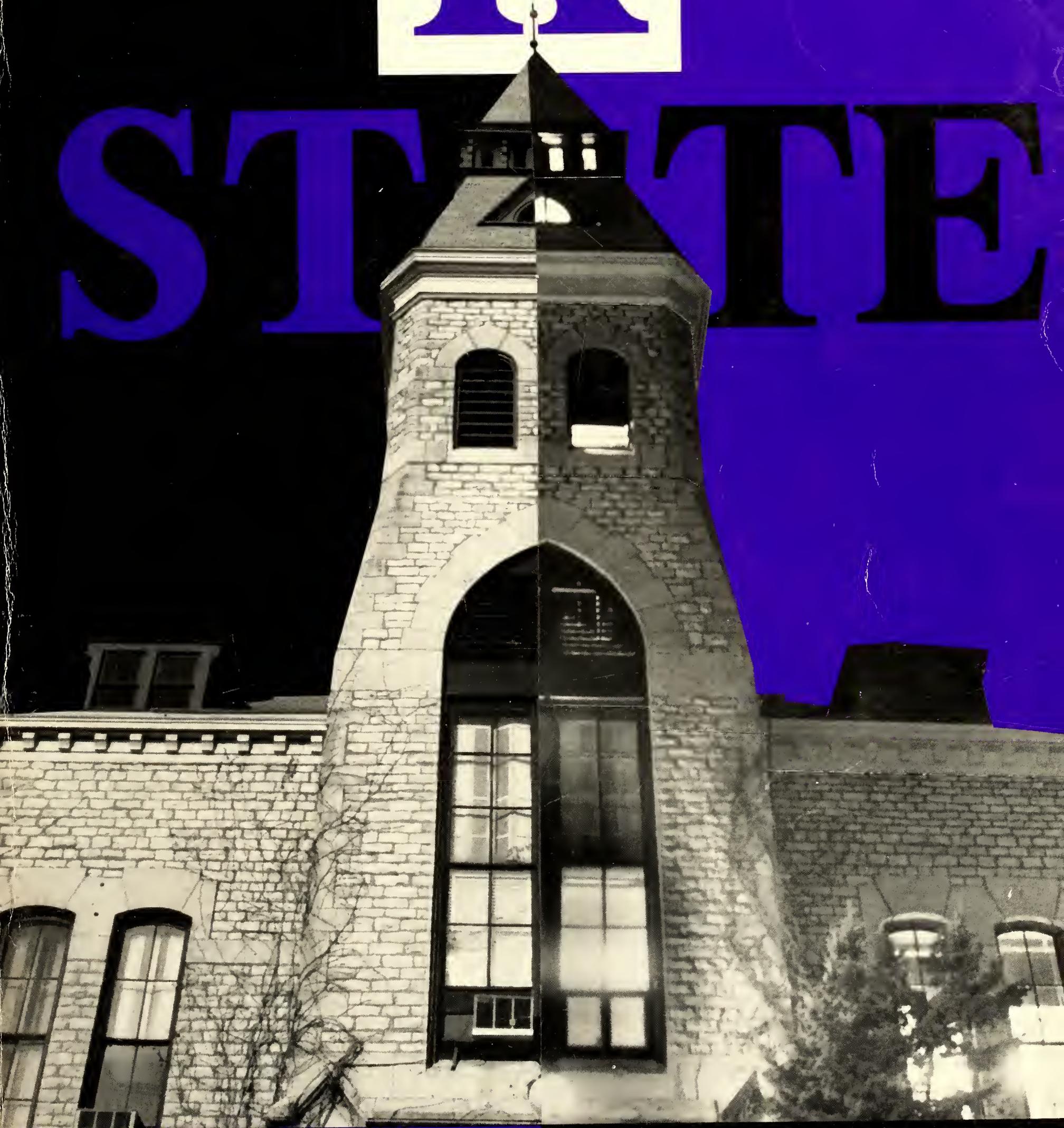


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# K-State Undergraduate Catalog 1992-1994

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**Executive Director**  
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## Information

You may call toll-free for information about admission to Kansas State University.

### Undergraduate students

Dial 1-800-432-8270 from any place in Kansas 24 hours a day. After 5 p.m. your call will be recorded and returned the next working day. Outside of Kansas dial (913) 532-6250.

Prospective students should contact the Office of Admissions, 119 Anderson Hall, Kansas State University, Manhattan, KS 66506-0102.

### Graduate students

Dial 1-800-232-0133, ext. 6194, 24 hours a day. After 5 p.m. your call will be recorded and returned the next working day. Outside the United States dial (913) 532-6191.

Prospective students should contact the Graduate School, 101 Fairchild Hall, Kansas State University, Manhattan, KS 66506-1103.

**K-State (USPS 355-690)**

**Volume 76**

**June 1992**

**Number 3**

K-State is published four times a year in April, May, June, and August by University Publications, Kansas State University, 5 Anderson Hall, Manhattan, KS 66506-0118. Second-class postage paid at Manhattan, Kansas 66502. POSTMASTER: Send changes to K-State, University Publications, 5 Anderson Hall, Kansas State University, Manhattan, KS 66506-0118. The material in this catalog is provided for informational purposes and does not constitute a contract. For example, courses, curricula, degree requirements, fees, and policies are subject to constant review and change without notice.

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8076-7660-692

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# About the Catalog

The *K-State Undergraduate Catalog* is a reference for those interested in academic policies, procedures, and programs of the university. Refer to the table of contents or the index for specific topics of interest.

Degree requirements and programs are organized by colleges and departments. Course descriptions are provided to help you and your academic advisor plan your academic choices.

## Course Descriptions

The following course description key explains the system used for courses listed throughout the catalog.

### Sample course description

**ENGL 425. Women in Literature.** (3) I, II, S. Literary works, by or about women. Treats individual writers, writers considered within various traditions, themes, or formal issues. Pr.: ENGL 120 or 125.

The letters **ENGL** denote the department in which the course is offered (in this case, English).

The three digits of the course number **425** represent the level of the course.

### Level numbers:

- 000-099 Not applicable toward degree requirements.
- 100-299 Lower division undergraduate. Designed as freshman or sophomore course.
- 300-499 Upper division undergraduate. Designed as junior or senior course.
- 500-699 Upper division undergraduate. Primarily for a junior or senior, but also may be taken for graduate credit. A course numbered 500 may be taken for graduate credit only in a minor field. A course numbered 600 may be taken for credit in a graduate student's major.
- 700-799 Graduate and upper division, primarily for graduate level.
- 800-899 Graduate level for master's course or professional course beyond the undergraduate level.
- 900-999 Graduate level, primarily for doctoral candidate.

The number in parentheses (**3**) following the course title indicates the units of credit given for the course. Each credit unit usually represents one 50-minute period of lecture or recitation each week of the semester.

The **I, II, S,** and/or **intersession** following the course title indicate the semester, or semesters, each course is usually offered; **I** stands for fall semester, **II** for spring, **S** for summer school, and **intersession** for the term between semesters.

The abbreviation **Pr.** indicates prerequisites for the course. In the sample course, students would be required to have completed either ENGL 120 or ENGL 125 before enrolling for ENGL 425. Some courses may allow or require concurrent enrollment in other courses. This is indicated by the abbreviation **Conc.**

## Faculty Lists Key

In the departmental sections, faculty members are listed by their last names. Those on the graduate faculty have an asterisk following their names.

An all-inclusive faculty and administration section precedes the index. This section lists each faculty member's full name, academic degrees, and year of first appointment at K-State (in parentheses). Those on the graduate faculty have an asterisk following their names.

## Contacts

All phone numbers are (913) area code, except where noted. All addresses are Manhattan, Kansas, 66506, except where noted.

## Other Publications

Other K-State publications are available on request from the offices listed below.

### Office of Admissions

119 Anderson Hall, 532-6250

*K-State Admissions Guide*: an introduction to Kansas State University, including photographs and undergraduate application information and forms.

### Division of Continuing Education

College Court Building, 532-5687

*Summer School Bulletin*: course descriptions and admission information. Available in early spring.

*After Hours*: information and course descriptions for classes starting after 4 p.m. on campus during fall and spring semesters. Available in December and July.

### Graduate School

101 Fairchild Hall, 532-6191

*The Graduate School*: an introduction to K-State's graduate programs that includes photos and admission information.

*K-State Graduate Catalog*: descriptions of graduate programs, courses, and policies.

### K-State Union Bookstore

K-State Union, First Floor, 532-6583

*Class Schedule*: a description of the courses offered during an academic semester/session.

# About the University

## Kansas State University

The university was founded February 16, 1863, established under the Morrill Act, by which land-grant colleges came into being.

At first the university was located on the grounds of the old Bluemont Central College, chartered in 1858, but in 1875 most of the work of the university was moved to the present site.

The 664-acre campus is in northern Manhattan, convenient to both business and residential districts. Under an enactment of the 1991 Kansas Legislature, the Salina campus was established through a merger of the former Kansas College of Technology with the university.

Additional university sites include 18,000 acres in the four branch locations of the Agricultural Experiment Station—Hays, Garden City, Colby, and Parsons—and 8,600 acres in the Konza Research Prairie jointly operated by the AES and the Division of Biology.

One of the six universities governed by the Kansas Board of Regents, Kansas State University continues to fulfill its historic educational mission in teaching, research, and public service.

## Objective of the educational program

The objective of the educational program at Kansas State University is to develop individuals capable of applying enlightened judgment in their professional, personal, and social lives.

To that end the university program is designed:

**I.** To provide full and efficient counseling and guidance to students at the university. Specifically, this means to:

A. Learn and make known to students all that is possible and useful about their interests, aptitudes, and abilities.

B. Apply that knowledge to the students' choice of courses and curricula as fully as possible without encroaching harmfully on their initiative and feeling of self-responsibility.

C. Provide continuing guidance for students according to their needs.

**II.** To prepare students for an occupation or a profession which includes an organized body of information and theory so they may realize their creative potential. More specifically this means that students should acquire:

A. The ability to recognize and master fundamental principles in their fields of specialization.

B. The knowledge basic to their special fields of study.

C. The ability to reason critically from facts and recognized assumptions to useful technical conclusions.

D. The basic skills associated with their fields of study.

E. A professional attitude in their chosen work.

**III.** To provide all students with an opportunity to gain the knowledge and abilities members of a democratic society need, whatever occupation or profession they expect to enter. Specifically, this means that through its program the university undertakes to help the student:

A. Develop communication skills.

B. Develop the ability to apply critical and creative thinking to the solution of theoretical and practical problems.

C. Understand the basic concepts of the natural sciences, the interrelations of the natural and social sciences, and the impact of science on society.

D. Comprehend and evaluate the processes and institutions in society at home and abroad, and develop a dynamic sense of personal responsibility as effective citizens in a democratic society.

E. Develop habits of self-evaluation, responsibility, and enterprise that will increase the effectiveness of the educative process in college, and provide the basis for continued self-improvement.

F. Develop a well-adjusted personality, good character traits, and a sound philosophy of life.

G. Prepare for effective participation in family life.

H. Utilize actively and fully the capacity for aesthetic appreciation and enjoyment.

**IV.** To stimulate the faculty and students to extend the boundaries of knowledge through critical and creative thinking and experimentation.

**V.** To provide the facilities for extending education outside the boundaries of the campus to the members of the community that the institution serves.

## Accreditation

Kansas State University is fully accredited by the North Central Accrediting Association and by various professional accrediting agencies. Credit earned at K-State is transferable to other institutions.

## Faculty

The faculty at Kansas State University are dedicated to excellence in teaching, student advising, research, extension education, scholarly achievement, and creative endeavor.

K-State recognizes superior teaching with annual faculty awards. Citations for the Outstanding Teachers of the Year and for Distinguished Graduate Faculty Members are presented at Commencement. The university also honors faculty members who contribute to the expansion of knowledge in their respective fields.

The faculty assume a major responsibility to participate in outreach activities that serve the citizens of the state, and many hold leadership positions in their disciplines and in professional organizations.

# Calendar

Contact the College of Technology for K-State at Salina enrollment dates.

## Summer Term 1992

### June 8, Monday

Last day to withdraw from an eight-week course with 100% fee refund. Summer term enrollment.

### June 9, Tuesday

Classes, late fee of \$15, and drop/add begin.

### June 12, Friday

Last day to withdraw from an eight-week course with 90% fee refund, to enroll without dean's permission, or for faculty, staff, and teachers to enroll without late fee.

### June 19, Friday

Last day to withdraw with 50% fee refund, to sign-up for A/Pass/F grading option for an eight-week course, and to submit an undergraduate application for July graduation to dean's office.

### June 23, Tuesday

Late fee of \$35 begins.

### June 25, Thursday

Last day to drop an eight-week course without a W being recorded.

### July 2, Thursday

Applications for undergraduate graduation due in Registrar's Office from deans' offices.

### July 3, Friday

University holiday.

### July 10, Friday

Last day an eight-week course may be dropped before the end of summer term.

### July 31, Friday

Last day of summer term examinations.

### August 3, Monday, noon

Final grade sheets due in Enrollment Center.

## Fall Semester 1992

### August 19-21, Wednesday-Friday

Enrollment and fee payment.

### August 21, Friday

Last day to withdraw with 100% fee refund.

### August 22, Saturday, 9 a.m.-noon

Part-time express enrollment and fee payment.

### August 24-27, Monday-Thursday

Late enrollment and fee payment.

### August 24, Monday

Classes, late fee of \$15, and drop/add begin.

### August 24-27, Monday-Thursday

Evening enrollment and fee payment.

### August 28, Friday

Last day to add a course without instructor permission, and for faculty, staff, and teachers to enroll without late fee.

### September 4, Friday

Last day to withdraw with 90% fee refund, to sign up for A/Pass/F grading option for a course that meets the first half of the semester, and to enroll without dean's permission.

### September 7, Monday

Labor Day. University holiday.

### September 10, Thursday

Last day to drop a course that meets the first half of the semester without a W being recorded.

### September 18, Friday

Last day to withdraw with 50% fee refund, to sign up for A/Pass/F grading option for a full semester course, and to submit December graduation application to dean's office.

### September 21, Monday

Twentieth class day.

### September 22, Tuesday

Late fee of \$35 begins.

### September 25, Friday

Last day to drop a course that meets the first half of the semester. Academic progress reports due at noon in Enrollment Center.

### September 28, Monday

Last day to drop a full semester course without W being recorded.

### October 19, Monday

Courses that meet second half of the semester begin.

### October 30, Friday

Last day to drop a full semester course or to sign up for A/Pass/F grading option for a course that meets the second half of the semester.

### November 4, Wednesday

Last day to drop a course that meets the second half of the semester without a W being recorded.

### November 9-20 and November 30-

### December 4, Monday-Friday

Early enrollment for spring 1993.

### November 20, Friday

Last day to drop a course that meets the second half of the semester.

### November 25-29, Wednesday-Sunday

Student holiday.

### November 26-27, Thursday-Friday

University holiday.

### November 30, Monday

Classes resume.

### December 8-9, Tuesday-Wednesday

Winter 1993 intersession enrollment.

### December 12, Saturday

Commencement.

### December 14-18, Monday-Friday

Semester examinations.

### December 21, Monday, Noon

Deadline for grades to be submitted to Enrollment Center.

### December 24-25, Thursday-Friday

University holiday.

## Winter 1993 Intersession

### Dec. 8-9, Tuesday-Wednesday

Winter 1993 intersession enrollment.

### January 1, Friday

University holiday.

### January 2-12, Monday-Friday

Winter 1993 intersession.

## Spring Semester 1993

### January 1, Friday

University holiday.

### January 9, Saturday, 9 a.m.-noon

Part-time express enrollment and fee payment.

### January 11-12, Monday-Tuesday

Enrollment and fee payment.

### January 12, Tuesday

Last day to withdraw with 100% fee refund.

### January 13, Wednesday

Classes, late fee of \$15, and drop/add begin.

### January 13-15, Wednesday-Friday

Late enrollment and fee payment.

**January 13-14, 19, and 25, Wednesday-Thursday, Tuesday, Monday**  
Evening enrollment and fee payment.

**January 18, Monday**  
University holiday.

**January 20, Wednesday**  
Last day to add a course without instructor's permission, and for faculty, staff, and teachers to enroll without late fee.

**January 22, Friday**  
Last day to withdraw with 90% fee refund, to sign up for A/Pass/F grading option for a course that meets the first half of the semester, and to enroll without dean's permission.

**February 1, Monday**  
Last day to drop a course that meets the first half of the semester without a W being recorded.

**February 5, Friday**  
Last day to withdraw with 50% fee refund, to sign up for A/Pass/F grading option for a full semester course, and to submit May undergraduate application to dean's office.

**February 10, Wednesday**  
Twentieth class day.

**February 11, Thursday**  
Late fee of \$35 begins.

**February 12, Friday, Noon**  
Last day to drop a course that meets the first half of the semester. Academic progress reports due in Enrollment Center.

**February 17, Wednesday**  
Last day to drop a full semester course without a W being recorded.

**March 8, Monday**  
Classes that meet the second half of the semester begin.

**March 19, Friday**  
Last day to drop a full semester course and to sign up for A/Pass/F grading option for a course that meets only the second half of the semester.

**March 20-28, Saturday-Sunday**  
Student holiday.

**March 29, Monday**  
Classes resume.

**March 31, Wednesday**  
Last day to drop a course that meets the second half of the semester without a W being recorded.

**April 12-23, Monday-Friday**  
Early enrollment for summer and fall 1993 courses.

**April 16, Friday**  
Last day to drop a course that meets the second half of the semester.

**April 28-29, Wednesday-Thursday**  
Spring 1993 intersession enrollment.

**May 6, Thursday**  
No classes. Final examinations for courses that meet only on Thursday night begin at 7 p.m. Deadline for submitting tentative grade sheets for graduating seniors to the Enrollment Center.

**May 6-8, 10-12, Thursday (7 p.m.)-Saturday, Monday-Wednesday**  
Semester examinations.

**May 13, Thursday**  
Deadline for returning grade change sheets for graduating seniors to the Enrollment Center.

**May 14-15, Friday-Saturday**  
Commencement.

**May 17, Monday, noon**  
Deadline for submitting grades to the Enrollment Center.

## Spring 1993 Intersession

**April 28-29, Wednesday-Thursday**  
Spring 1993 intersession enrollment.

**May 17-June 4, Monday-Friday**  
Spring 1993 intersession.

## Summer Term 1993

**June 7, Monday**  
Summer term enrollment. Last day to withdraw from an eight-week course with 100% fee refund.

**June 8, Tuesday**  
Classes, late fee of \$15, and drop/add begin.

**June 11, Friday**  
Last day to withdraw from an eight-week course with 90% fee refund; to enroll without dean's permission; and for faculty, staff, and teachers to enroll in an eight-week course without late fee.

**June 18, Friday**  
Last day to withdraw with 50% fee refund, to sign up for A/Pass/F grading option for an eight-week course, and to submit an undergraduate application for July graduation to dean's office.

**June 22, Tuesday**  
Late fee of \$35 begins.

**June 24, Thursday**  
Last day to drop an eight-week course without a W being recorded.

**July 1, Thursday**  
Applications for undergraduate graduation due in Registrar's Office from dean's offices.

**July 5, Monday**  
University holiday.

**July 9, Friday**  
Last day an eight-week course can be dropped.

**July 30, Friday**  
Last day of summer term examinations.

**August 2, Monday, Noon**  
Final grade sheets due in the Enrollment Center.

## Fall Semester 1993

**August 18-20, Wednesday-Friday**  
Enrollment and fee payment.

**August 20, Friday**  
Last day to withdraw with 100% fee refund.

**August 21, Saturday, 9 a.m.-noon**  
Part-time express enrollment and fee payment.

**August 23, Monday**  
Classes, late fee of \$15, and drop/add begin.

**August 23-26, Monday-Thursday**  
Late enrollment and fee payment.

**August 23-26, Monday-Thursday**  
Evening enrollment and fee payment.

**August 27, Friday**  
Last day to add a course without instructor permission, and for faculty, staff, and teachers to enroll without late fee.

**September 3, Friday**  
Last day to withdraw with 90% fee refund, to sign up for A/Pass/F grading option for a course that meets the first half of the semester, and to enroll without dean's permission.

**September 6, Monday**  
University holiday.

**September 9, Thursday**  
Last day to drop a course that meets the first half of the semester without a W being recorded.

**September 17, Friday**  
Last day to withdraw with 50% fee refund, to sign up for A/Pass/F grading option for a full semester course, and to submit December graduation application to dean's office.

**September 20, Monday**  
Twentieth class day.

**September 21, Tuesday**  
Late fee of \$35 begins.

**September 24, Friday**

Last day to drop a course that meets the first half of the semester. Academic progress reports due at noon in Enrollment Center.

**September 27, Monday**

Last day to drop a full semester course without W being recorded.

