 31 Session ends

### First 4-week session

M Jun 8 Registration & orientation  
Tu Jun 9 Classwork begins  
F Jul 3 Independence Day recess  
Th Jul 2 Session ends

### Second 4-week session

M Jul 6 Registration, classwork begins  
F Jul 31 Session ends  
F Jul 31 Summer commencement











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