**October 18, Monday**

Courses that meet the second half of the semester begin.

**October 29, Friday**

Last day to drop a full semester course or to sign up for A/Pass/F grading option for a course that meets only the second half of the semester.

**November 3, Wednesday**

Last day to drop a course that meets the second half of the semester without a W being recorded.

**November 8–19, November 29–December 3, Monday–Friday**

Early enrollment for spring 1994 courses.

**November 24–28, Wednesday–Sunday**

Student holiday.

**November 25–26, Thursday–Friday**

University holiday.

**November 29, Monday**

Last day to drop a course that meets the second half of the semester. Classes resume.

**December 7–8, Tuesday–Wednesday**

Winter 1994 intersession enrollment.

**December 11, Saturday**

Commencement.

**December 13–17, Monday–Friday**

Semester examinations.

**December 20, Monday, noon**

Deadline for grades to be submitted to the Enrollment Center.

**December 24, Friday**

University holiday.

## Winter 1994 Intersession

**December 7–8, Tuesday–Wednesday**

Winter 1994 intersession enrollment.

**January 3–11, Monday–Friday**

Winter 1994 intersession.

## Spring Semester 1994

**January 1, Wednesday**

University holiday

**January 8, Saturday, 9 a.m.–noon**

Part-time express enrollment and fee payment.

**January 10–11, Monday–Tuesday**

Enrollment and fee payment.

**January 11, Tuesday**

Last day to withdraw with 100% fee refund.

**January 12, Wednesday**

Classes, late fee of \$15, and drop/add begin.

**January 12–14, 18, 24, Wednesday–Friday, Tuesday, Monday**

Late enrollment and fee payment.

**January 12–13, 18, 24, Wednesday–Thursday, Tuesday, Monday**

Evening enrollment and fee payment.

**January 17, Monday**

University holiday.

**January 19, Wednesday**

Last day to add a course without instructor's permission, and for faculty, staff, and teachers to enroll without late fee.

**January 21, Friday**

Last day to withdraw with 90% fee refund, to sign up for A/Pass/F grading option for a course that meets the first half of the semester, and to enroll without dean's permission.

**January 28, Friday**

Last day to submit May graduation application to dean's office.

**January 31, Monday**

Last day to drop a course that meets the first half of the semester without a W being recorded.

**February 4, Friday**

Last day to withdraw with 50% fee refund, and to sign up for A/Pass/F grading option for a full semester course.

**February 9, Wednesday**

Twentieth class day.

**February 10, Thursday**

Late fee of \$35 begins.

**February 11, Friday**

Last day to drop a course that meets the first half of the semester. Academic progress reports due at noon in Enrollment Center.

**February 16, Wednesday**

Last day to drop a full semester course without a W being recorded.

**March 7, Monday**

Class that meets the second half of the semester begins.

**March 18, Friday**

Last day to drop a full semester course, and to sign up for A/Pass/F grading option for a course that meets only the second half of the semester.

**March 21–27, Saturday–Sunday**

Student holiday.

**March 28, Monday**

Classes resume.

**March 30, Wednesday**

Last day to drop a course that meets the second half of the semester without a W being recorded.

**April 6–22, Monday–Friday**

Early enrollment for summer and fall 1994 courses.

**April 15, Friday**

Last day to drop a course that meets the second half of the semester.

**April 27–28, Wednesday–Thursday**

Spring 1994 intersession enrollment

**May 5, Thursday**

No classes. Final examinations for courses that meet only on Thursday night begin at 7 p.m. Deadline for submitting tentative grade sheets for graduating seniors to the Enrollment Center.

**May 5–7, 9–11, Thursday (7 p.m.)–Saturday, Monday–Wednesday**

Semester examinations.

**May 12, Thursday**

Deadline for returning grade change sheets for graduating seniors to the Enrollment Center.

**May 13–14, Friday–Saturday**

Commencement.

**May 16, Monday, noon**

Deadline for submitting grades to the Enrollment Center.

**May 30, Monday**

Deadline for international student applications for fall 1994.

## Spring 1994 Intersession

**April 27–28, Wednesday–Thursday**

Spring 1994 intersession enrollment.

**May 16–June 3, Monday–Friday**

Spring 1994 intersession.

## Summer Term 1994

### June 6, Monday

Last day to withdraw from an eight-week course with 100% fee refund. Summer term enrollment.

### June 7, Tuesday

Classes, late fee of \$15, and drop/add begin.

### June 10, Friday

Last day to withdraw from an eight-week course with 90% fee refund; to enroll without dean's permission; and for faculty, staff, and teachers to enroll without late fee.

### June 17, Friday

Last day to withdraw with 50% fee refund, to sign up for A/Pass/F grading option for an eight-week course, and to submit an undergraduate application for July graduation to dean's office.

### June 21, Tuesday

Late fee of \$35 begins.

### June 23, Thursday

Last day to drop an eight-week course without a W being recorded.

### June 30, Thursday

Applications for undergraduate graduation due in Registrar's Office from dean's offices.

### July 4, Monday

University holiday.

### July 8, Friday

Last day to drop an eight-week course.

### July 29, Friday

Last day for summer term examinations.

### August 1, Monday, Noon

Final grade sheets due in the Enrollment Center.

## Glossary and Abbreviations

**A/Pass/F:** A grading option in which a student earning a grade of A in a course will have an A recorded for that course; a grade of B, C, or D will be recorded as a Pass; and a grade of F will be recorded as an F.

**Academic load:** The total number of semester hours enrolled in during one semester.

**Advanced standing:** Having credit awarded for previous work or testing.

**Advisor:** A faculty member who provides information and makes recommendations on courses, requirements, prerequisites, and programs of study.

**Audit:** To attend a course regularly without participating in course work and without receiving credit.

**B.A.:** Bachelor of arts degree. Courses selected from a variety of disciplines with concentrations in one or two areas. A modern language is required for a B.A. degree.

**B.S.:** Bachelor of science degree. A specified program of required courses with fewer electives than the B.A. A modern language is not required.

**Baccalaureate:** Refers to the bachelor's degree.

**Classification:** Level of progress toward a degree with classifications of freshman, sophomore, junior, or senior, depending on the number of semester hours completed.

**College:** An academic unit of the university. Kansas State University has nine colleges.

**Concurrent enrollment:** Taking a course during the same semester as another. Abbreviation: Conc.

**Course:** A unit of study a student enrolls in during a semester.

**Credit by examination:** Credit received when a student takes an oral or written examination without registering for a course.

**Credit hour:** A unit of measurement used in determining the quantity of work taken. Each credit hour is roughly equivalent to one hour of class time per week. For example, a class meeting three hours a week would be a three-credit-hour class. Abbreviation: Cr.

**Credit/No Credit:** A grading option with successful completion of a course recorded as Credit and failure as No Credit. No other grades are given for such courses and they are not figured into the grade point average.

**Curriculum:** A program of courses that meets the requirements for a degree in a particular field of study.

**Degree program:** Courses required for completion of a particular degree.

**Department:** A unit within a college representing a discipline.

**Discipline:** An area of study representing a branch of knowledge, such as mathematics.

**Dismissal:** A student who neglects his or her academic responsibilities may be dismissed on recommendation of an academic dean.

**Double major:** Having two programs of academic study.

**Drop/Add:** Changing the student's course schedule by adding and/or dropping a course.

**Dual degree:** A student may elect in some cases to earn two degrees at one time.

**Electives:** Courses chosen by a student that are not required for the major or minor. The number of hours of electives required varies according to student's major.

**Enrollment:** The process of selecting courses and having courses reserved.

**Equiv.:** Equivalent.

**Extracurricular:** Activities such as band or debate for which a student may earn credit toward graduation. Extracurricular activities are counted as electives.

**Financial aid:** Help for a student who lacks funds to pay for college. Aid is available from grants, loans, scholarships, and work/study employment.

**Grade point average (GPA):** A measure of scholastic performance. A GPA is obtained by dividing the number of grade points by the hours of work attempted, where an A = 4 points, a B = 3 points, a C = 2 points, a D = 1 point, and an F = 0 points.

**Hour:** The unit by which course work is measured. The number of semester hours assigned to a course is usually determined by the number of hours a class meets per week.

**Intersession:** Courses offered between fall and spring semesters and after spring semester.

**Lec.:** Lecture. A class wherein the teaching is done primarily through oration.

**Major:** The subject or subject areas upon which a student chooses to place principal academic emphasis.

**Option:** An approved group of courses creating a specialty within a major field of study.

**Orientation:** Activities designed to help the new student become acquainted with the university.

**Prerequisite:** A requirement, usually credit in another course, which must be met before a particular course can be taken. Abbreviation: Pr.

**Probation:** Probation is academic warning that a student is in academic difficulty which could lead to dismissal from the university.

**Rec.:** Recitation. A small section usually taken in conjunction with a lecture.

**Scholastic honors:** An award an undergraduate receives based on the excellence of K-State academic work.

**Secondary major:** Interdisciplinary major which must be completed along with a first major course of study.

**Special student:** An undergraduate student taking courses at K-State but not regularly enrolled in work toward a degree.

**Transcript:** An official copy of a student's permanent academic record.

**Transfer student:** A student who terminates enrollment in another college or university and subsequently enrolls at K-State.

**Undergraduate student:** A university student who has not received a bachelor's degree.

**V/Var.:** Variable. The credits earned in some courses may vary.

# Admission

Richard N. Elkins, Director  
119 Anderson Hall, Manhattan  
532-6250

Undergraduate students interested in attending Kansas State University in Manhattan or on the Salina campus should write to the Office of Admissions in Manhattan for an application form and instructions concerning the admission process. Students should return the completed application form with a nonrefundable \$15 application fee to the Office of Admissions. All correspondence and inquiries concerning admission to the university should be addressed to this office.

## Admissions advising

The admissions office in Manhattan is open weekdays from 8 a.m. to 5 p.m. for admissions information. Campus offices are closed Saturdays and Sundays.

Students and parents are always welcome and are encouraged to visit the campus. However, it is best to write two weeks in advance for an appointment. Normally several admissions representatives are available for consultation concerning educational plans.

The Office of College Advancement in Salina is also open weekdays from 8 a.m. to 5 p.m. Contact that office for specific information regarding available programs of study on that campus and appointments for campus visitation.

No academically qualified applicant will be denied admission to the university on the basis of race, sex, national origin, handicap, religion, age, sexual orientation, or other nonmerit reasons.

Specific admission procedures are given to students when they inquire about admission. Students should apply early in the senior year of high school.

Transfer students should apply for admission approximately four to six months prior to the term they wish to enter.

## High school graduates

Admission to Kansas State University is granted to any individual who has graduated from an accredited Kansas high school. Out-of-state applicants are expected to have a strong academic rank in class and good scores on the American College Test battery. Applicants with previous college credit, earned after graduation from high school, must apply as transfer students.

## High school prerequisites

Each entering freshman student should have completed the high school mathematics courses necessary for his or her K-State curriculum. A listing of the mathematics prerequisites for each university curriculum appears in the Degrees section of this catalog.

The Kansas Board of Regents recommends that a Kansas Regents university preparatory curriculum include the following 15 units:

Four units of English, including one unit of literature and one unit of oral expression.

Three units of mathematics, including Algebra I and II, one-half unit of geometry, and one-half unit of trigonometry. (See the Degrees section of this catalog for specific curricular requirements.)

Three units of social studies, including American history, government, and economics.

Three units of natural sciences, preferably biology, chemistry, and physics.

Two units of foreign languages. (These may be in one foreign language or a combination of two foreign languages.)

## Transfer students

Transfer students (those with previous college credit) are expected to have at least a 2.0 (C) average in previous academic work to be considered for admission to the university. This applies both to Kansas and out-of-state transfer students.

Most academic credits from accredited junior and senior colleges and universities are transferable to K-State. Information about institutions previously attended must be furnished upon application and official transcripts must be furnished regardless of the applicant's wishes concerning advanced standing. Failure to provide either will disqualify the applicant. To be official, transcripts must be sent directly from each college attended to the K-State Office of Admissions, Manhattan, KS 66506-0102. Hand-carried transcripts and transcripts sent by students are unofficial even though they may carry the college seal or signatures that are placed on official records. Only half of the hours required for a K-State baccalaureate degree can be taken at a two-year college. See the Degrees section of this catalog for degree requirements.

K-State has a special pre-transfer advising agreement with selected Kansas community colleges that provides a structured program of advising and course selection to ensure a

smooth and trouble-free transition from community college to university. Check with your community college admissions office or the K-State admissions office for information on this program.

K-State also subscribes to the transfer articulation agreement with all 19 Kansas community colleges. Students who have received an associate of arts degree from a Kansas community college are guaranteed junior classification and are not required to fulfill the K-State physical education concepts course requirement. All credits of an associate degree are not necessarily applicable toward a baccalaureate degree; additional freshman, sophomore, and general education courses may be required to meet degree requirements.

### Admission of undergraduate international applicants

For purposes of admission, international applicants are defined as all persons who are not citizens or permanent residents of the United States.

In most cases, international applicants seeking admission to Kansas State University must meet the same academic standards for admission as those required of American students. There are wide variations, however, between educational systems throughout the world that make exact comparisons of educational standards difficult. International applicants are selected on the basis of their prior academic work, English proficiency, probability of success in the chosen curriculum (as evidenced by prior work in the academic area involved), and certification of adequate financial resources.

In addition to submitting copies of secondary school records and, when applicable, college transcripts, international students must submit scores from the Test of English as a Foreign Language (TOEFL). TOEFL scores are required of international students who:

1. Have completed their secondary education in a country where English is not the native language.
2. Have completed fewer than two years study in a U.S. high school.
3. Have completed fewer than two years (60 semester hours) of training in an accredited U.S. college or university.

A minimum score of 550 on the TOEFL is required for admission. Proficiency also may be demonstrated by passing a full academic year of college-level freshman English (i.e., equivalent to ENGL 100 and ENGL 120) with a grade of C or better at an accredited institution of higher education in the United States.

Deadlines for international student applications are as follows:

1. For students currently studying in the United States:

Apply by	For
June 15	Fall semester
October 15	Spring semester
April 1	Summer term

2. For students outside the United States:

Apply by	For
April 15	Fall semester
July 15	Spring semester
January 1	Summer term

The university regulations recommend that international students and their dependents (if they are with the student) purchase or be in possession of a medical insurance policy or equivalent coverage. Medical insurance can be purchased on the campus or from other independent agencies. In addition a student health fee is mandatory for all students.

### Awarding of advanced standing credit to international students

The following methods are used by Kansas State University to validate the awarding of advanced standing credit for international students who have completed work in their home countries at the postsecondary level:

1. Credit is granted based upon recommendation by recognized academic publications, primarily the *World Education Series* of American Association of Collegiate Registrars and Admissions Officers.
2. Validation by a comparable credit-granting department at Kansas State University. Validation by one of the following two options will be at the discretion of the credit-granting department.

*Option A:* Course-by-course evaluation examination by comparable K-State academic department.

*Option B:* The advisor and/or academic dean's office makes a preliminary evaluation of the level a student has completed and begins the student at that level. Upon successful completion of that course, all related lower-level courses in that area, as determined by the department granting credit, would be validated and credit awarded.

### English proficiency

English is the language of instruction at Kansas State University. All undergraduate students whose primary language is not English must show proficiency in English before being admitted. If our review of the student's proficiency level indicates in-

adequate preparation he or she may be offered one of the following conditional admissions:

1. Full-time study in the English Language Program before pursuing academic studies.
2. A combination of part-time study in the English Language Program and part-time study in his or her academic area.

During the registration period at the beginning of each semester all new undergraduate students (including transfer students) whose primary language is not English are required to take written proficiency and spoken proficiency tests. These students may not participate in the enrollment process until results of these tests are made available to academic advisors. The purpose of the tests is to identify students who may need help in increasing their English proficiency so that they can realistically profit from their academic pursuits at Kansas State University.

The director of the English Language Program will recommend appropriate enrollment options based on the test results. These recommendations could include one of the following:

1. Full-time study in the English Language Program until adequate proficiency is demonstrated.
2. A combination of part-time study (6 hours) in the English Language Program and part-time study (6 hours) in the academic area until adequate proficiency for full-time academic study is demonstrated.
3. Full enrollment in the academic program with no English language requirements.

### Special and non-degree seeking students

Students who have not participated in formal education for some time or students who do not intend to become candidates for a degree may apply for admission as students in special status.

Students applying for special status need to submit an application for admission and a \$15 nonrefundable application fee. Test scores and transcripts are required of all applicants. All applicants must meet standard admission requirements.

At the discretion of the director of admissions, some students may be admitted as non-degree seeking students. Such students will be allowed to complete a maximum of 15 semester hours in this status. In order to pursue work beyond the semester in which the 15th hour is completed, students must apply for regular admission to the director of admissions and meet all requirements for regular admission.

Under certain circumstances, outstanding high school students are admitted as non-degree students to take courses during the senior year. To be considered for such admission, a student must have the recommendation of the high school principal and have an outstanding high school academic record. The College of Arts and Sciences monitors the progress of these students carefully.

Adults who are not high school graduates are sometimes admitted if the high school work they completed was of good quality, or if they show promise of collegiate success as evidenced by scores on the American College Test battery. Where applicable, a GED certificate will be accepted in lieu of a high school diploma.

These options do not apply to international students.

All students are subject to stated requirements and are responsible for payment of all fees, regular attendance at classes, and maintenance of satisfactory standing.

### **American College Test (ACT)**

Freshman applicants to K-State are required to take the ACT and to have their test scores forwarded to the university. The test should be taken on one of the national test dates throughout the year, preferably

in October. Numerous test centers are available throughout the state and nation. Further information about the ACT can be obtained from your high school counselor or principal.

### **Fraudulent applications**

Individuals who withhold or provide fraudulent information on applications for undergraduate admissions or readmissions are subject to immediate dismissal from the university. The decision for immediate dismissal will be made by the director of admissions. This decision will be made after a complete and thorough review of the situation and an individual conference with the student involved. The individual dismissed has the right to appeal the decision to the Admissions and Enrollment committee, whose decision will be final.

### **Medical history**

Board of Regents' regulations require all new students to submit a medical history form to Lafene Health Center prior to registration.

### **Military evaluation for credit**

An evaluation of military training and experience is conducted in the Office of Admissions for a fee of \$25. An evaluation of military experience is optional and has no bearing on admission status to K-State. This evaluation does not include evaluation of transfer work from other educational institutions.

The fee covers evaluation of documents to include DD-214, DD-295, certificates of completion, Defense Language Institute transcripts, Academy of Health Sciences at Fort Sam Houston transcripts, and AARTS transcripts. Active military personnel may have their current, primary MOS evaluated, provided it has been validated by a performance evaluation within the last 12 months.

*Credit awarded through military credential evaluation will be recorded on your K-State transcript at the time you enroll in a K-State course.*

In general, the university follows the recommendation given in "A Guide to the Evaluation of Educational Experiences in the Armed Services" published by the American Council on Education as these recommendations apply to a student's K-State degree program. *Kansas State University does not award physical education credit for basic training.* Credit in military science is granted based on length of time in service and rank upon discharge. Military correspondence courses and courses which last less than two weeks are not recognized for college-level credit. Credits resulting from military evaluations granted by other institutions are not transferable to K-State.

# Academic Advising

Each new student is assigned an academic advisor. Students are expected to complete the ACT Assessment Program before enrolling and to participate in orientation/early enrollment programs. In addition, students are expected to schedule appointments with their academic advisors before early enrollment and at other times as needed.

Students must inform their advisors of any special needs or deficiencies that might affect academic success. Students are expected to know academic policies, procedures, and degree requirements, and to remain informed about their progress in meeting these requirements. Students are encouraged to seek assistance as needed from the various student support services provided by the university.

## Credit by examination

Many opportunities exist at Kansas State University to earn college credit by examination. K-State participates in the College Level Examination Program (CLEP), Proficiency Examination (PEP), DANTES, high school International Baccalaureate, and the College Board high school Advanced Placement Testing Program. Local examinations (quiz outs) also are given in many course areas by individual departments within the university.

Details concerning testing opportunities are available on request from the Office of Admissions, 119 Anderson Hall, Manhattan, Kansas 66506-0102, or Academic Assistance Center, 101 Holton Hall, Manhattan, Kansas 66506-1307. Also see the catalog section on the Academic Assistance Center.

## Credit by departmental examination

Students who are enrolled in K-State classes may petition a K-State department for permission to attempt to earn credit for a specific K-State course through a special departmental examination. Credit may be granted for any course with the consent of the head of the department offering credit for that subject. Permission is granted only if the student has prepared for the examination. The examination must be taken under the supervision of the head of the department in which the course is given. Credit earned by special examination is considered resident credit.

Credit by examination may receive letter grades of A, B, C, or D, or a notation "credit" as determined by the department. The graded work will receive grade points to be computed in the student's GPA. Nongraded credit by examination will be treated as graded hours in implementing A/Pass/F policy.

## Extension and correspondence credit

College-level credit earned through accredited extension divisions may be applied toward credit requirements for a degree at K-State. The credit must be applicable to the curriculum chosen and the amount of credit that can be used is limited. Contact the appropriate dean's office for further information.

## Pre-law advising

While the Association of American Law Schools does not specify a particular pre-law curriculum, it does emphasize the selection of rigorous courses that will enable students to achieve comprehension and expression in words; critical understanding of the human institutions and values with which the law deals; and creative power in thinking. The development of these capacities is a highly individualized process vigorously pursued in a variety of disciplines and degrees.

Students in *all* majors who are considering law study should consult with the K-State pre-law advisor in the dean's office of the College of Arts and Sciences as early as possible in their undergraduate careers. Also see catalog information on pre-law studies in the Colleges of Arts and Sciences, Business Administration, Engineering, and Human Ecology.

# Enrollment

Donald E. Foster, University Registrar  
118 Anderson Hall  
532-6254

Enrollments for fall and spring semesters, for summer term, and January and May intersessions occur at specified times during the academic year. The specific times are outlined in the *Class Schedule*, a booklet published by the Registrar's Office, or in a similar pamphlet published by the Division of Continuing Education.

## Assignment to classes

Students are responsible for fulfilling all requirements of the curriculum in which they are enrolled. They should consult with their advisors and be familiar with the *K-State Undergraduate Catalog*.

A catalog is given to new each student and copies are maintained for student use in the Office of Admissions, all deans' offices, Farrell Library, and all departmental offices. Catalogs may also be purchased at the K-State Union Bookstore.

No student is officially enrolled in courses or for private lessons in music or other subjects until a formal class assignment is completed. *No assignment is complete until all fees and charges are paid.*

A student may not enroll later than 10 class days after the beginning of a semester (five days for summer term) except by permission of the dean. Students should enroll during regularly scheduled registration periods in order to avoid late fees.

A student may not enroll for more than 19 K-State credit hours in a semester unless the student is granted permission to do so by the student's academic dean or the dean's representative. If the published curriculum of a college or department in which the student is enrolled requires that more than 19 K-State credit hours be taken during a semester, this 19-credit limit does not apply.

A student who has paid full fees on campus and who wishes to take a course through the Division of Continuing Education may, in certain instances, request a waiver of continuing education fees. Fee waivers do not apply to self-supporting courses and are contingent on the college dean's approval for the additional hours and final authorization by continuing education staff. Credit courses administered by the Division of Continuing Education award regular university credit and are included in the credit limits established in the preceding paragraph.

## Faculty and employees

Full-time faculty members and regular employees, with approval of their department heads or deans, may enroll in graduate or undergraduate work not to exceed 6 credit hours in fall and spring semesters or 3 credit hours during the summer session.

## Late enrollment

A student who seeks to enter the university later than 10 calendar days after the start of the semester is admitted only by special permission of the student's dean. Those who enroll after the regular registration period and up through the 20th day (10th for summer term eight-week course) of class pay a late fee of \$15. However, anyone enrolling after the 20th day (10th for summer term eight-week course) of class must pay a \$35 late fee.

## Dropping and adding courses

If a student wants to drop or add a course or if an instructor recommends a change, the student should confer with an advisor.

The instructor *may* drop a student from a course after the first week of classes if the student has neither attended any of the scheduled class meetings nor notified the instructor of his or her intent to take the course. For purposes of this procedure enrollment in and payment of tuition for a course *do not* constitute notification of intent to take a course.

No student may add a course after the first week of classes without the permission of the instructor.

The last day for dropping a course without a W being recorded is at the end of the 25th day of classes. After the 10th week of classes, courses may not be dropped. In cases where courses are shorter than the full semester, deadlines will be applied pro rata.

A summer term eight-week course may be dropped without a W being recorded through the thirteenth day; after the fifth week a full-term course may not be dropped.

## Curriculum change

Students desiring to transfer from one college to another within the university should confer with both deans concerned.

## Retake policy

Students may retake courses in order to improve the grade. If a course is retaken, the original grade is noted as retaken and removed from the grade point average.

Retakes can be accomplished only by re-enrolling in and completing a K-State resident course. Courses originally taken on a letter grade basis may be retaken on an A/Pass/F basis if appropriate, or if originally taken on an A/Pass/F basis may be retaken on a letter grade basis. The retake grade will always be used in the grade point average computation regardless of whether it is higher or lower than the original grade.

Although there is no limit to the number of times a course may be retaken, a student may retake a course with subsequent removal of the prior grade from calculation of the grade point average only once for each course, and for a total of five courses during the student's academic career at K-State. Any grades obtained from retaking courses beyond these limitations will be used in calculating the grade point average. A retaken course will count only once toward meeting degree requirements. Courses retaken before fall 1986 will not be used in determining whether five courses have been retaken.

Any course retaken after completion of a bachelor's degree will not affect the credits or the GPA applied to that degree.

## A/Pass/F policy

Students, except first-semester freshmen and students on probation, may enroll in certain courses (if normal prerequisites have not been met) under the A/Pass/F grading option. Under this option, a student earning a grade of A in a course will have an A recorded on the transcript for that course; a grade of B, C, or D will be recorded as Pass; a grade of F will be recorded as F.

Students may request the A/Pass/F option for eligible courses during the third and fourth weeks of each regular semester or during the second week of the summer term. Students requesting the use of the A/Pass/F option must obtain the signature of their advisors. The decision by a student to use the A/Pass/F option is treated with strict confidentiality.

It is the responsibility of a student requesting enrollment under the A/Pass/F option to be sure that such an enrollment is valid in the declared degree program. A course originally completed under the A/Pass/F option *may not* be converted at any time to a graded basis.

Students should be aware that some schools, scholarship committees, and honorary societies do not find work taken on a nongraded basis (Pass) acceptable.

Furthermore, many employers do not view nongraded (Pass) course work favorably. All students should be cautious in using the A/Pass/F option.

Each department or division may specify which courses its majors may take under the A/Pass/F option consistent with the university requirements listed below.

1. A student may enroll under the A/Pass/F option for any free elective course offered under this option, that is, in any course that is in no way specified even in general terms in his or her curriculum. Courses that are specified by name or number and courses that meet general distribution requirements are not considered free electives.
2. A student may enroll under the A/Pass/F option for any general distribution requirement offered under this option, provided the course is in the upper division level (300 and above), for example, three courses in the humanities.
3. A student may not enroll under the A/Pass/F option in any course that is required by name or number as part of his or her curriculum.

Students may submit Pass hours for graduation requirements up to and not exceeding one-sixth of the total number of hours required for a bachelor's degree. That is, five-sixths of all hours submitted for the degree must be hours submitted on a graded or credit basis.

### **Credit/No Credit courses**

Certain courses for which the learning experience is based primarily on participation and/or attendance may be offered solely on a Credit/No Credit basis. No grades are given for such courses.

For courses that are normally given for a grade, the designation Credit may be obtained in the case of credit by examination. (See the Academic Advising section of this catalog.)

### **Class attendance**

Class attendance policies will be determined by the instructor of each course. Instructors will determine if, and the manner in which, work and exams missed may be made up.

### **Withdrawal from the university**

A student who withdraws from the university must have an official withdrawal permit from the appropriate dean.

If a student withdraws during the first 25 days of the semester, no mark will be recorded on the student's transcript; thereafter, a mark of W is recorded. The deadline for withdrawing is the end of the 10th week of the semester.

If a student finds it necessary to withdraw from the university for verifiable nonacademic reasons after the 10th week, he or she should consult the appropriate dean's office.

### **Auditing classes**

Auditing is attending a class regularly, without participating in class work or receiving credit, and is permitted on a space-available basis. Permission to audit a class is granted by the instructor, with the approval of the dean of the college in which the class is offered. Laboratory, continuing education, and activity courses may not be audited. A non-refundable fee is charged each auditor except full-time university faculty members, employees, and full-time students. No record is made on the academic transcript. Students process the audit permission through the Enrollment Center. Students 60 years or older may audit on a space-available, no-fee basis.

### **Dead week**

The week before the final examination period (known as dead week) is set aside as a period of curtailed social activity. No examinations, other than weekly laboratory quizzes, studio, or language proficiency examinations, may be given during the last five calendar days before final examinations.

### **Dead day**

In the fall semester there is a weekend between the end of regularly scheduled classes and the beginning of final examinations. In the spring semester a single day, called dead day, is allowed between the end of classes and the beginning of final exams. Dead day ends at 4:30 p.m. Normally classes end on Wednesday, dead day is Thursday, and examinations begin on Thursday at 7 p.m.

### **Final examinations**

A final examination period during which no regular classes meet is scheduled at the end of the fall and spring semesters. Final examinations are given during this period. There is no specially scheduled period for final examinations in the summer session.

Except for honors, problems, seminars, and language and fine arts performance courses, the last examination (last unit test or comprehensive test) in a course must be given during the examination period specified by the University Admissions and Enrollment Committee and is published in the *Class Schedule*. Classes may have take-home examinations, projects, papers (excluding term papers), or other media, in lieu of written final examinations as the last evaluation instrument in the class. In such instances, a deadline for submittal of the medium may not be earlier than the time of the end of the course's scheduled examination period as published in the *Class Schedule*.

# Fees

Keith L. Ratzloff, Controller

## Fees subject to change

The following schedule of fees was in effect when this catalog was prepared. However, there is no guarantee this schedule will not be changed without notice before the beginning of any semester or summer term.

Students enrolled on a per-credit-hour basis or changing from 6 or fewer to 7 or more credit hours will be assessed for all hours in which they are enrolled, including those for which the grade of W is recorded. Students withdrawing from courses are eligible for refunds in accordance with the refund policy.

Students receiving scholarships or grants not processed through the K-State Office of Student Financial Assistance before registration will be required to pay the full amount of their fees from personal resources on the day they register.

## Payment of fees

Unless a deferment is granted, students must pay the total amount of their semester or summer term fees on the day they register and should use a check for exact amount of fees, MasterCard, or VISA. For students' safety, cash and checks requiring change are discouraged. Late fees are assessed for students who register or pay their fees after the regular registration period.

## Deferments

If the student's eligibility to receive financial aid is verifiable prior to the student's fee payment date, the director of student financial assistance may authorize the deferment of payment of tuition and fees in accordance with the Board of Regents Policy and Procedures Manual (Chapter 2, Section E). The student's obligation to pay regularly assessed tuition and fees is not reduced by an approval to defer payment. A deferment may be authorized for:

1. Those students who have fulfilled the application requirements and whose awards have been made by the June packaging date, but whose checks are not in. Deferments may be granted only to the approved level of financial aid eligibility. The amount of fees over and above the anticipated financial aid award must be paid by the student at the time of fee payment. No late fee will be assessed.

2. Those students who have applied for financial aid, but have not met the scheduled application deadlines. Deferments will be limited only to the amount of anticipated aid eligibility. A payment of one-third down or an amount equal to the aid that has been received, whichever is greater, will be required.

3. Veterans receiving benefits. Full tuition deferment only. Will be required to pay campus privilege fees. Late fee assessed.

4. International students. Full tuition deferment only. Will be required to pay campus privilege fees. Late fee assessed.

## Returned checks

Fee payment checks that are returned uncollectible by financial institutions will be subject to a \$10 charge, in addition to all other fees.

## Withholding student records

The university withholds students' academic records for nonpayment of fees, loans, and other appropriate charges and for nonreturn of university property.

## Tuition

This fee is the student's contribution toward the costs of instruction and covers approximately 20 to 25 percent of the instructional costs.

## Educational Opportunity Fund

This fee aids the academic achievement and progress of underrepresented K-State students.

## Student services support

This fee finances adaption and equipping of Holton Hall for improved delivery of student services programs.

## Student health

For a description of the services provided by this fee, see the section on Lafene Health Center in this catalog.

## K-State Union repair and replacement

This fee is used for repairs and replacements at the K-State Union.

## Student fee revenue bonds

This fee is used to retire the refunding bonds, Series 1985 and the Bramlage Coliseum revenue bonds. The refunding bonds advance refunded the outstanding balance of the Student Union Annex I bonds, Student Union Annex II bonds, stadium revenue bonds, and the student recreational building bond.

## Activity

This fee is used for a range of student interests and activities. Students enrolling in 6 or fewer credit hours do not pay a full activities fee and are not entitled to student ticket rates for certain activities.

## K-State Union

This fee is used for the administration, support, and operation of the student K-State Union.

## Student publications

This fee supports the *Collegian* and *Royal Purple*.

## Recreational Services

This fee supports the Chester E. Peters Recreation Complex (equipment, interior upkeep, supplies, etc.).

## KSDB-FM

This fee supports the student radio station (equipment, means of service to operate the station, recent upgrade of power wattage, etc.).

## Athletics

This fee supports intercollegiate athletics.

## Fine arts

This fee supports fine arts programming (theater, dance, music, art, etc.).

## Student publications equipment

This is a temporary fee to provide new equipment for student publications (*Collegian* and *Royal Purple*).

# Schedule of Fees

The following schedule of fees was in effect when this catalog was prepared.

A schedule of fees for Kansas State University at Salina follows this section.

## Contracts and compensatory charge

This schedule does not limit the charges that may be collected under arrangements with other governmental or private agencies, except that such arrangements may not provide for lesser charges. Compensatory or other charges to more nearly cover the actual cost of instruction are specifically authorized.

**Students enrolled in 7 or more semester credit hours:**

	Resident	Non-resident
<b>Tuition (based on student classification)</b>		
Undergraduate	\$ 662.00d	\$2,501.00
Veterinary medicine	1,630.00f	5,207.00f
<b>Campus privilege fees</b>		
Educational Opportunity Fund	6.00	6.00
Student services support	3.00	3.00
Student health	80.00a	80.00a
K-State Union repair and replacement	3.00b	3.00b
Student fee revenue bonds:		
Refunding bonds		
(stadium, Union, recreation bldg.)	22.25	22.25
Coliseum bonds	8.25	8.25
Activity fee	8.00	8.00
K-State Union	22.00b	22.00b
Student Publications	4.80	4.80
Recreational Services	8.00b	8.00b
KSDB-FM	.85	.85
Athletics	10.00	10.00
Fine arts	7.40	7.40
Student Publications equipment	3.90	3.90
Total undergraduate	<u>\$ 849.45</u>	<u>\$2,688.45</u>
Total veterinary medicine	<u>\$1,817.45</u>	<u>\$5,394.45</u>

**Fees per summer term (based on student classification)**

	Resident	Non-resident
<b>Tuition</b>		
Undergraduate	per credit hour \$44.00d	\$167.00
Veterinary medicine	per credit hour 109.00f	347.00f
<b>Campus privilege fees</b>	per credit hour 13.05e	13.05e

<sup>a</sup>Students enrolled in a spring semester but not attending summer school may use Lafene Health Center services during the summer by paying a \$20 fee prior to the first day of summer school classes. After the start of classes the fee for such students will be \$25, payable during the first visit to the health center. Students who have paid their health fees may elect to have their spouses covered if they pay, within 10 days of their own health fee payment, a spouse fee of \$75 for a semester, or \$20 or \$25 (as appropriate) for a summer term. Full-time K-State employees will not be assessed a student health fee, but they may choose to pay the fee and therefore be eligible for Lafene Health Center services.

<sup>b</sup>Students paying the full incidental fee who will be attending classes at off-campus locations during an entire semester and who will reside outside of a 30-mile radius of K-State's Manhattan campus during that semester may elect to be exempted from all campus privilege fees.

**Students enrolled in 6 or fewer semester credit hours:**

	Resident	Non-resident
<b>Tuition (based on student classification)</b>		
Undergraduate	per credit hour \$44.00d	\$167.00
Veterinary medicine	per credit hour 109.00f	347.00f
<b>Campus privilege fees</b>		
Educational Opportunity Fund	total fee 3.00	3.00
Student services support	total fee 1.00	1.00
Student health	total fee 25.00a	25.00a
K-State Union repair and replacement	total fee 1.50	1.50
Student fee revenue bonds:		
Refunding bonds		
(stadium, Union, recreation bldg.)	total fee 12.50	12.50
Coliseum bonds	total fee 3.75	3.75
Activity fee	total fee 4.00c	4.00c
K-State Union	total fee 11.00	11.00
Student Publications	total fee 2.40	2.40
Recreational services	total fee 3.50	3.50
KSDB-FM	total fee .50	.50
Athletics	total fee 5.00	5.00
Fine arts	total fee 3.25	3.25
Student Publications equipment	total fee 1.95	1.95

**Auditing**

Auditing, permitted on a space-available basis, allows class attendance without participation or credit upon recommendation of the instructor and approval of the dean. This privilege is not applicable to laboratory and Division of Continuing Education courses. Any person 60 years or older may audit classes at no cost but still must obtain approval from the instructor and dean.

Undergraduate	per credit hour \$44.00d	\$167.00
Graduate	per credit hour 56.00d	179.00
Veterinary medicine	per credit hour 109.00f	347.00f

<sup>c</sup>Not a full activity fee and does not entitle students to student ticket rates for certain activities, such as athletic events.

<sup>d</sup>Employees (as defined in the Eligibility for Resident Fees section) are assessed the resident tuition at the hourly rate.

<sup>e</sup>Summer-term campus privilege fees are assessed only on the first 6 credit hours for each summer term and are not applicable to students enrolled in formally organized classes actually conducted at off-campus locations.

<sup>f</sup>Effective May 1992: The veterinary medicine senior class will be assessed three equal tuition payments based on 6 credit hours for the summer term and full-time tuition for the following fall and spring semesters. The tuition assessments will be equal, but the campus privilege fees assessments will be based on the applicable amounts for each enrollment period.

**Off-campus courses# (Based on course level)**

Undergraduate credit	\$62.00 per semester hour
No credit	Lowest advertised tuition rate per semester hour
Non-credit courses	Vary to correspond with total direct costs

**Regents Center construction fee**

Students enrolled in K-State courses offered in the KU Regents Center in Kansas City will be assessed a \$10-per-credit-hour charge to defray costs of construction of this new facility.

**Media fees**

Videotape electronic media fee	\$25 per credit hour
Audiotape electronic media fee	\$40 per credit hour
Real-time/interactive electronic media fee	\$20 per clock hour

**TELENET media fee**

(For courses delivered via Kansas Regents Network)

1-credit-hour course	\$15
2-credit-hour course	\$20
3-credit-hour course	\$25

#As approved by the Board of Regents, off-campus courses may be offered for either resident or extension credit. Resident credit will be awarded only with the approval of the appropriate campus faculty council. (For off-campus courses, the established off-campus fees per credit hour for undergraduate courses are to be collected and an amount equal to the on-campus incidental fee per credit hour deposited to the general fee fund.)

**On-campus fees administered through the Division of Continuing Education**

		Resident	Non-resident
<b>Credit Tuition</b>			
Undergraduate	per credit hour	\$44.00	\$167.00
Veterinary Medicine	per credit hour	109.00	347.00
Coordination fee	per credit hour	10.00	10.00

**Non-credit Tuition** Vary to correspond with total direct costs

**Coordination fee** Vary to correspond with total direct costs

**Student fees (both credit and applicable non-credit courses)**

Activity Fees	per day	\$2.55*	\$2.55*
Health Fees	per day	\$1.20**	\$1.20**

\*To a maximum of the part-time activity fee of \$53.35 per semester

\*\*To a maximum of \$25 per semester

**Conferences, institutes, and seminars**

Non-credit Vary to correspond with total direct costs

**Application for admission processing fees (not subject to refund)**

**Applications**

For first-time admission	\$15.00
For international students	40.00

**Veterinary medicine applications**

Application for admission to first professional program in College of Veterinary Medicine	20.00
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**Private music lessons**

Students enrolled in a degree program with a major in music, music education, or applied music and dual majors in music and theatre are exempt from fees for private music lessons.

For other students enrolled in credit courses, fees are payable in advance and are as follows (Enrollment subject to availability of staff and facilities.)

	Students
<b>Two 30-minute lessons a week</b>	
Semester	\$75.00
Summer session	37.00

<b>One 30-minute lesson a week</b>	
Semester	45.00
Summer session	22.50

**Single lessons, per lesson** 7.50

**Practice piano**

Semester, 1 hour daily	9.00
Summer session, 2 hours daily	9.00

**Practice organ, two-manual**

Semester, 1 hour daily	18.00
Summer session, 2 hours daily	18.00

**Practice organ, three-manual**

Semester, 1 hour daily	37.50
Summer session, 2 hours daily	37.50

**Engineering equipment fee**

For undergraduates enrolled in the College of Engineering:

**Fall or spring semesters**  
 \$100 per student per semester if enrolled in 7 or more credit hours  
 \$50 per student per semester if enrolled in 4, 5, or 6 credit hours  
 \$25 per student per semester if enrolled in 3 or fewer credit hours

**Summer term**  
 \$50 per student per summer term if enrolled in 4 or more credit hours  
 \$25 per student per summer term if enrolled in 3 or fewer credit hours

**Intersessions**  
 \$25 per student per intersession.

**Field camps**

Summer field camps in geology, archaeology	\$300.00
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**Late registration or fee payment  
(not subject to refund)**

After regular registration through 20th day of classes	\$15
After 20th day of classes	\$35

Exceptions: The \$15 fee begins after the last regular evening registration if registering for evening courses only; after the starting date for late-starting courses; and after the first Friday of classes for faculty, staff, and teachers. For summer terms, the fee increases from \$15 to \$35 after the 10th day of classes. Late fees do not apply to corrections of fee assessments.

**Study abroad program fee  
(not subject to refund)**

Administrative fee per semester or summer term for each student enrolled in a study abroad program not taught or conducted by K-State faculty	\$25
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**Military training and experience evaluation**

Administrative fee for evaluating the military training and experience of a student to determine college-level equivalency	\$25
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**Additional fees**

Copies of public documents  
At cost

Laboratory courses  
Cost of breakage

Parking misuse fees  
As filed in the Board of Regents office

Interlibrary loan and other charges  
As appropriate when authorized

Library misuse fees  
As appropriate when authorized

Loans and related interest and charges  
As appropriate when authorized

Rental and use fees for recreational equipment  
As appropriate when authorized

Returned check fee  
\$10 per check

ROTC property  
As appropriate when authorized

Student health services  
As appropriate when authorized

Transcript fee  
\$3 per transcript

Student identification card replacement  
\$10 per each replacement

Student fee receipt replacement  
\$1 per each replacement

Administrative service fee for all students applying for federal Stafford Loans  
\$10 per academic year

Students are required to reimburse the institution for the cost of excess breakage and wastage of materials, and materials used in excess of those required for completion of course work.

**American Institute of Baking students**

Students enrolled in a regular semester at the American Institute of Baking will be considered adjunct students by paying the fees, other than tuition, under "Students enrolled in 7 or more hours" on the Schedule of Fees. These students will be entitled to use the Lafene Health Center, K-State Union, and Recreational Center, and to purchase tickets for athletic and cultural events at student prices.

**Other expenses**

In addition to the applicable fees, students are required to purchase textbooks, drawing instruments, and other personal equipment and supplies when needed for courses in the curriculum chosen. Costs will vary each semester, but are estimated to approximate the following:

Enrollment fees for an undergraduate Kansas resident—Manhattan campus	\$ 915
Books and supplies, approximately	285
Room and board in university housing	1,420
Clothing, laundry, postage, travel, extra meals, phone, social activities (varies with the individual), miscellaneous	1,015
Total estimated expenses (half of academic year)	\$3,635

## Schedule of Fees for K-State at Salina

The following schedule of fees was in effect when this catalog was prepared.

**Contracts and compensatory charges**

This schedule does not limit the charges that may be collected under arrangements with other governmental or private agencies, except that such arrangements may not provide for lesser charges. Compensatory or other charges to more nearly cover the actual cost of instruction are specifically authorized.

**Students enrolled in 12 or more semester credit hours:**

	Resident	Non-resident
<b>Tuition</b>		
Undergraduate	\$ 481.00	\$1,670.00
<b>Campus privilege fees</b>		
Student service and activity	26.50	26.50
Educational Opportunity Fund	4.00	4.00
Student Union operation	14.00	14.00
Campus vehicle parking	5.50	5.50
Total undergraduate	<u>\$ 531.00</u>	<u>\$1,720.00</u>

**Students enrolled in 11 or fewer semester credit hours:**

	Resident	Non-resident
<b>Tuition and audit fees (per credit hour)</b>		
Undergraduate	\$40.25	\$139.25
<b>Campus privilege fees (per credit hour)</b>		
Student service and activity	2.39a	2.39a
Educational Opportunity Fund	.35a	.35a
Student Union operation	1.26a	1.26a
Campus vehicle parking	.50a	.50a

**Fees per summer term**

	Resident	Non-resident
<b>Tuition and audit fees (per credit hour)</b>		
Undergraduate	\$40.25	\$139.00
<b>Special fees</b>	4.50a	4.50a

**Flight training lab fees**

	Solo/ hour	Dual/ hour
<b>Aircraft</b>		
Cessna 150/152	\$ 30.00	\$ 45.00
Cessna 172	45.00	60.00
PA-28	45.00	60.00
Cessna 177	50.00	65.00
Beechcraft "Musketeer"	50.00	65.00
Beechcraft 24R (Sierra)	60.00	75.00
Cessna 310	120.00	135.00
<b>Ground time</b>		
One-on-one instruction		5.00

**Other fees**

International student matriculation (non-refundable)	25.00
<b>Off-campus credit courses</b>	
Workshops, conferences, and seminars; when announced (per credit hour)	53.00
A & P program only (per credit hour)	64.00
Deferred payment processing (non-refundable)	10.00

**Additional fees**

Transcript fee	\$ 3.00
Library misuse fees	
As appropriate when authorized	
Students are required to reimburse K-State at Salina for cost of: excess breakage and waste of materials and materials used in excess of those required for course work.	

## People Eligible for Resident Fees

### 1. Residents

Usually includes adults who have been residents of Kansas for 12 months or longer prior to registering for any semester or term and minors of parents who meet these residency requirements. The official residency determination for fee purposes is made by the Registrar's Office.

### 2. Employees

a. Employees for universities under the Kansas Board of Regents, other than hourly student employees, working four-tenths time or more as follows:

For fall semesters: More than half of September and all of October and November pay periods.

For spring semesters: More than half of February and all of March and April pay periods.

For summer terms: Part of June and all of July pay periods, or more than half of February and all of March and April pay periods preceding the summer sessions.

Exceptions to the above requirements can be made for the term in which a graduate degree is awarded.

Pay periods start on the 18th of the preceding month and end on the following 17th; e.g., September pay period starts August 18 and ends September 17.

b. Employees of the federal government given adjunct appointments at Kansas State University or assigned to one of the ROTC units at K-State.

### 3. Military

a. Military personnel stationed and living in Kansas except military personnel assigned to K-State as full-time students.

b. People who are domiciliary residents of the state, who were in active military service prior to becoming domiciliary residents of the state, who were present in the state for a period of not less than two years during their tenure in active military service, whose domiciliary residence was established in the state within 30 days of discharge or retirement from active military service under honorable conditions, but whose domiciliary residence was not established in time to meet the residence duration requirement.

### 4. Dependents

Dependent spouses and children of the employees and military personnel defined above.

### 5. Exchange students from Missouri

Students eligible to pay resident fees at the University of Missouri who are enrolled in the following programs at Kansas State University: Bachelor of Architecture; B.S. in architectural engineering; B.S. in bakery science and management; B.S. in construction science; B.S. in milling science and management; B.S. in horticulture therapy; and Bachelor of Interior Architecture.

This privilege is granted in exchange for resident fees for Kansas students arbitrated by Kansas Board of Regents and Missouri Board of Education.

### 6. Kansas high school graduates

Students who have graduated from an accredited Kansas high school within 6 months of enrollment at K-State who were Kansas residents at the time of high school graduation or within 12 months prior to graduation.

### 7. Recruited/transferred employees

People who have been recruited to full-time employment in Kansas or transferred to a Kansas location and their dependents.

## Refund Policy

The following table applies to students who completely withdraw from a semester, summer term, field geology, or private music lessons and to the reduction, if any, in fees for students who reduce their enrollment. Refunds will not be made until sufficient time has lapsed to ensure that fee payment checks have been honored by the bank—usually 15 days after student pays. Reduction in fees resulting from action taken after the last day of a semester or term will not be refunded.

### Withdrawal

Through the last business day prior to the first day of classes or the last day of regularly scheduled fee payment (whichever comes first) 100% refund

### 16-week semester

Through week two 90%  
Through week four 50%  
After week four No refund

### Summer term

Through week one 90%  
Through week two 50%  
After week two No refund

For courses less than 5 weeks, 100% refund will be given through the day after the course begins. No refund will be given after that time.

### Continuing education refunds

#### Extension credit courses

100% refund if requested prior to second course meeting or if the course is canceled.

50% refund if requested after the second class meeting.

No refund if requested after one-third of the scheduled class meetings.

Extension course fees are not transferable.

#### Extension non-credit courses

Fees are non-refundable unless, subsequent to acceptance of the fees, the service, at the option of the university, is not provided.

#### Conference, institutes, and seminars

100% refund if cancellation of registration is received by official notification at least 48 hours prior to the time of the scheduled event.

# Degrees

## Common degree requirements

The common requirements for all curricula leading to an undergraduate degree are: Expository Writing, 6 credits; Public Speaking, 2 credits; Principles of Physical Fitness, 1 credit.

## Degree requirements

To graduate, a student must complete a prescribed curriculum. Under special conditions substitutions are allowed as the interests of the student warrant. The total credit requirement for bachelor's degrees ranges from 120 to 167 hours, according to the curriculum taken.

There are two grade point averages a student must meet to be awarded a degree: (1) at least 2.0 on K-State resident graded courses that are applied to the degree, and (2) at least a 2.0 cumulative GPA for all resident graded courses taken at K-State. Professional curricula may impose additional degree requirements.

Students must file an application for graduation clearance in the appropriate dean's office during the first four weeks of the semester (first two weeks for summer term) in which the degree is to be completed.

It is the student's responsibility to be certain that transcripts from all transfer institutions are on file in the Registrar's Office before the end of the semester or summer term the degree requirements will be completed.

Up to half of the credits required for a normal four-year degree may be completed at an accredited two-year college.

Each student must complete at least 30 resident credits to be considered for a degree. Further, the student must complete 20 of the last 30 hours of resident credit at K-State. Courses in the student's major field shall be taken in residence unless an exception is granted by the major department on petition of the student. That department shall have jurisdiction over the acceptance of major courses by transfer for fulfillment of the major requirement.

Exceptions to the residence requirement of the final year may be made by the dean of the college and the department head in the student's major field, if the student has completed a total of three years of work acceptable to K-State. The student must submit satisfactory plans and reasons for completing the degree requirements at another institution, such as a dental, medical, law, or medical technology school, before earning a degree here.

Resident work includes all regularly scheduled course or laboratory instruction given by the regular university faculty.

At least five-sixths of the credit hours taken at K-State and applied toward a degree must be graded hours. Required courses of an internship or practicum nature or credit by examination, offered on a Credit/No Credit basis only, are to be considered as graded hours in implementing the five-sixths policy.

Candidates for spring graduation should attend commencement. Fall graduates are asked to participate in the commencement exercises in December or the following spring. Prospective summer graduates may participate in the exercises before or after graduation.

Students generally complete degree requirements in the normal four or five academic years allotted for that purpose. However, it could take additional time because of a significant change of educational objective. A student may interrupt studies for one or more semesters. Normally, the student will be expected to complete the degree program in not more than two years beyond the scheduled time. The individual whose education has been interrupted may have to meet new degree requirements if a change has occurred.

## Dual degrees

Students may elect in some cases to earn two degrees at the same time. A minimum of 150 credit hours must be completed and the requirements for both colleges must be satisfied. Students should confer with each academic dean as early as possible to determine appropriate programs of study.

Each student who is eligible to graduate must file an application for graduation in the academic dean's office during the first four weeks of the semester he or she plans to complete degree requirements. Summer graduates must file their applications for graduation during the first two weeks of the summer session.

## Math requirements for degrees

The degrees shown below are conferred on completion of the prescribed curricula. The letter that precedes each curriculum indicates the suggested high school math courses that students should have completed in high school.

- (A) One unit of algebra, or one unit of geometry, or a unit involving the combination of these, or approved substitute
- (B) One unit of algebra
- (C) Two units of algebra

(D) One unit of algebra and one unit of geometry

(E) One and one-half units of algebra and one unit of geometry

(F) Two units of algebra, one unit of geometry, and one-half unit of trigonometry

## College of Agriculture

Bachelor of science in agriculture

(E) Agribusiness (B.S. in agribusiness)

(E) Agricultural economics

(E) Agricultural education

(E) Agricultural journalism

(E) Agricultural technology management

(E) Agronomy (crops and soils)

(E) Animal sciences and industry

(E) Bakery science and management (B.S. in bakery science and management)

(E) Feed science and management (B.S. in feed science and management)

(E) Food science and industry (B.S. in food science and industry)

(E) Horticulture

(E) Horticultural therapy

(E) Milling science and management (B.S. in milling science and management)

(E) Parks, recreation, and resource management (B.S. in parks, recreation, and resource management)

(E) Pest science and management

(E) Pre-forestry (nondegree)

(E) Pre-veterinary medicine (nondegree)

(E) Retail floriculture (associate degree and certificate program)

## College of Architecture and Design

(F) Architecture—five years (bachelor of architecture)

(F) Interior architecture—five years (bachelor of interior architecture)

(F) Landscape architecture—five years (bachelor of landscape architecture)

## College of Arts and Sciences

Bachelor of arts, bachelor of fine arts, bachelor of music, bachelor of music education, and bachelor of science

(B) Anthropology, B.A. or B.S.

(A) Art, B.A. or B.F.A.

(E) Biochemistry, B.A. or B.S.

(E) Biology, B.A. or B.S.

(E) Chemistry, B.A. or B.S.

General chemistry

Chemical science

(B) Computer science, B.A. or B.S.

(B) Economics, B.A. or B.S.

(A) English, B.A.

(E) Fisheries and wildlife biology, B.A. or B.S.

(B) Geography, B.A. or B.S.

(E) Geology, B.A. or B.S.

(E) Geophysics, B.A. or B.S.

- (A) History, B.A. or B.S.
- (B) Information systems, B.A. or B.S.

#### Interdisciplinary studies

- (A) Humanities, B.A.
  - (D) Life science, B.A. or B.S.
  - (E) Physical science, B.A. or B.S.
  - (A) Social science, B.A. or B.S.
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- (B) Journalism and mass communications, B.A. or B.S.
  - (E) Kinesiology, B.A. or B.S.
  - (F) Mathematics, B.A. or B.S.
  - (E) Medical technology, B.A. or B.S.
  - (E) Microbiology, B.A. or B.S.
  - (A) Modern languages, B.A.
  - (A) Music
    - Music, B.A.
    - Applied music, B.M.
    - Music education, B.M.E.
  - (A) Philosophy, B.A. or B.S.
  - (E) Physics, B.A. or B.S.
  - (B) Political science, B.A. or B.S.
  - (E) Pre-dentistry, B.A. or B.S.
  - (E) Pre-law (nondegree)
  - (E) Pre-medical records administration (nondegree)
  - (E) Pre-medicine, B.A. or B.S.
  - (E) Pre-nursing (nondegree)
  - (E) Pre-occupational therapy (nondegree)
  - (E) Pre-optometry (nondegree)
  - (E) Pre-pharmacy (nondegree)
  - (E) Pre-physical therapy (nondegree)
  - (E) Pre-respiratory therapy (nondegree)
  - (E) Pre-veterinary medicine (nondegree)
  - (E) Psychology, B.A. or B.S.
  - (B) Radio-television, B.A. or B.S.
  - (E) Social work, B.A. or B.S.
  - (E) Sociology, B.A. or B.S.
  - (A) Speech, B.A. or B.S.
  - (A) Speech pathology-audiology, B.A. or B.S.
  - (A) Statistics, B.A. or B.S.
  - (A) Theatre, B.A. or B.S.

#### College of Business Administration

##### Bachelor of science in business administration

- (E) Accounting
- (E) Finance
- (E) General business administration
- (E) Management
- (E) Marketing

#### College of Education

- (A) Elementary education (bachelor of science in elementary education)
- Secondary education (bachelor of science)
  - (A) Education—Art
  - (E) Education—Biological science
  - (B) Education—Business
  - (E) Education—Chemistry
  - (E) Education—Earth science
  - (B) Education—Economics
  - (A) Education—English
  - (A) Education—English and journalism
  - (A) Education—Geography
  - (A) Education—History
  - (A) Education—Journalism
  - (F) Education—Mathematics
  - (A) Education—Modern languages
  - (E) Education—Physical science
  - (E) Education—Physics
  - (B) Education—Political science
  - (B) Education—Sociology
  - (A) Education—Speech

#### College of Engineering

- (F) Agricultural engineering (B.S. in agricultural engineering)
- (F) Architectural engineering (B.S. in architectural engineering)
- (F) Chemical engineering (B.S. in chemical engineering)
- (F) Civil engineering (B.S. in civil engineering)
- (F) Computer engineering (B.S. in computer engineering)
- (F) Construction science (B.S. in construction science)
- (F) Electrical engineering (B.S. in electrical engineering)
- (E) Engineering technology (B.S. in engineering technology)
- (F) Industrial engineering (B.S. in industrial engineering)
- (F) Mechanical engineering (B.S. in mechanical engineering)
- (F) Nuclear engineering (B.S. in nuclear engineering)

#### College of Human Ecology

- B.S. in clothing and textiles
- (C) Apparel and textile marketing
- (C) Apparel design
- (C or F) Textiles
- B.S. in dietetics
- (C) Dietetics

- B.S. in foods and nutrition
- (C) Community health and nutrition
- (C or F) Food science
- (F) Nutritional sciences (pre-medical)
- (C or F) Nutrition and exercise sciences

- B.S. in hotel and restaurant management
- (C) Hotel and restaurant management

- B.S. in human development and family studies
  - (C) Early childhood education
  - (C) Human development and family studies
    - Community services
    - Family and consumer economics
    - Family studies (pre-law)
    - Life span human development
    - Human development and family studies and social work

- B.S. in human ecology
- (C) General human ecology
  - Home economics education
  - teacher certification

- B.S. in human ecology and mass communications
- (C) Human ecology and mass communications

- B.S. in interior design
- (C) Interior design

#### College of Technology

- Associate of technology
  - (E) Aviation maintenance
  - (F) Chemical engineering technology
  - (F) Civil engineering technology
  - (F) Computer engineering technology
  - (B) Computer information systems
  - (E) Computer science technology
  - (F) Electronic engineering technology
  - (F) Industrial engineering technology
  - (F) Mechanical engineering technology
  - (E) Professional pilot
  - (F) Surveying technology

- Associate of technology and associate of applied science
  - (E) Aviation maintenance

- Aviation maintenance certificate
- (B) Aviation maintenance

#### College of Veterinary Medicine

- Veterinary medicine (doctor of veterinary medicine)
- (See Colleges of Agriculture and Arts and Sciences for B.S. degrees in connection with College of Veterinary Medicine.)

# Grades

The university uses the following grades:

- A**, for excellent work
- B**, for good work
- C**, for fair work
- D**, for poor work
- F**, for failure
- I**, for incomplete
- IX**, for unfinished incomplete, equivalent to F
- P**, for grades of B, C, or D in courses taken under the A/Pass/F grading option
- Cr**, for credit in courses for which no letter grade is given (nongraded courses)
- NC**, for no credit in courses for which no letter grade is given (nongraded courses)
- NR**, for no grade reported
- NX**, for NR converted to the equivalent of F
- W**, for withdrawn

The grade of Incomplete normally is given in regular courses (other than independent studies, research, and problems) only for verifiable personal emergencies. The faculty member has the responsibility to provide written notification to the student of the incomplete work. The student has the responsibility to take the initiative in completing the work, and is expected to make up the incomplete during the first semester in residence at the university after receiving the grade of I. If the student does not make up the incomplete during the first semester in residence at the university after receiving it, a grade may be given by the faculty member without further consultation with the student.

If after the end of the first semester the I remains on the record it will be designated as IX for record-keeping purposes and will be computed in the student's GPA, weighted at 0 points per credit. The designation of NR will be treated in a like manner.

Courses in which a Cr or P grade is received will be used in fulfilling graduation requirements. Only the grades A, B, C, D, and F (and the designations IX and NX under conditions described above) are used in calculating resident grade averages.

## Report of grades

Academic progress reports for new freshmen are mailed to students and deans' offices at the close of the fifth week of classes.

The instructor reports final semester grades, based on examinations and class work, to the Registrar's Office.

If a student drops a 16-week course after the 25th day of classes, a mark of W is reported on the transcript. No 16-week course may be dropped after the tenth week

of the semester. Regardless of the time of withdrawal, a final grade is reported if all the required work of the course has been completed.

In case of absence from the final examination, the instructor reports a mark of I for incomplete or computes the grade on the basis of zero for the final examination. If an Incomplete is reported, a reasonable time, usually not over one month, is allowed in which to take the exam.

For students who may be eligible to graduate in the spring semester, tentative grades will be collected at the end of regular class meetings. Instructors may revise tentative grades as a result of final examinations.

## Points

For each semester hour of graded work, students earn points, as follows: A = 4, B = 3, C = 2, D = 1, F = 0.

## Scholastic deficiencies

### Through summer 1993

*The following policy is effective through the summer term 1993.*

Students are notified of their scholastic status by the appropriate academic deans from information supplied by the Registrar's Office. The scholastic record is evaluated twice yearly, at the end of the fall semester and at the end of the spring semester. The student's scholastic status does not change as a result of work taken in summer term or intersession.

Students (excluding students in the College of Veterinary Medicine) are placed on probation or dismissal as directed by the scholastic deficiency policy.

### Probation

Students will be placed on probation if 19 or fewer hours have been completed and the semester or cumulative GPA drops more than three points below a C (2.0) average; if 20 through 39 hours have been completed and the semester or cumulative GPA drops more than two points below a C (2.0) average; if 40 through 60 hours have been completed and the semester or cumulative GPA drops more than one point below a C (2.0) average; or if more than 60 hours have been completed and the semester or cumulative GPA drops below a C (2.0).

Students are automatically taken off probation when their overall grade point average reaches the required level.

### Dismissal

Students may be dismissed if they have

completed 12 or more semester hours of resident graded course work, have been on probation the previous semester, and have a GPA more than:

- a. 12 points below a 2.0 for 12-60 hours,
- b. 11 points below a 2.0 for 61-80 hours,
- c. 10 points below a 2.0 for 81-100 hours,
- d. 9 points below a 2.0 for 101-120 hours,
- e. 8 points below a 2.0 for 121-140 hours, or
- f. 7 points below a 2.0 for 141 or more hours.

Students who neglect their academic responsibilities may be dismissed at any time on recommendation of the academic dean.

## Scholastic deficiencies

### Beginning fall 1993

*The following policy is in effect beginning with the fall 1993 semester*

Students are notified of their scholastic status by the appropriate academic deans from information supplied by the Registrar's Office. The scholastic record of each undergraduate is evaluated twice yearly, at the end of the fall semester and at the end of the spring semester. The student's scholastic status does not change as a result of work taken in summer session or intersession.

Students (excluding students in the College of Veterinary Medicine) are placed on academic warning or dismissal according to the following policy:

1. Students who earn less than a 2.000 semester or cumulative GPA will be placed on academic warning.
2. Students will be automatically taken off academic warning when the cumulative GPA reaches 2.000.
3. The thresholds below are used for computing academic dismissal:
  - a. Credit hours used to determine the appropriate threshold will include transfer hours, all K-State hours attempted, and any miscellaneous hours accumulated.
  - b. Credit hours used in calculating semester and cumulative grade point averages will include only K-State resident graded hours. Grades for courses accepted in transfer from another institution will not be used in the grade point average calculation.
  - c. Students will not be dismissed until they have completed at least 30 semester credit hours.
  - d. Students must be on academic warning the semester prior to dismissal.

e. Students will be academically dismissed if their cumulative GPA as a K-State resident is below the following threshold values:

Hours completed	K-State GPA
30-45	1.75
46-60	1.80
61-75	1.85
76-90	1.90
91-105	1.95
greater than 105	2.00

4. Students who earn a semester GPA of 2.200 or more on 12 or more graded hours (or the minimum grade point average established by the student's college, if higher) during the semester in question will not be dismissed.

5. Students who neglect their academic responsibilities may be dismissed at any time on recommendation of the academic dean.

6. Dismissed students will be readmitted only when approved for reinstatement by the Academic Standards Committee of the college the students are attempting to enter. Normally students must wait at least one semester before being considered for reinstatement and are on academic warning at the time of readmission.

7. The effective date of this policy change is the fall 1993 semester.

### Scholastic deficiencies chart

Effective through summer 1993 term

This chart may be used to determine deficiency for an overall average if the student has completed only K-State graded hours.

Hours completed	Grade points		Hours completed	Grade points		Hours completed	Grade points	
	Probation less than	Dismissal less than		Probation less than	Dismissal less than		Probation less than	Dismissal less than
3	3	—	50	99	88	97	2.0 GPA	184
4	5	—	51	101	90	98	2.0 GPA	186
5	7	—	52	103	92	99	2.0 GPA	188
6	9	—	53	105	94	100	2.0 GPA	190
7	11	—	54	107	96	101	2.0 GPA	193
8	13	—	55	109	98	102	2.0 GPA	195
9	15	—	56	111	100	103	2.0 GPA	197
10	17	—	57	113	102	104	2.0 GPA	199
11	19	—	58	115	104	105	2.0 GPA	201
12	21	12	59	117	106	106	2.0 GPA	203
13	23	14	60	119	108	107	2.0 GPA	205
14	25	16	61	2.0 GPA	111	108	2.0 GPA	207
15	27	18	62	2.0 GPA	113	109	2.0 GPA	209
16	29	20	63	2.0 GPA	115	110	2.0 GPA	211
17	31	22	64	2.0 GPA	117	111	2.0 GPA	213
18	33	24	65	2.0 GPA	119	112	2.0 GPA	215
19	35	26	66	2.0 GPA	121	113	2.0 GPA	217
20	38	28	67	2.0 GPA	123	114	2.0 GPA	219
21	40	30	68	2.0 GPA	125	115	2.0 GPA	221
22	42	32	69	2.0 GPA	127	116	2.0 GPA	223
23	44	34	70	2.0 GPA	129	117	2.0 GPA	225
24	46	36	71	2.0 GPA	131	118	2.0 GPA	227
25	48	38	72	2.0 GPA	133	119	2.0 GPA	229
26	50	40	73	2.0 GPA	135	120	2.0 GPA	231
27	52	42	74	2.0 GPA	137	121	2.0 GPA	234
28	54	44	75	2.0 GPA	139	122	2.0 GPA	236
29	56	46	76	2.0 GPA	141	123	2.0 GPA	238
30	58	48	77	2.0 GPA	143	124	2.0 GPA	240
31	60	50	78	2.0 GPA	145	125	2.0 GPA	242
32	62	52	79	2.0 GPA	147	126	2.0 GPA	244
33	64	54	80	2.0 GPA	149	127	2.0 GPA	246
34	66	56	81	2.0 GPA	152	128	2.0 GPA	248
35	68	58	82	2.0 GPA	154	129	2.0 GPA	250
36	70	60	83	2.0 GPA	156	130	2.0 GPA	252
37	72	62	84	2.0 GPA	158	131	2.0 GPA	254
38	74	64	85	2.0 GPA	160	132	2.0 GPA	256
39	76	66	86	2.0 GPA	162	133	2.0 GPA	258
40	79	68	87	2.0 GPA	164	134	2.0 GPA	260
41	81	70	88	2.0 GPA	166	135	2.0 GPA	262
42	83	72	89	2.0 GPA	168	136	2.0 GPA	264
43	85	74	90	2.0 GPA	170	137	2.0 GPA	266
44	87	76	91	2.0 GPA	172	138	2.0 GPA	268
45	89	78	92	2.0 GPA	174	139	2.0 GPA	270
46	91	80	93	2.0 GPA	176	140	2.0 GPA	272
47	93	82	94	2.0 GPA	178	141 or more	2.0 GPA	more than 7 points below 2.0 GPA
48	95	84	95	2.0 GPA	180			
49	97	86	96	2.0 GPA	182			

**Reinstatement**

Normally a student must wait at least one semester before being considered for reinstatement.

A dismissed student will be readmitted only when approved for reinstatement by the academic standards committee of the college the student is attempting to enter.

Students who earn a semester grade point average of at least 2.0 but less than 2.2 on 12 or more credits during the semester they are dismissed can be considered for immediate reinstatement.

The application for reinstatement must be directed to the academic standards committee of the specific college in which the student wishes to enroll.

**Graduation honors**

Degree candidates who have completed a minimum of 60 hours in residence, with at least 50 hours in graded courses, are considered for graduation with scholastic honors as follows: Students with a 3.950 or above K-State academic average are designated as *summa cum laude*. The remaining students in the upper three percent of the college graduating class are designated *magna cum laude*. Those remaining in the upper 10 percent are graduated *cum laude*. Doctor of veterinary medicine degree candidates are eligible to receive these honors based on courses completed in the professional program.

**Semester honors**

Students with 12 graded hours whose semester grade point average places them in the upper 10 percent academically of their classes and colleges will be awarded semester scholastic honors.

**Credits for extracurricular work**

Students may earn credit toward graduation by satisfactory participation in certain extracurricular activities. These activities, and the maximum semester hours of credit allowed, are as follows:

Subject	Semester	Total
KSU Symphony Orchestra	1	4
Bands (Marching, Symphonic, Pep, etc.)	1	4
Concert Choir	1	4
Collegiate Chorale	1	4
K-State Singers	1	4
Concert Jazz Ensemble and Jazz Labs	1	4
Men's Glee Club	1	4
Women's Glee Club	1	4
Instrumental Ensemble	1	4
Vocal Ensembles	1	4
Opera Workshop	1	4
Debate	2	4
Kansas State Collegian Journalism	1	4
K-State Agriculturist	1	4
K-State Engineer	1	2
Royal Purple Journalism	1	4
Men's Athletics	1	4
Women's Athletics	1	4

\*Maximum is 4 credits; however, the number allowed can vary depending on college.

Extracurricular credit is also available with the K-State Dance Workshop (through Dance Production class).

Credits may be counted as electives in a student's curriculum. A student may use no more than 8 semester hours in these subjects toward graduation and enroll for not more than two in a semester.

A student is regularly assigned to these activities, with permission of the instructor in charge of the work. A student participating in one or more of these activities must be enrolled even though the credits exceed the maximum for graduation.

**Classification of students**

An entering student with less than 30 semester hours accumulated credit is classified as a freshman. A student is advanced to a higher classification upon successful completion of sufficient credit hours to meet the requirements as listed below:

Freshman	Sophomore	Junior	Senior	Fifth-year student*
Less than 30	30	60	90	120

\*Applies only to the College of Architecture and Design and the College of Engineering.

**Student Records**

**University policy**

Kansas State University maintains various student records to document academic progress and to record interactions with university staff and officials. To protect each student's rights to privacy, and to conform with federal law, the university has an established policy for handling student records. Interpretation of this policy is based on experience with educational records, and the policy itself may subsequently be modified in light of this experience. Notice of this policy and of a student's rights under federal law is given annually. Copies of this policy are available at the Registrar's Office, 118 Anderson Hall.

**Directory information**

Certain information concerning students is considered to be open to the public upon inquiry. This public information is called directory information and includes a student's name, local address and telephone number, permanent mailing address, college, curriculum, year in school, date and place of birth, dates of attendance at K-State, awards and academic honors, degrees and dates awarded, most recent educational institution attended, participation in officially recognized activities and sports, and height and weight of members of athletic teams.

Directory information as defined above will be released for individual students by the Registrar's Office to anyone upon inquiry, unless the student has requested after registering that directory information not be released. The student's request to have directory information withheld must be submitted for each semester the student is enrolled and should be made at the Registrar's Office, which will notify other appropriate university offices.

**Confidential information**

With the exception of the information noted above, student records are generally considered to be confidential. The following policies govern access to confidential student records:

1. Each type of student record is the responsibility of a designated university official, and only that person or the dean, director, or vice president to whom that person reports has authority to release the record. The responsible officials are:

- a. Academic records: For undergraduates, the registrar, Anderson Hall.
- b. Admissions records: For undergraduates, the director of admissions, Anderson Hall.
- c. Financial aid records: director of Student Financial Assistance, Fairchild Hall.
- d. Business records: Controller's Office, Anderson Hall.
- e. Traffic and security records: head of KSU Police Department, East Stadium.
- f. Medical records: director, Student Health Service, Lafene Health Center.
- g. Counseling records: director, University Counseling Services, Lafene Health Center.
- h. Actions of academic standards committees: college dean.
- i. Academic disciplinary records: chair, Undergraduate Grievance Committee.
- j. Nonacademic disciplinary records: dean of student life, Holton Hall.
- k. Housing records: director of housing and dining services, Pittman Building.
- l. Placement records: director of Career Planning and Placement Center, Holtz Hall.
- m. Evaluations for admission to graduate or professional programs: dean (of the Graduate School or the appropriate college) or department head.
- n. Special academic programs: faculty member in charge of the program, and dean of the college.

o. Foreign student records: foreign student advisor, International Student Center.

p. Test scores for College Level Examination Program (CLEP), American College Testing Program (ACT), Miller Analogies Test (MAT), etc.: director, Academic Assistance Center, Holton Hall.

2. Confidential educational records and personally identifiable information from those records will not be released without the written consent of the student involved, except to other university personnel, or in connection with the student's application for financial aid, or in response to a judicial order or subpoena, or in a bona fide health or safety emergency; or, upon request, to other schools in which the student seeks or intends to enroll; or to the U.S. comptroller general, the secretary of H.E.W., the U.S. commissioner of education, the director of the National Institute of Education, the assistant secretary for education, state educational authorities, or state and local officials where required by state statute adopted before November 19, 1974.

3. The responsible official may release records to university personnel who have a legitimate need for the information in order to carry out their responsibilities.

4. All student records are reviewed periodically. Information concerning the frequency of review and expurgation of specific records is available in the Registrar's Office.

5. With certain exceptions, students may review records that pertain directly to them upon request and may obtain a copy of the record at cost, according to the following schedule:

a. Transcript of academic record—\$3 per copy.

b. Housing department records—four cents per page.

c. Medical records (Lafene Health Center)—no charge to patient for medical purposes. A charge of \$10 to \$25 to outside parties with patient release.

d. Other records—no charge.

The major exceptions to student review are medical and counseling records. These may be released, however, to other medical or psychological professionals at the written request of the student; and may be inspected by the patient at the discretion of the professional staff. Other exceptions are law enforcement records, private notes of staff members, and financial records of parents.

6. A student may waive the right to review a specific record by submitting in writing a statement to this effect to the official

responsible for that record. Examples are recommendations for career placement or admission to graduate study.

7. *University personnel who have access to student educational records in the course of carrying out their university responsibilities shall not be permitted to release the record to persons outside the university, unless authorized in writing by the student or as required by a court order. Only the official responsible for the records has the authority to release them.*

8. All personal educational information about a student released to a third party will be transferred on condition that no one else shall have access to it except with the student's consent. A record is maintained showing who has had access to student records, and this record is open to inspection by the student.

### Release of grades

Reports of a student's grades are routinely sent to the student. Parents of dependent students may obtain grades by writing to the Registrar's Office. Proof of dependency is required. The grades of other students will be sent to their parents only with written permission of the student.

### Withholding records

In the case of a student who is delinquent in an account to the university, including unpaid traffic or parking violations, or about whom official disciplinary action has been taken, the appropriate university official may request that the student's record not be released. The effect of this action is that transcripts are not released and registration forms are withheld. In order for the action to be rescinded, the Registrar's Office must receive written authorization from the official who originally requested the action, indicating that the student has met the obligation. Further information concerning this policy can be obtained from the Registrar's Office, 118 Anderson Hall, 532-6254.

### Review and challenge of records

Upon request to the official listed above, a record covered by the act will be made available to the student within a reasonable time and no later than 45 days after the request. Copies are available at the student's expense and explanations and interpretations of the records may be requested from the official in charge. If the official believes that a particular record or file contains inaccurate or misleading information or is otherwise inappropriate, the university will afford an opportunity for a hearing to challenge the record's content. Prior to any formal hearing, the official in charge of the record is authorized to attempt, through informal meetings and

discussions with the student, to settle the dispute. If this is unsuccessful, the matter will be referred to the appropriate vice president.

If the student is still dissatisfied, a hearing may be requested. The hearing, conducted by a hearing officer appointed by the president, will be held within two weeks. The student will have the opportunity at the hearing to present any relevant evidence, and a decision will be rendered within two weeks after the hearing. If the result does not satisfy the student, he or she may place a statement in the file.

### Complaints

A student who believes the university has not complied with federal law or regulations may send a written complaint to The Family Educational Rights and Privacy Act Office, 400 Maryland Avenue, S.W., Washington, D.C. 20202.

### Transcript

A transcript is a certified, official copy of a student's permanent academic record. Since it contains confidential information, it cannot be released to anyone but the student without a specific request signed by the student.

Each transcript costs \$3; the required fee must be paid in advance. A transcript request must be made in person or in writing to the Registrar's Office, 118 Anderson Hall; it cannot be requested by telephone or fax.

A written request must be sent to Kansas State University Registrar's Office, 118 Anderson Hall. The request must include the following:

1. Student current name, plus any other name or names used while attending K-State.
2. Student I.D. number.
3. Student date of birth.
4. Student beginning and ending dates of enrollment at K-State.
5. The number of transcripts requested.
6. Where each transcript is to be sent.
7. \$3 for each transcript requested.
8. Student "original" signature.
9. Student current home address and day-time telephone number.
10. Indicate if transcript(s) should be held until current semester grades are posted and/or until degree is posted.

Transcripts may be requested in person by coming into the Registrar's Office during work hours. Students must have a K-State student ID or current driver's license for identification purposes. No one else may pick up or have a student's transcript mailed without written permission from the student. Written permission must include the name of the person authorized to request or obtain transcript and student's "original" signature.

Transcript requests cannot be honored for a student with a delinquency to the university.

Transcripts picked up by or sent directly to the student are stamped "issued to student." Some institutions will not accept a transcript that is marked "issued to student."

Transcripts are sent through the mail and not faxed.

# All-University Regulations

## Student Conduct

### Philosophy of student conduct

The purpose of discipline in the university setting is to protect the campus community and its members. To achieve this protection, students at K-State are expected to follow university rules and policies pertaining to nonacademic conduct. Persons who violate these policies, interfere with the rights of others, disrupt the educational process, or commit other unlawful acts will be held accountable for their actions.

The following principles govern the disciplinary process: every effort is made to bring about outcomes that are positive for all parties involved; students will be members of all Student Governing Association judicial bodies; formal hearing processes are fundamentally fair and respect the rights of the individuals involved; confidentiality will be maintained; records of proceedings will be released only on written authorization of the student involved. The procedures are outlined in the SGA Judicial Code, included in the by-laws to the SGA Constitution.

Descriptions of the judicial structure and process, as well as university policies, are free and are available in the SGS Office of the K-State Union.

### Prohibited conduct

Important definitions of terms describing prohibited conduct are stated in the Student Conduct Code, available in the Student Government Office in the Union.

The following misconduct is subject to disciplinary action:

1. Intentionally or recklessly causing physical harm to any person on university premises or at university-sponsored activities, or intentionally or recklessly causing reasonable apprehension or fear of such harm.
2. Unauthorized use, possession, or storage of any weapon on university premises or at university-sponsored activities.
3. Intentionally initiating or causing to be initiated any false report, warning, or threat of fire, explosion or other emergency on university premises or at university-sponsored activities.
4. Intentionally or recklessly interfering with university or university-sponsored activities, including, but not limited to, studying, teaching, research, university administration, or fire, police, or emergency services.

5. Knowingly violating the terms of any disciplinary sanction imposed in accordance with this code.

6. Unauthorized distribution, use, or possession of a controlled substance as described in Chapter 65, Article 41 of Kansas Statutes Annotated, including but not limited to marijuana, cocaine, and heroin, on university premises or at university-sponsored activities.

7. Violation of the university's published alcohol and cereal malt beverage policy.

8. Intentionally or recklessly misusing or damaging fire safety equipment on university premises or at university-sponsored activities.

9. Forgery, unauthorized alteration, or unauthorized use of any university document or instrument of identification.

10. Intentionally and substantially interfering with the freedom of expression of others on university premises or at university-sponsored activities.

11. Theft of property or of services on university premises or at university-sponsored activities; knowing possession of stolen property on university premises or at university-sponsored activities.

12. Intentionally or recklessly destroying or damaging the property of others on university premises or at university-sponsored activities.

13. Unauthorized presence in or use of university premises, facilities, or property.

14. Negligently, recklessly, or intentionally participating in the hazing of another. (Consent by the person hazed shall be no defense to hazing.)

15. Intentionally or recklessly engaging in conduct which clearly and directly impairs, interferes with, or obstructs the missions, processes, and functions of the university.

16. Telephone harassment, which shall include making calls containing lewd or obscene remarks; making calls intended to harass whether or not conversation ensues; making the telephone ring repeatedly with intent to harass; and making repeated calls in which conversation ensues solely to harass.

Attempts to commit acts prohibited by this code shall be considered violations to the same extent as completed acts.

Sanctions may be imposed for prohibited conduct pursuant to the Student Governing Association Constitution and By-Laws.

## Academic Dishonesty

All academic relationships ought to be governed by a sense of honor, fair play, trust, and a readiness to give appropriate credit for the intellectual endeavors of others when credit is due. K-State's policy on academic dishonesty assures due process and provides guidelines for action in instances where the proper academic relationships and attitudes have broken down.

Any student enrolling at K-State implicitly accepts the university's stipulations concerning academic honesty and the procedures they entail.

Complete copies of the academic dishonesty policy are available from the SGS Office in the K-State Union. The policy outlines grievance procedures for all matters of academic dishonesty, grade appeals, or other academic grievances brought by students against faculty members or faculty members against students.

### Plagiarism

Plagiarism, taking someone else's intellectual work and presenting it as your own, covers unpublished and published sources. Borrowing another's term paper, handing in a paper purchased from an individual or agency, or submitting papers from living group, club, or organization files are all punishable as plagiarism.

The standard for attribution and acknowledgement of literary indebtedness is set by each discipline. Students should consult with their department or with recognized handbooks in their field if in doubt.

The guidelines apply to faculty and research assistants in their possible use of students' and colleagues' research and ideas, as well as to students' use of source materials and authorities, and student use of other students' ideas and work.

### Other forms of academic cheating

Other forms of academic dishonesty subject to penalties include, but are not limited to, consultation of books, library materials, or notes during a test; use of crib sheets or hidden notes during an examination or looking at another student's test; having a confederate supply questions or answers from an examination to be given or in progress; having another person stand in on an exam or other graded activity; deliberate falsification of lab results; submission of falsified data; procurement or alteration, without permission, of examinations or other academic exercises; collaborating on projects where collaboration is forbidden; and other forms of academic dishonesty and fraud.

### Adjudication and penalties

Guidelines for adjudicating charges of dishonesty are described in the policy. Further information is contained in the Faculty Senate Minutes, April 11, 1989, Student Grievance Procedures.

The minimum penalty for cheating on an examination or paper, if proved, is an F for the assignment; maximum penalty is dismissal from the university. Minimum penalty for cheating on a comprehensive final, if proved, is an F for the course; maximum penalty is dismissal from the university.

In a second proved instance of academic dishonesty, suspension from the university is automatic. Dismissal from the university is the maximum penalty.

## University Policies

Students, faculty, and administrators are members of a community dedicated to the growth and development of individuals.

Enrollment at K-State entails responsibilities as well as privileges. Acceptance of and adherence to the following policies is necessary for the protection of the rights of others and the protection and health of the community. Copies of the following policies are available in the Student Government Services Office in the K-State Union and the Dean of Student Life Office in Holton Hall, unless otherwise indicated.

### Academic grievance

The following procedures will be employed to deal with all matters of cheating, academic dishonesty, grade appeals, or other academic grievances brought by students against faculty members or faculty members against students. These procedures will serve three functions: (1) safeguard the rights and academic freedom of both students and faculty, (2) assure due process, and (3) provide for consistency in handling undergraduate academic grievances throughout the university.

Procedures:

#### *Grievances against faculty or administrators*

Unethical actions by faculty or administrators should be reported as soon as possible so that appropriate action can be taken. The grievance must be made within six months of the alleged unethical action(s). Students should begin by contacting the office of their dean. The dean, or a representative of the dean, will describe the procedure to be followed and will aid the student in procedural matters. Further, the

dean or representative will appoint a faculty member as an advocate for the student if the situation seems to warrant an advocate or if the student requests an advocate. If a faculty advocate is appointed, the student will participate in the selection of, and must agree to the appointment of, the person selected. The advocate need not be in the college.

#### *Grievances involving student academic dishonesty*

The procedures for handling charges of cheating or other academic dishonesty are given in the policy on academic dishonesty which immediately follows this section on academic conduct.

#### *Grievances involving change of grade (but not academic dishonesty)*

a. All efforts will be made by the student and instructor involved in any grievance to settle all disputes that may arise. Grade appeals must be initiated within six months following the issue date of the grade in question.

b. If a grade change grievance is not resolved by the student and instructor, the student may appeal in writing to the department head concerned who will act as a mediator in the dispute. This appeal should be made within two weeks of the date of the original appeal. At this time, the student may petition the dean of his/her college for an ombudsperson. The duties of the ombudsperson are to arrange meetings of all concerned parties and report actions taken at each level to the appropriate persons or groups. The role of the ombudsperson is to expedite the process and to ensure a fair hearing.

c. If the grievance has not been settled to the student's satisfaction at the department level, written appeal may be made to the dean of the college in which the course is taken. This appeal should be made within two weeks of the date of receipt of the appeal by the department head. The dean will act as a second mediator.

d. If the student does not feel that an adequate solution has been reached in any academic dispute, she/he may appeal in writing to the Undergraduate Grievance Board, which will arbitrate the dispute. This appeal should be made within two weeks of the date of receipt of the appeal by the dean.

e. The two week time limits given in the sections above are intended to move the grievance process along at a reasonable rate. The limits may be modified for reasonable reasons such as illness, scheduled academic holidays, or mutual consent of both parties.

**Advertising, sales, and solicitation**

Facilities of Kansas State University are not available for unrestricted use by non-university groups. University property may not be used for commercial purposes except when sponsored by a university-affiliated organization or department. The regulations governing fund-raising and the posting and distribution of literature are available in the SGS Office only.

**AIDS, ARC, and AIDS virus guidelines**

Under the direction of the Kansas Board of Regents, the university has developed guidelines to assist students, staff, and faculty members in the event that they have to deal with situations involving acquired immune deficiency syndrome (AIDS) or AIDS-related complex (ARC). Complete copies of the guidelines are also available in the Lafene Health Center.

**Alcohol and cereal malt beverage policy**

The legal drinking age in Kansas for alcoholic beverage is 21. The Kansas Board of Regents policy permits the use and sale of cereal malt beverages (3.2 beer) under authorized and appropriately controlled conditions and regulations. By state law, the sale of alcoholic liquor is not permitted on state property. Included in the K-State policy is information on alcohol and cereal malt beverage consumption in residence halls, at athletic events, and for student organizations.

**Drug-free workplace policy**

In 1988, Congress passed the Drug-Free Workplace Act. This act applies to all institutions holding and applying for federal grants and contracts. K-State adopted the policy that the unlawful manufacture, distribution, dispensing, possession, or use of controlled substances is prohibited in its workplace.

**Facilities usage**

K-State facilities are available for use by authorized groups for activities that complement the teaching, research, and service programs of the university. Policies and procedures for use of K-State facilities (other than the K-State Union) are available in the Division of Facilities Management in Dykstra Hall.

Policies and procedures for use of the K-State Union are available in the Union Reservations Office on the second floor or in the Handbook for UAB Registered Organizations.

**Gender**

The goal of this policy is to create an environment in which all students, faculty, and staff interact solely on the basis of individual strengths and characteristics without having those interactions shaped by generalizations, stereotypes, or valuations based on gender. Copies are also available in the Women's Resource Center in Holton Hall and Affirmative Action Office in Anderson Hall.

**Political activity guidelines**

All members of the university community are encouraged to take advantage of opportunities to educate themselves regarding the candidates and issues relating to national, state, and local elections. Copies of the university guidelines related to political activities on campus are available in the SGS Office only.

**Prayer at university functions**

Nonsectarian prayers, invocations, benedictions, or silent meditations are permitted at university functions to enhance mutual respect and awareness.

**Racial and/or ethnic harassment**

Racial and/or ethnic harassment is prohibited by K-State and includes, but is not limited to, verbal, physical, or written behavior directed toward or relating to an individual or group on the basis of race, ethnicity, or racial affiliation. It has the purpose or effect of creating an intimidating, hostile, or offensive work or educational environment; interfering with an individual's work, academic performance, living environment, personal security, or participation in any university-sponsored activities; and threatening an individual's employment or academic opportunities.

Racial and/or ethnic harassment should be reported to the university administrator responsible for the department or unit or to the Affirmative Action Office. For students with complaints of harassment by other students, the dean or associate dean of student life may be regarded as the appropriate administrator. Copies of the policy are also available from the Affirmative Action Office in Anderson Hall.

**Religious activities**

In a pluralistic, multicultural, and interdenominational university environment, freedom of worship is supported. Religious programs and activities must comply with university policies as well as federal, state, and local laws. In keeping with its education mission, the university may specify the time, place, and manner of religious events, but may not regulate their content.

**Sexual harassment policy**

K-State prohibits sexual harassment and has defined sexual harassment as any behavior that, through inappropriate sexual content or disparagement of members of one sex, interferes with an individual's work or learning environment. This policy applies to the working and learning relationships of all individuals within the university community—faculty, staff, and students.

Sexual harassment should be reported to the university administrator responsible for the department or unit or to the Affirmative Action Office. For students with complaints of harassment by other students, the vice president for institutional advancement may be regarded as the responsible administrator. Copies of the Policy Prohibiting Sexual Harassment are available from the SGS office, departmental offices, or the Affirmative Action Office in Anderson Hall.

**Sexual violence**

No form of sexual violence will be tolerated or condoned at Kansas State University. This policy prohibits not only those acts commonly understood to constitute "sexual assault," but all attempts to coerce sexual activity as well. This university will investigate acts of sexual violence perpetrated by and/or against students and will respond with appropriate action, which may include suspension or dismissal. Copies are available also in the Women's Resource Center in Holton Hall.

# Student Financial Assistance

Larry Moeder, Director  
104 Fairchild Hall  
532-6420

Kansas State University administers an extensive financial aid program to bridge the gap between family contribution and the cost of attending the university. Detailed information concerning financial aid is available on request from the Office of Student Financial Assistance, 104 Fairchild Hall.

The ACT Family Financial Statement (FFS) is the preferred application for all federal and state aid programs. Students living in Kansas may obtain the FFS from any high school counselor or from K-State. The priority date for submitting the FFS is March 15 before the fall semester in which the student intends to enroll.

## Scholarship programs

Each year nearly 4,000 Kansas State University undergraduate students receive more than \$4 million of scholarship assistance based on their academic records, financial need, and/or leadership qualities. The K-State scholarship application is due by February 1 each year for the following academic year. Applications and scholarship information are available from high school counselors, the Office of Student Financial Assistance, and the various colleges at K-State.

## Grants

Approximately 5,500 students are assisted through two federal grant programs.

Assistance exceeds \$7 million. The ACT Family Financial Statement is the application for these programs and should be filed by March 15.

## Loan programs

K-State has six kinds of student loans: the Perkins Loan, the Stafford Loan, the Parent Loan for Undergraduate Students (PLUS), the Health Professions Student Loan (HPSL), Alumni/Foundation Loans, and the Supplemental Loan for Students (SLS—like PLUS but for independent students).

The Perkins Loan is a five percent interest loan. The Stafford Loan is an eight percent interest loan that is funded by participating lending agencies. HPSL carries a five percent interest rate. No interest is charged while a student is attending school. At the time the borrower begins repaying these loans, the interest begins accruing on the unpaid balance. The repayment period may be up to 10 years.

The Alumni Loan/Foundation Loan charges six percent interest payable annually from the date of the loan, with \$50 monthly payments beginning six months after the borrower leaves school.

The PLUS/SLS loans are 9.34 percent for 1991-1992. They begin accruing interest 60 days after the borrower receives the money. While independent students may defer payments (but not interest), parents borrowing on their student's behalf, begin monthly payments either 30 or 60 days (depending on the lender) after receiving the money.

Qualified students also may borrow through emergency, alumni, and endowment funds to meet specific needs. Interested students should contact the Office of Student Financial Assistance.

## Employment

Kansas State University provides services for students seeking part-time employment to help offset educational, living, and social expenses. The Student Employment Center handles two categories of jobs: College Work-Study Program jobs and Campus Payroll jobs. In addition, the center handles the advertising of several off-campus employment positions. All of the center's jobs are posted on the job board, which is in the K-State Union.

To be employed on the hourly student payroll, a student must be enrolled in at least 6 resident semester credit hours at K-State during a fall or spring semester, and at least 3 resident semester credit hours at K-State during a summer term, or have been enrolled in at least 6 resident semester credit hours at K-State during the preceding spring semester.

## Services for veterans

The university maintains a veterans' service to aid veterans and children of deceased or disabled veterans in securing educational benefits.

Veterans who have more than 181 days of service after January 31, 1955, may be eligible for educational benefits. Children of a deceased or disabled veteran may be entitled to educational benefits, providing the veteran's death or disability was due to active service in World War I, World War II, the Korean Campaign, or Vietnam.

Information may be obtained from your nearest Veterans' Administration Office or the Office of Student Financial Assistance.

## State vocational rehabilitation program

The university cooperates with the State Board for Vocational Education in providing rehabilitation training for physically handicapped persons who need financial assistance. Correspondence should be addressed to the Vocational Rehabilitation Administration, Kansas State Department of Education, 120 East 10th Street, Topeka, Kansas 66612.

## Satisfactory Academic Progress

Federal regulations require that financial aid recipients make satisfactory academic progress in order to be eligible for federal financial aid programs. Included are students who receive aid from any of these programs: Pell Grant, Supplemental Educational Opportunity Grant (SEOG), State of Kansas Scholarship, Perkins Loan, Guaranteed Student Loan (GSL), Supplemental Loan for Students (SLS), PLUS loan, Health Professions Loan (HPSL), and College Work-Study (CWS).

K-State has established a framework for evaluating a student's efforts to earn a degree within a given period of time. This includes a quantitative measure (number of hours earned each semester and a maximum number of allowed credit hours) and a qualitative measure (grade points earned for hours completed each semester).

All recipients of student financial assistance will be required to meet the standards of satisfactory academic progress. The only programs not covered by this policy are athletic grants-in-aid and non-federally funded scholarships.

### Definition of satisfactory progress

Federal guidelines for awarding financial aid are based on specific minimum federal standards. Satisfactory academic progress is determined by the formula:

$$\frac{\text{Hours for which federal financial aid is awarded}}{\text{Hours completed}} = \text{Credit or deficiency}$$

Students begin satisfactory academic progress measurement during the first term federal aid is received. Credits or deficiencies are carried forward. Credits or deficiencies apply only to satisfactory academic progress measurement.

Minimum hours required for these programs are:

	Hours per semester	Hours per summer*
<b>Undergraduates</b>		
Pell full-time grant	12	6
3/4-time grant	9	5
1/2-time grant	6	3
State of Kansas scholarship (A portion of each scholarship contains federal funds)	12	Only for full-time, regular term
SEOG, Perkins, Stafford, SLS, PLUS, and HPSL	6	3

Students will be measured by the financial aid award that requires completing the most hours. For example, a student with a full-time Pell and a GSL must complete 12 hours.

\*Or term less than 15 weeks.

A course cannot be counted twice for financial aid purposes. Example: A student has received a D in a 3-credit-hour course and takes that course again to get a higher grade. The credit hours have already been counted as financial aid hours and cannot be counted again, even though the GPA is improved.

Courses in which a grade of F or incomplete (I), (IX), withdrawn (WD), NR, or NC is recorded are not counted in the satisfactory progress measurement.

Hours completed in excess of the required minimum standards will be credited to a student's overall academic achievement.

Course hours earned by a student while at another institution will be credited only after a transcript from the other institution is received by the Registrar's Office at Kansas State University and the credit is accepted. The course or courses will count for the academic year in which K-State accepted the credit. Cumulative grade point average is determined by the Registrar's Office.

The scholastic deficiencies chart is printed in the Grades section of this catalog. Qualitative measurements for financial aid recipients will be based on this chart. However, federal regulations require students to earn a 2.0 cumulative grade point by the end of their sophomore year (60 hours) to receive federal financial assistance.

#### **Transfer students**

Transfer students may receive financial aid for the first semester at K-State and then follow the same standards for satisfactory progress as all other students.

#### **Financial aid warning**

Students who are deficient in hours during a semester or summer term will be placed on financial aid warning for one term. At the end of the next term, a student's performance will again be measured. A student will be reinstated to satisfactory status for financial aid awarding purposes if the deficiencies have been removed. A

student will be placed on financial aid exclusion if the deficiency has not been eliminated.

#### **Financial aid exclusion**

Students on financial aid exclusion will be denied financial assistance until they meet the qualifications for satisfactory progress. Students may file an appeal for satisfactory academic progress to the Office of Student Financial Assistance. If an appeal is approved, financial aid (if available) may be reinstated for the term in question.

#### **Appeal process**

Appeal forms for satisfactory academic progress are available at the Office of Student Financial Assistance. Appeals are made in writing to the satisfactory academic progress administrative officer in the Office of Student Financial Assistance indicating the circumstances of the appeal. The student's academic advisor must state that a conference has been held with the student to discuss the academic deficiencies and to decide what action is being taken to improve the student's academic record.

All appeals are reviewed and students who submit appeals will be informed of the action taken. The appeal may be either approved or denied. If approved, financial aid may be reinstated subject to its availability. The student may be required to participate in special activities to improve his or her academic program. Decisions regarding appeals are final and not subject to further review.

# Services for Students

## Academic Assistance Center

Mike Lynch, Director  
Holton Hall  
532-6492

The Academic Assistance Center provides a comprehensive and coordinated system for the identification, diagnosis, advisement, counseling, and referral of students to the various academic support services available at K-State. In addition, the AAC provides direct academic support through programs which include:

### Learning Skills Seminar

The Learning Skills Seminar is designed for new incoming students and provides study skills instruction and assistance in the specific social science and mathematics courses in which the student is enrolled.

### Tutorial assistance

Free tutoring is available to any K-State student through the EOF tutoring program. Students desiring assistance are assigned to small groups that meet on a weekly basis with a peer tutor who assists them with course content and learning strategies.

### Study Skills Lab

The AAC provides instruction in basic academic and study skills through the course Study Skills Laboratory (DED 051). Any student may enroll in the Study Skills Lab for 1 to 3 hours of graded credit. Topics covered include note-taking, textbook mastery, how to prepare for and take examinations, time management, stress management, etc.

### Freshman Seminar

The AAC offers a Freshman Orientation Seminar (EDCEP 111) to new incoming students for 1 hour of credit. Freshman Seminar provides any new student with a general orientation to K-State and university life. Topics covered include study skills, effective use of campus resources and services, academic planning and advising, career decision making, and university policies and procedures.

### Math lab

The AAC provides a computer-assisted math lab for students desiring either a basic review of pre-algebra mathematics before actually enrolling in a formal mathematics course or assistance with Intermediate and College Algebra. Students enrolling in the Learning Skills Seminar program receive math lab assistance as a part of the semi-

nar. Students who are unsure of which math course to enroll in may take a 45-minute math placement exam. This assessment is available on a walk-in basis in the AAC.

### Credit by examination

K-State offers students a variety of quiz-out programs through which a student may earn academic credit in specific courses. The AAC is the campus service agency for the College-Level Examination Program (CLEP), the DANTES Program, and the American College Test Proficiency Examination Program (ACT-PEP). The center will also provide consultation and conduct utility studies for academic departments interested in implementing a credit-by-examination program. Information and registration for the CLEP, DANTES, and ACT-PEP programs are available from the AAC.

### Entrance and professional examinations

The AAC administers the following examinations, which are often required to enter selected undergraduate, graduate, or professional programs. Contact the AAC to obtain further information concerning these and other examinations.

American College Test (ACT)  
Dental Admissions Testing Program  
Graduate Management Admissions Test  
Graduate Record Examination  
Insurance Institute Exams  
Law School Admission Test  
Medical College Admission Test (MCAT)  
Miller Analogies Test  
National Teacher Examination (Core Battery)  
National Teacher Examination (Specialty Areas)  
Optometry Admission Testing Program  
Pre-Professional Skills Test  
Scholastic Aptitude Test (SAT)  
Test of English as a Foreign Language (TOEFL)  
Test of Spoken English  
Veterinary Aptitude Test

## Alcohol and Other Drug Education Service

Bill Arck, Director  
214 Lafene Health Center  
532-6927

The Alcohol and Other Drug Education Service offers information about physical

effects and social issues related to alcohol and other drug use or abuse. Campus services provided include media activities such as newspaper ads, posters, brochures, and radio public service announcements; coordination of and participation in awareness events, such as National Collegiate Alcohol Awareness Week and National Collegiate Drug Awareness Week; and presentations providing information on alcohol and drug-related topics.

This office can also make referrals to various resources for those with concerns about their own or another's possible alcohol and/or drug use or abuse.

## Career Planning and Placement Center

James N. Akin, Director  
Holtz Hall  
532-6506

The Career Planning and Placement Center is available to assist prospective students, degree candidates, and alumni in their career assessments. The staff is committed to fostering self-direction and personal responsibility in those seeking help with their career plans and placement goals. Strong academic programs, capable students, and a campus work ethic combine to give K-State students a distinct advantage over those from many institutions in planning and achieving vocational/professional and graduate study goals.

The office provides a centralized job search assistance for students of all colleges and departments. It brings together students, faculty members, and employer representatives seeking college-educated personnel. Services include career advising; campus workshops on resume building, job search strategies, and interview techniques; candidate referrals; a government job center; summer employment assistance; an extensive career library; on-campus interviews; and career fairs.

## Cooperative Houses

### Clovia

Alpha of Clovia Cooperative House accommodates up to 62 women. Although 4-H members are given preference, any undergraduate woman is welcome to apply for membership. To keep the house self-supportive, the women at Clovia contribute

four to six hours a week for duties. Providing economical living conditions for members is a main goal at Clovia. House bills are approximately \$180 per month, and vary according to social activities and other house functions. Applications can be obtained at County Extension Offices, the State 4-H Department at Kansas State University, or the Clovia Membership Chairman, 1200 Pioneer Lane, Manhattan, Kansas 66502, (913) 539-3575.

### **Smith Scholars Program**

The Smith Scholars Program provides a broad learning experience for 38 young men each year. Smith Scholars are selected on the basis of academic promise and potential to contribute to a structured program of organized living. The Smith Scholars live in Smith Scholarship House, a cooperative living arrangement wherein the men do the cooking and housekeeping, providing a substantial savings in housing costs over most other types of living groups.

The Smith Scholars Program is a joint project of the Maitland E. Smith Scholarship House Alumni Association and the KSU Foundation. For more information write to the Smith Scholars Program, 331 North 17th Street, Manhattan, Kansas 66502; or phone (913) 539-4685.

## **Dean of Student Life Office**

Pat J. Bosco, Associate Vice President for Institutional Advancement and Dean of Student Life  
122 Anderson Hall  
532-6237

Susan M. Scott, Associate Dean  
E. Bernard Franklin, Assistant Dean  
102 Holton Hall  
532-6432

Student life services, including Admissions, Financial Assistance, Greek Affairs, Housing, K-State Union, New Student Services, Recreational Services, Registrar, and the Associate Dean of Student Life Office, are coordinated and directed by the associate vice president and dean. These units meet the needs of prospective and enrolled students.

The office is responsible for the Student Governing Association, student activities, leadership development, the administration of the judicial program for nonacademic misconduct, and off-campus housing. Student activities, FENIX, Religious Affairs, and the International Student Center are supervised and supported by this office. Staff members coordinate assistance to students and families in times of per-

sonal crisis and are available to students for general advice, counsel, and assistance with personal problems.

## **Educational Supportive Services**

Anne Butler, Director  
Holton Hall  
532-5642

Low-income, physically limited, and minority students are assisted in setting and attaining realistic educational goals and are provided information about graduate-level educational opportunities. Students admitted and enrolled at K-State are offered educational supportive services including counseling (personal, career, academic, and financial), academic preadvising, individualized tutorial assistance, and a variety of referral services.

## **FENIX**

Nancy Bolsen, Director  
201 Holton Hall  
532-6434

FENIX Adult Student Services assists undergraduate and graduate students who are married, have children, are re-entering the educational system after several years, or are 25 years of age or older. Staff members assist students with admission and enrollment and provide information or referrals for housing, child care, refresher and study skills courses, tutoring, financial aid, insurance, public school enrollment, community family programs, emergency locator and commuter information. Staff members work with university and student groups, such as the Non-Traditional Student Association, to make their experiences as adult students at K-State successful ones. The staff may be able to assist the returning K-State student in advising about remedying past academic deficiencies. FENIX staff also help students with their everyday challenges and special concerns before, during, and after their admission to K-State.

## **Greek Affairs**

Barb Robel, Advisor  
Holton Hall  
532-5546

### **Sororities**

Booklets describing sororities and setting forth the provisions regulating selection of

new members are provided to all prospective freshmen and interested upperclasswomen by Panhellenic Council.

House bills in sororities will average approximately \$1,400 a semester. This includes room, board, and sorority dues. Freshman members, however, live in residence halls and pay sorority dues of approximately \$60 a month.

The following national sororities have established chapters at K-State: Alpha Chi Omega, Alpha Delta Pi, Alpha Kappa Alpha, Alpha Xi Delta, Chi Omega, Delta Delta Delta, Delta Sigma Theta, Gamma Phi Beta, Kappa Alpha Theta, Kappa Delta, Kappa Kappa Gamma, Pi Beta Phi, Sigma Gamma Rho, Sigma Kappa, Sigma Sigma Sigma, and Zeta Phi Beta.

### **Fraternities**

Fraternities select new members primarily during the summer months. High school seniors are often guests at fraternity houses during their senior year, and throughout the spring and summer months each fraternity has representatives visiting high school seniors and their parents in Kansas and surrounding states.

Freshman men may live in a fraternity house if they accept invitations to membership before classes start and if they cancel their residence hall contracts. Costs will average \$1,400 a semester.

The following national fraternities are established at K-State: Acacia, Alpha Gamma Rho, Alpha Kappa Lambda, Alpha Phi Alpha, Alpha Tau Omega, Beta Sigma Psi, Beta Theta Pi, Delta Sigma Phi, Delta Tau Delta, Delta Upsilon, Farm-House, Kappa Alpha Psi, Kappa Sigma, Lambda Chi Alpha, Omega Psi Phi, Phi Beta Sigma, Phi Delta Theta, Phi Gamma Delta, Phi Kappa Tau, Phi Kappa Theta, Pi Kappa Alpha, Pi Kappa Phi, Sigma Alpha Epsilon, Sigma Chi, Sigma Nu, Sigma Phi Epsilon, Tau Kappa Epsilon, Theta Xi, and Triangle.

## **Housing and Dining Services**

Charles Werring, Director  
Pittman Building  
532-6453

We encourage all students new to K-State to live in an organized living group, such as a residence hall, fraternity, or sorority. The advantage of living in some form of organized housing is that adjustment to the university setting will be quicker and smoother. Students who choose a living group are offered both more interaction

with other students and university staff and more opportunities to participate in organized social events.

Kansas State University provides residence hall living for approximately 4,000 students, and 576 apartments for students and their families.

### **Residence halls**

K-State residence halls have professionally trained, full-time, live-in staff. In addition, juniors, seniors, and graduate students serve as assistant directors and resident assistants in each residence hall.

A number of lifestyle options exist, including academic cluster areas (students of the same major living together), intensive study floors, and graduate student/upper-class areas. Additional information on these opportunities is available on request.

Edwards Hall is primarily for graduate and upperclass students.

Contracts are issued on receipt of a residence hall room application and \$25 nonrefundable application fee for fall enrollees and \$12.50 for those entering in the spring.

When the application and fee are received by the Department of Housing and Dining Services, an academic-year housing and dining services contract is forwarded to the student. The cost of the contract is set on an annual basis, and is one of the lowest room and board rates in the Big Eight.

Students may elect either the full payment plan or installment plan.

### **Smurthwaite House Women's Leadership Program**

The Smurthwaite House Women's Leadership Program is a special leadership and personal development experience for women students who would like to become active in leadership positions in student government, academic organizations, and co-curricular organizations.

Assignment to Smurthwaite House and the Women's Leadership Program is made through a special application process. Because space is limited and assignment is not guaranteed, it is best to also go through the regular residence hall application and contract process.

### **Self-government in residence halls**

Learning to manage your own affairs is certainly a part of university life. This takes maturity and self-discipline. All residence halls have a system of self-governance through which students work together in

determining policies regarding their living situations. Elected representatives serve on individual hall governing boards and assume responsibility for many social and educational activities.

### **Family housing**

Student families have access to one- and two-bedroom apartments at Jardine Terrace, both furnished and unfurnished. These low-cost apartments are close to the campus. Coin-operated laundry facilities are available.

The rental includes gas, water, and trash. A deposit is required. Assignments are made on a first-come, first-served basis, and early application is recommended. Families residing in Jardine Terrace Apartments use the mayor-council form of government to regulate community life.

Apartments are partially accessible for people with physical limitations. The Department of Housing and Dining Services is pleased to work with students and family members to accommodate special needs.

## **International Student Center**

Donna Davis, Director  
532-6448

The International Student Center provides a comfortable atmosphere where people wanting to increase their international perspective can find new friends. Made possible by a private gift, the center includes a multipurpose meeting room, dining room, kitchen, and reading lounge. Students from everywhere pass through the center each day, sharing cultures, traditions, recipes, language lessons, and their common concern for what is happening in today's world. Everyone is welcome to join in the programs and activities of the International Student Center and the various international student organizations.

### **Foreign Student Office**

Adjacent to the International Student Center is the Foreign Student Office. This office provides administrative services required for international students and scholars by their home countries and the United States Immigration and Naturalization Service. The office also acts as the university's primary resource for international student programs.

## **K-State Union**

Jack Sills, Director  
532-6591

The K-State Union is the campus center for social, recreational, educational, and cultural activities. It opened in March 1956 and is supported only by generated revenue and student fees.

The K-State Union was built entirely by student fees. It features a full-service bookstore; a food service operation; a recreation area complete with bowling, billiards, video games, snack bar, and pro shop; Union Station; an art gallery; information counter; check cashing service; automatic bank teller machines; lounges; copy center; two auditoriums; campus vending service; and much more.

Union Program Council is the student volunteer arm of the K-State Union. UPC provides more than 450 programs each year for the social, cultural, educational, and personal growth of students. Student Governing Association offices are located on the ground floor.

The Union Governing Board is the body that establishes policy under which the K-State Union director and staff operate.

## **Lafene Health Center**

Lannie W. Zweimiller, Director  
532-6544

The Lafene Health Center is a modern ambulatory healthcare facility designed to provide for most student outpatient health needs. The health center is fully accredited by the Joint Commission on Accreditation of Healthcare Organizations. Students who have paid the health fee as a part of their tuition are eligible for care. Non-student spouses, university conference participants, and other campus visitors may receive care upon payment of a special fee.

Lafene Health Center provides, through a full complement of medical and other professional personnel, a range of services that include special clinics for sports-related injuries, women, and allergies and immunizations, as well as a clinic for general care. Also included are services in health education, nutrition, and physical therapy. The services of a pharmacy, laboratory, and x-ray are available at reduced rates.

The center is staffed by full-time physicians with medical support personnel. When necessary, the student is referred to specialists for treatment at the student's expense.

After regular clinic hours, a student who is ill or injured may receive medical care until midnight through the after-hours clinic of the Lafene Health Center. Home visits are not made. The local ambulance service is available, when needed, to transport patients to the appropriate health care facility.

It is strongly recommended that all students at K-State carry medical insurance, either through the parents' plan at home or through the university-sponsored student health insurance plan available at special rates. This latter plan covers most services provided at Lafene Health Center and allowed claims for medical expenses if the student requires care away from the campus.

K-State requires a complete medical history, including a current immunization record, on all new students or transfer students. This history must be completed on the Kansas State University medical history form and is required prior to provision of non-emergency treatment at the health center. A physical examination is not required, but encouraged, and a copy of this examination assists the staff in evaluating illnesses. If a student has a continuing medical problem, a summary from the attending physician is helpful should treatment at the center be needed. Students receiving allergy injections must furnish instructions from their allergists before injections can be administered at the health center.

## Multicultural Student Organizations

Diana Caldwell, Coordinator  
201 Holton Hall  
532-6436

Emphasis is placed on building strong cultural groups that help foster the development of leadership skills and roles for multicultural students on campus; supporting multicultural student organizations, including Asian-American Students for Intercultural Awareness (ASIA), Black Student Union (BSU), the Hispanic American Leadership Organization (HALO), Native American Student Body (NASB), and other special interest organizations; assisting student organizations in sponsoring programs and activities that bring multicultural leaders and role models to K-State; and heightening multicultural awareness within the community.

## New Student Services

Pat J. Bosco, Associate Vice President/  
Dean of Student Life  
122 Anderson Hall  
532-7091

New Student Services works with prospective students and their families. Admissions representatives meet with high school students during school visits, college fairs, and special events.

New Student Services coordinates campus visits, orientation and enrollment, and the Presidential Lecture Series.

## Off-Campus Housing

The Office of the Associate Dean of Student Life maintains an up-to-date listing of major apartment complexes, real estate agents, and property management companies. This office also maintains a bulletin board that lists available rental units, with information on cost, size, restrictions, etc., and other housing options. A roommate matching service is also available.

## Recreational Services

Raydon H. Robel, Director  
532-6980

Recreational Services is responsible for the intramural, recreational sports, and fitness programs for the campus.

Intramural sports are the scheduled competitive activities of the recreation program. Teams are organized by fraternities, sororities, residence hall floors, and off-campus, co-rec, and faculty/staff groups. More than 30 different intramural activities are offered for competition.

The natatorium at the Ahearn Sports Complex has two 25-yard swimming pools, one diving pool with two one-meter and two three-meter boards, and a sun deck.

The Chester E. Peters Recreation Complex houses 16 handball/racquetball courts; two gyms (convertible to six basketball, nine volleyball, six tennis, and 18 badminton courts); two weight and exercise areas; combatives area; a running track; locker rooms; and a central supervisory and check-out area.

Outdoor facilities include lighted tennis and handball/racquetball courts, multi-purpose playfields, a fitness cluster, and running trails. Outdoor recreational equipment and camping equipment can be rented at the Outdoor Rental Center.

The department provides employment as lifeguards, sports officials, building managers, and office assistants.

## Religious Affairs

Don Fallon, Coordinator  
102 Holton Hall  
532-6432

The coordinator of religious activities in Holton Hall provides information regarding religious activities and organizations on campus and in the community. Pastoral care and counseling are available through this office and by referral. Students may seek counseling regarding relationships, sexuality, death and loss, or other personal and spiritual concerns. Two memorial chapels on campus, Danforth and All Faiths, are available for student worship, weddings, and private meditation.

## Services for Physically Limited Students

Gretchen Holden, Director  
Holton Hall  
532-6441

Services for Disabled Students works to meet the needs of students with physical limitations and documented learning disabilities by providing academic, financial, and vocational counseling. Staff will work as a liaison with students' instructors. Reading and study skills instruction may be of special interest to learning disabled students.

Other supportive services include tutorial assistance, readers, notetakers, typing, and an errand service. Assistance is provided in obtaining taped texts. Test taking accommodations, including extended time for test taking, oral examinations, and scribes, can be arranged through this office. Classes scheduled in inaccessible locations will be relocated for students with mobility impairments. Individualized help with enrollment is available. Efforts will be made to provide interpreters for hearing impaired students when requested.

Special equipment available to students includes a talking calculator, Kurzweil Reading Machine, variable-speed tape recorders, and a TTY (telephone for the hearing impaired). A shuttle van, equipped with an hydraulic lift, operates on campus between all buildings and is available to

students with either temporary or permanent physical limitations. Accessible housing is available.

## Student Activities

Sally Routson, Coordinator  
K-State Union, SGS Office  
532-6541

The coordinator of student activities helps students identify activities and avenues of campus involvement. The coordinator also advises the Student Governing Association and student judicial system, administers the student activity fee, and assists individuals and groups who wish to organize and register their activities on the K-State campus. Leadership workshops are organized annually, and consultation is available for leadership development to interested campus leaders and organizations.

## Student Government

Sally Routson, Coordinator of Student Activities  
K-State Union, SGS Office  
532-6541

The purpose of the Student Governing Association is to help students voice any concerns, suggestions, or grievances they may have. Every student is automatically a member of the Student Governing Association and is represented by a college council (elected by the students in each respective college), by one student senator for each 300 students enrolled in the colleges, and by the student body president. The student senators and the student body president are elected by the K-State student body.

SGA is divided into three branches: legislative, judicial, and executive. The legislative branch—student senate—is composed of six standing committees: academic affairs and university relations, communications, finance, senate operations, student affairs and social services, and legislative affairs. A major function of student senate is the allocation of the student activity fee and the Educational Opportunity Fund, which are collected as part of the tuition payment. These funds are used to assist student and university organizations in providing programming and services for the K-State community.

The judicial branch is composed of judicial council, student review board, tribunal, parking citation appeals board, and the living group judicial boards.

The student body president and cabinet make up the executive branch. The president has the responsibility to promote the general welfare of the students and acts as the official voice of the student body to the faculty, administration, and public.

Another form of representation is the Associated Students of Kansas. ASK is a student lobby group that takes the concerns of students in each of the state schools to the Kansas legislature.

### Student organizations

More than 325 organizations are available to students, faculty members, staff, and community members.

Any organization desiring to become a registered organization must adhere to University Activities Board guidelines.

Registered groups may schedule rooms and tables in the K-State Union, use most campus facilities, and post notices on campus bulletin boards.

## U-LearN

16 Holton Hall  
532-6442

University Learning Enhancement Resource Network (U-LearN) is a walk-in and phone-in resource center that answers questions regarding academic, campus, and community activities and general information.

U-LearN programs include the Work Opportunity Resource for K-State students, a job board; a listing of tutoring, typing, babysitting, and odd jobs for students who want to utilize their special skills or are looking for assistance in these areas. The Volunteer Income Tax Assistance program assists students, faculty, and staff in filing their income tax forms.

## University Counseling Services

Fred Newton, Director  
Second Floor, Lafene Health Center  
532-6927

The Counseling Service is open 8 a.m. to 5 p.m. weekdays. Emergencies from 5 p.m. to midnight on weekdays and 8 a.m. to midnight on weekends are handled through the Lafene Health Center After-Hours Service (532-6544). Professional counselors, psychologists, and a psychiatrist are available to assist K-State students.

Individual, couple, and/or group counseling is offered for people wishing to discuss academic, career, or personal concerns. A policy of confidentiality is followed. No information is released without written authorization of the student. Psychological testing may be used as an adjunct to career or personal counseling.

In addition, programs using a workshop or seminar format are offered to enhance personal growth and skill development. These include stress management, biofeedback, career life planning, assertiveness training, relationship enhancement, responsible drinking, and ACOA support. Career Life Planning (EDCEP 511) is offered for academic credit.

Consultation by center staff members is offered to individual students, staff, or faculty members concerning their work and living environments. Additionally, the staff is available for class or group presentations and workshops upon request.

## Upward Bound Program

Reginland McGowan, Director  
202a Holton Hall  
532-6497

This federally funded program provides academic and personal counseling and guidance to disadvantaged high school students from Junction City, Manhattan, Rock Creek, and Riley County high schools. Designed to motivate students with academic potential to pursue a postsecondary education, Upward Bound provides its 9th, 10th, 11th, and 12th grade participants with academic, social, cultural, and career-oriented activities and experiences during the school year, and with a summer residential program for credit.

## Women's Resource Center

Judith Davis, Director  
206 Holton Hall  
532-6444

The Women's Resource Center serves to promote the academic and personal well-being of K-State students. Center services include support, advocacy, and referral services to individual students experiencing difficulties; study and support groups; educational programs on a variety of gender-related topics to classes and to student, faculty, and community groups; and a browsing/lending library.

# Auxiliary Services and Facilities

## Administrative Services

John Streeter, Director  
21 Anderson Hall  
532-6281

The administrative computing community of the university is supported by the Office of Administrative Systems. Services consist of software development, systems project management, systems analysis, applications programming, and production data processing.

Major application systems include admissions, financial assistance, registration, and student, employment, financial, property, and alumni records. Most administrative application systems are operated on the university's central mainframe computer system in the IBM MVS/XA CA-IDMS-DC environment.

COBOL and CA-ADS/O are the principal programming languages. Database services are provided by CA-IDMS-DB. A fourth-generation language, FOCUS, is available for end user report preparation on the IBM VM/XA system.

## Affirmative Action Office

Jane Rowlett, Director  
214 Anderson Hall  
532-6220

The Affirmative Action Office is available to students on matters of equal opportunity in all areas including admissions, access to programs and activities, and employment. The university is committed to a policy of equal educational opportunity regardless of race, sex, national origin, handicap, religion, age, or sexual orientation. Any barriers that students encounter for these reasons should be discussed with this office so that we may aid in their removal.

## Alumni Association

Fred Thibodeau, Executive Director  
KSU Foundation Center  
2323 Anderson, Suite 400  
532-6260

The Kansas State University Alumni Association is a 30,000-member organization. It is an independent group of alumni and friends devoted to the university.

The nonprofit organization supports K-State through student recruitment programs, maintenance of records on more than 110,000 alumni and friends, publication of the *K-Stater*, and sponsorship of local alumni gatherings and class reunions.

## Child Care

### KSU Child Development Center

Jana Adams, Director  
Jardine Terrace, Building L  
539-1806

The KSU Child Development Center is a nonprofit corporation serving the child care needs of K-State students, faculty, and staff. It is fully licensed by Kansas and is professionally staffed. Its facilities are in building "L" of Jardine Terrace.

The center offers full-day programs for toddlers (ages 12 months and walking through 2½), preschoolers (ages 2½ through 5), and school-age children (ages 5-12). Limited part-time program spaces are offered to families of toddler and preschool children who need regular flexible care.

### Department of Human Development and Family Studies

Mary DeLuccie, Director  
Justin Hall  
532-5510

This department operates two child care facilities. Both are licensed by the Kansas State Department of Health and Environment and accredited by the National Academy of Early Childhood Programs. Enrollment in these programs is open to members of the K-State and Manhattan communities.

The Hoeflin Stone House Child Care Center is on the northeast edge of campus. The center provides full day care for 30 children ranging in age from 18 months to 5 years. Priority is given to children of working parents. The program focuses on the children's developmental needs and interests.

The Early Childhood Laboratory on the east edge of campus hosts an interagency program with USD 383. The facility integrates children who have disabilities with nonhandicapped children, and accommodates an age range from 2½ to 5 years in a part-day program.

The activities and environment at both facilities are designed to foster children's cognitive, language, social, emotional, and physical growth and development.

## Computing and Network Services

Tom L. Gallagher, Director  
10 Cardwell Hall  
532-6311

Computing and Network Services provides support for instruction and instructional activities in research, administration, and public service. These services also are available to other public and private educational institutions. Statewide computing efforts are fostered among the Board of Regents' institutions through the Kansas REgents NETwork (KARENET). Access to the National Science Foundation supercomputers can be gained through MIDnet, a regional high speed, TCP/IP network. Electronic mail service to other research and educational institutions throughout the world is available through BITMAIL. Microcomputers and terminals are connected to more than 25 computing systems on campus through an Equinox data switch. Dial-out and dial-in facilities are also provided through the data switch.

### Academic services

The instructional and research activities of the faculty, staff, and students are supported by academic user services, technical services, and operations services. The professional staff provides assistance in the use of hardware and software. Manuals, text, publications, a newsletter, and other materials are available in the User Information Center in Cardwell Hall. In addition, manual racks are maintained in several locations on campus.

Personal accounts are available to all students, staff, and faculty. These accounts are non-transferable and are not to be used for monetary gain or for business activities. All computer users are expected to follow normal standards of ethics and polite conduct in their use of the computing resources.

Many programming languages and applications packages are available. Contact the User Information Center in Cardwell Hall for a current list of facilities and services. Noncredit courses are taught periodically to assist users to utilize more fully the capabilities of the computer and its program environment.

### Operations services

The mainframe computer is an IBM 3084Q (27 MIPS) with 96 megabytes of memory and 48 input/output channels. This machine is shared between administrative

and academic uses. Supporting peripheral equipment includes tape drives, disk drives, line printers, page printer, interactive terminals, color graphics terminals, remote-job-entry stations, and an incremental plotter. Many remote computing laboratories on campus provide interactive access to users.

A UNIX operating system server is accessed through the campus backbone ethernet network.

Microcomputer laboratories in Seaton, Fairchild, Justin, Cardwell, and Dickens Hall have IBM-compatible microcomputers available for general use. Macintosh micros are available in Dickens Hall. Several departments and colleges provide specialized microcomputer laboratories for the exclusive use of their students.

## Family Center

Stephan R. Bollman, Director  
Campus Creek Road  
532-6984

The Family Center provides applied educational experiences to students while offering family-related educational outreach, counseling, and consultation services to the Manhattan community and the state. The Family Center provides an interdisciplinary focus with faculty participation from departments within the college.

Students, under faculty supervision, offer services involving marriage and family therapy and family life education. Affiliated programs include the Friendship Tutoring Program for school-age children and programs sponsored by grants. Special workshops address particular family topics, including working parents, parent education, and family life. The annual National Rural Families Conference features the Ruth Hoeflin Forum on Family Issues.

Services are available to students and the general public. A fee is assessed for some services based on a sliding scale.

## Foundation

Arthur F. Loub, President  
KSU Foundation Center  
2323 Anderson, Suite 500  
532-6266, 532-7500

The Kansas State University Foundation, the official fund-raising arm of the university, is a nonprofit organization certified under Section 501 (C) (3) of the IRS Code of 1954. The foundation acts as the custodian for gifts to the university and is encouraged to receive and hold in trust

any real and personal property given for the use of Kansas State University, and to administer and control all the gifts to provide services that are not or cannot be provided through appropriated funds.

Although the foundation is not a bank it offers many of the same services and is responsible for the administration of more than 2,000 scholarships and the processing of 43,000 gifts annually, while administering total assets of \$100 million. Policy is formulated by a 175-member board of trustees and an executive committee of 15 members to which the staff, directed by the president, is responsible.

## Institutional Advancement

Robert S. Krause, Vice President  
122 Anderson Hall  
532-5942

The vice president for institutional advancement is responsible for the external relations of the university and is the chief student affairs officer. Additionally, the vice president coordinates ongoing activities with the KSU Foundation, KSU Alumni Association, and Department of Intercollegiate Athletics, and external relations with governmental agencies, the Board of Regents, and other university constituents. The vice president for institutional advancement reports directly to the president and serves as chief spokesperson for the university.

## Libraries

Brice Hobrock, Dean of Libraries  
Farrell Library  
532-6516

Kansas State University Libraries provide support for the educational, research, extension, and public services objectives of K-State. The libraries' staff is responsible for acquiring, maintaining, and providing access to collections of materials requisite to the university's program requirements. Librarians at K-State are dedicated to organizing, promoting, and interpreting the collections for the university community and the citizens of Kansas.

Farrell Library is the central unit of the university library system. It is supplemented by four specialized subject libraries: Weigel Library of Architecture and Design (Seaton Hall), Chemistry/Biochemistry (Willard Hall), Math/Physics (Cardwell Hall), and Veterinary Medical (Veterinary Medical Teaching Building).

The libraries contain more than 1.2 million volumes and that number is increasing at an annual rate of about 40,000 volumes. Current journal and serials subscriptions total 9,477. In addition to the volumes cataloged according to the library of Congress Classification, the libraries contain a document depository collection of U.S. government publications that numbers more than 1.2 million; about 100,000 maps; a complete archival collection of ERIC (Educational Resources Information Center) documents; a curriculum materials collection; and more than 2.2 million pieces of microforms. Audio-visual materials number approximately 47,000 items and include sound recordings, tapes, slides, and printed music scores. A collection of more than 200 newspapers is maintained from Kansas communities, major U.S. cities, and other countries.

Specialized collections and the university archives contain a variety of old, rare, and unusual books, manuscripts, and other materials. The archives offer an assortment of published and unpublished material, including photographs, documenting K-State history. The Minorities Resource and Research Center is a special collection of materials by and about Blacks, Hispanics, and Native Americans. The juvenile literature collection numbers about 12,000 volumes of children's books and is used primarily by students in teacher education.

The reference unit, located on the first floor of Farrell Library, is the service center of the system. It provides traditional reference service as well as computerized information retrieval from more than 200 online databases. Staff members are available to help students, faculty, and others find the information they need. Terminals for LYNX, the libraries' online catalog, are located here, throughout Farrell, and in the branch libraries.

Other areas of Farrell Library contain collections and provide services to students. These include audio-visual, reserves/copy center, microforms/periodicals, government documents, interlibrary loan, and circulation units. The developing countries unit provides research information about developing countries in support of K-State's international agricultural programs. A postharvest documentation service, supported by a USAID grant, provides information to developing nations on postharvest handling of cereal grains and legumes.

The instructional services unit helps students acquire and develop library use skills necessary for lifelong learning.

To take advantage of the library resources in the region, the Regents Libraries operate a daily courier service between all Regents libraries. The service also connects many

of the state's private colleges to Regents libraries. The Regents libraries are connected through OCLC, a nationwide computerized cataloging and interlibrary loan network, as well as their individual online catalogs. All Regents libraries allow direct borrowing by students and faculty.

## Police Department

701 N. 17th  
Southeast corner, Memorial Stadium  
532-6412 business  
532-6400 emergency

The University Police Department is responsible for the protection of all properties owned and operated by the state educational institution or its affiliates. This authority is granted under state law. While service to the K-State community is of great concern to the department, the prevention of crime and investigation of all reported crimes is also of prime importance.

The department assists with parking control and regulates traffic control. Traffic and parking regulations are established by a student-faculty/staff Traffic and Parking Council, by authority of K.S.A.-74:3211.

The department is responsible for providing physical security on campus property. This includes opening and closing buildings, monitoring security cameras, and maintaining 16 emergency telephones strategically located throughout the university.

The University Police Department is open 24 hours a day. It provides a contact for emergency repairs and acts as the university operator outside normal business hours. The department has sworn police officers on duty 24 hours a day.

## Postal Service

113 Dykstra Hall  
532-6306

All mail for students must be addressed to their Manhattan residences, not the university.

Manhattan Post Office personnel deliver U.S. mail directly to university buildings and residence halls and pick up outgoing U.S. mail from various locations on the campus.

The Central Mail Service sells stamps, money orders, and other postal supplies; weighs, insures, and registers mail; and receives outgoing U.S. mail. A self-service postal unit is in the K-State Union.

## Speech and Hearing Center

Caroline Salva, Director  
107 Leisure Hall  
532-6879, 532-6873

The Speech and Hearing Center provides evaluation, management, and consultation services to university students with articulation, fluency, voice, language, or hearing impairments. These clinical services are also available to children and adults of the surrounding communities. The center provides educational and clinical experiences for students preparing for careers in speech-language pathology and audiology.

## Student Publications

Ron Johnson, Director  
103 Kedzie Hall  
532-6555

Student Publications Inc. is a nonprofit student publishing corporation that publishes the daily student newspaper, *The Kansas State Collegian*; the student yearbook, *Royal Purple*; and the *Campus Directory*. Student Publications is governed by the Board of Student Publications, composed of four students elected by the student body annually and three faculty members appointed by the university president.

The Board of Student Publications names an editor in chief and advertising manager of the *Collegian* three times each year. The *Royal Purple* editor is chosen in the spring for the following year. The editors and advertising managers hire students for staff positions.

*The Collegian* and *Royal Purple* each have faculty advisors, but their content is determined and controlled solely by the editors and student staffs.

## Telecommunications Services

Fred Damkroger, Director  
109 East Stadium  
532-7001

Telecommunications provides the voice, data, and video transmission capabilities for the university. The entire campus has been rewired since 1987. Fiber optic cables are also run to all the academic buildings and residence halls.

Long-distance service is provided using the state's intercity KANS-A-N network along with facilities provided by Southwestern

Bell and AT&T. The DEFINITY G2 automatically controls the routing of calls. Long-distance service for the residence halls is provided using these facilities as well. Each student in the residence halls has an opportunity to obtain an authorization code to facilitate the identification of calls and proper billing. Authorization codes for other campus users are available if circumstances warrant their use.

## University Press of Kansas

Fred M. Woodward, Director  
2501 W. 15th  
Lawrence, Kansas 66049  
(913) 864-4154

Kansas State University, in association with the other five Regents' universities, operates and supports the University Press of Kansas for the purpose of publishing scholarly and regional books on a nonprofit basis.

The press is governed by a board of trustees, who are the chief academic officers of the sponsoring institutions and who appoint two members and two alternates from each faculty to serve on the advisory editorial committee.

## University Relations

John Fairman, Assistant Vice President for  
University Relations  
122 Anderson Hall  
532-6269

Public information for K-State activities and events is coordinated through University Relations and its four units: News Services, Photographic Services, Printing Services, and University Publications.

News Services is the official outlet for print and broadcast news materials relating to K-State policies and administration. News Services also publishes *In-View*, the official faculty-staff newsletter.

Photographic Services offers photoprocessing, location and studio photography, and slide reproduction.

Printing Services prints books, brochures, business cards, envelopes, letterheads, posters, and other printed matter. Second- and third-class mailing services are available to all departments and affiliated organizations.

University Publications provides editing, design, and production coordination of enrollment management, recruitment, and informational publications.

# International Programs

William L. Richter, Interim Assistant  
Provost for International Programs  
Janet Papen, Administrative Officer  
304 Fairchild Hall  
532-5990

Building upon several decades of international involvement, K-State provides a range of programs that link the campus with other parts of the world. Many of these are coordinated through individual departments or colleges; others serve the whole university.

The Office of International Programs is responsible for coordinating international programs. The office houses the assistant provost for international programs, study abroad programs, and the various international and area studies programs. Coordination is assisted by an International Activities Council that is broadly representative of the university.

## International and Area Studies Programs

International and Area Studies Programs  
304 Fairchild  
Charles Bussing, 532-5990 or 532-6727

International Trade Studies  
Charles Bussing, 532-5990 or 532-6727

Students interested in world affairs may take advantage of several interdisciplinary opportunities. The South Asia Center and the Latin American studies and international studies programs offer secondary majors to undergraduates. For more information, see the Secondary Majors section of this catalog.

Several other international programs that do not offer degrees provide advice and opportunities to interested students and faculty. These include international trade studies, Canadian studies, and groups of scholars with interests in the Middle East, Western Europe, Eastern and Central Europe, and Africa. For more information, contact the Office of International Programs or the following:

Latin American studies  
Marcial Antonio Riquelme, 532-5990

South Asian studies  
Lelah Dushkin, 532-5990 or 532-6865

Canadian studies  
Judith Zivanovic, 532-6900

Russian studies  
Walter Kolonosky, 532-6760

Middle East studies  
Michael Suleiman, 532-6842

African studies  
Donald Adamchek, 532-6865

## Study Abroad Programs

Study Abroad Programs  
304 Fairchild

International Student Exchange Program  
Walter Kolonosky, 532-5990 or 532-6760

Exchange Agreement Programs  
304 Fairchild  
Janet Papen, 532-5990

The Office of Study Abroad provides information for students who wish to study in another country. K-State has bilateral exchange agreements with more than two dozen universities abroad. In addition, the university participates in the International Student Exchange Program (ISEP), through which many other exchanges are possible.

Qualified students are encouraged to apply for Rhodes, Marshall, Fulbright, Rotary, and other international scholarships.

### Programs

**Austria**  
Leopold Franzens University

**China (People's Republic of)**  
Luoyang Institute of Technology and Henan Agricultural University

**Central America (Regional)**  
Higher Council of Central American Universities

**Costa Rica**  
University of Costa Rica

**Czechoslovakia**  
Charles University

**Denmark**  
Aarhus School of Architecture

**England**  
Nottingham University

**France**  
Aix-Marseille University; Ecole Superieure d'Agriculture de Purpan

**Germany**  
Justus Liebig Universitat, Giessen; Ludwig Maximilian Universitat, Munich; Technical University, Trier

**Honduras**  
Escuela Agricola Panamericana, Tegucigalpa; Ministerio de Recursos Naturales de Honduras, Tegucigalpa

**Korea (Republic of)**  
Korea University

**Mexico**  
Instituto Tecnologico y de Estudios de Monterey

**New Zealand**  
University of Otago, Dunedin

**Paraguay**  
National University, Asuncion; Catholic University, Asuncion

**Switzerland**  
Eidgenossische Technische Hochschule, Zurich

**Italian Semester Program**  
Susanne Siepl-Coates, 532-5953

**Mexican Summer Program**  
Maureen Thrie, 532-6760

**Summer Abroad in English Education**  
Ray Kurtz, 532-5391

**Scholarship programs for foreign study**  
**Fulbright, Pearson**  
Walter Kolonosky, 532-5990 or 532-6760

**Marshall, Rhodes**  
Nancy Twiss, 532-6900

**Partnership Exchange (Germany, Switzerland)**  
Janet Papen, 532-5990  
Carol Miller, 532-6760

**Rotary International**  
Jerry Weis, 532-6615

**Yamani (Middle East)**  
Michael Suleiman, 532-6842

**International students**  
See the International Student Center and English Language Program sections of this catalog.

## International Development Programs

The Office of International Agricultural Programs, the Food and Feed Grains Institute, the International Grains Program, the International Meat and Livestock Program, the Human Ecology Paraguay Project, and other units maintain projects abroad, provide short-term consultants, and provide short-course training for foreign visitors. The International Trade Institute, in addition to its training programs, provides advice and assistance to Kansas manufacturers seeking overseas export markets.

K-State is a member of the MidAmerica International Agricultural Consortium and the Association of Big Eight Universities, through which collaborative development projects are pursued.

International Agricultural Programs  
William J. Jorns, Acting Director, 532-5714

International Trade Institute  
Wayne Norvell, Director, 532-6799  
Neelima Gogumalla, Assistant Director, 532-6799

International Community Service Program  
Carol A. Peak, Director, 532-5701

Food and Feed Grains Institute  
Charles Deyoe, Director, 532-6161  
Roe Borsdorf, Associate Director, 532-6161

International Grains Program  
Charles Deyoe, Director, 532-6161  
Roger Johnson, Associate Director, 532-6161

International Sorghum and Millet Program  
Richard Vanderlip, 532-7249

Paraguay Project  
Mercedith Smith, 532-5508

Resources for Developing Countries  
Nancy Donoghue, 532-7451

Wheat Genetics Resource Center  
Bikram Gill, 532-5692

International Meat and Livestock Program  
Jack Riley, Director, 532-6533

MidAmerica International Agricultural Consortium  
William J. Jorns, 532-5714

Association of Big Eight Universities, International Committee  
William L. Richter, 532-5990

## Secondary Majors

K-State University offers secondary majors in American ethnic studies, gerontology, industrial and labor relations, international studies, Latin American studies, natural resources and environmental sciences, South Asian studies, and women's studies. Open to students in all colleges, these secondary majors are designed to be taken concurrently with a primary major. Most programs of study will allow students to take both a primary and a secondary major within the normal four-year program, especially because courses applied toward the secondary major may also satisfy requirements for general education or restricted electives.

Program requirements follow a common pattern. Each includes two or more of the following features: an interdisciplinary introductory course (which might also satisfy distribution requirements); a list of electives from which students choose about 18 hours; and an interdisciplinary senior seminar featuring supervised independent study.

Each program has a supervisory committee and a director to whom students may refer for advising.

## American Ethnic Studies

Harriet Ottenheimer, Director

Professors Boyer,\* Fedder,\* Finnegan,\* McElroy,\* O'Brien,\* H. Ottenheimer,\* Rappoport,\* and Suleiman;\* Associate Professors Armagost,\* D. Benson,\* J. Benson,\* and A. Pigno; Assistant Professors W. R. Adams, A. Cochran,\* Prins, Rodgers, Wigfall, and Winokur; Instructors Baird-Olson and L. Kremer; Emeritus R. Taylor.

The American ethnic studies program primarily focuses on African Americans, Hispanic Americans, and Native American Indians, but includes the study of other ethnic groups in the United States as well. The courses in the program meet the educational and career needs of students by preparing them to function intellectually in a multiethnic, multiracial, multicultural world.

Students are encouraged to enroll in American ethnic studies courses whether or not they select the option of a secondary major in American ethnic studies.

### Secondary major

Students completing 24 semester hours of course work in a minimum of two departments may earn a secondary major in American ethnic studies. The director assists and advises secondary majors in planning appropriate schedules.

### Course requirements

DAS/DHE/ DED 160	Introduction to American Ethnic Studies .....	3
ANTH 200	Introduction to Cultural Anthropology .....	3
DAS/DED/ DHE 499	Senior Research Project in American Ethnic Studies .....	3

### Area courses

The distribution of area courses must include at least two American ethnic groups. No course can be used to fulfill more than one course requirement.

A. African American, Hispanic American, and Native American Indian ethnic groups of the United States .....	6
B. Background/ancestral cultures of African American, Hispanic American, and Native American Indian ethnic groups of the United States .....	3
C. Any United States ethnic group or the ancestral culture of a United States ethnic group .....	6

### Area courses

A. African American, Hispanic American, and Native American Indian	
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#### General

EDCIP 455	Teaching in a Multi-Cultural Society
EDCIP 733	Curriculum Materials for Ethnic Diversity
EDCIP 730	Education of the Disadvantaged
ENGL 280	American Ethnic Literature
ENGL 655	Readings in American-Ethnic Minority Literature
JMC 530	Ethnic Media in America
POLSC 602	Class, Power and Public Policy
POLSC 616	Discrimination and the Law
SOCIO 570	Race and Ethnic Relations in the U.S.A.
THTRE 672	American Ethnic Theatre

#### African American

ANTH 517	African American Music and Culture
ANTH 536	African American Cultures
ENGL 395	Topics: Contemporary Afro-American Fiction
ENGL 399	Topics in Contemporary African American Literature
HDFS 652	Black Families
HIST 539	Black American History
MUSIC 420	History of Jazz
MUSIC 424	Jazz in Kansas City and the Southwest
MUSIC 425	Topics in Jazz
KIN 703	Minority Groups in Sports
KIN/ SOCIO 435	Sport in Contemporary Society
POLSC 616	Discrimination and the Law

#### Hispanic American in the U.S.

SPAN 569	Special Studies: Chicano Language and Literature
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#### Native American

ANTH 533	Indians of Kansas
ANTH 630	Indians of North America
ART 662	Southwestern Indian Arts and Culture
HIST 537	History of the Indians of North America

**B. Background/ancestral cultures of African-American, Hispanic American, and Native American Indian ethnic groups of the United States.****African**

ANTH 550	Cultures of Africa
ANTH 517	African American Music and Culture
ANTH 536	African American Cultures
POLSC 526	African Politics

**Latin American**

ANTH 432	Indians of Mexico, Central America, and the Caribbean
ANTH 532	Central America: Its Peoples and Problems
ANTH 634	Indian Cultures of South America
ANTH 673	Precolumbian Civilizations of Mexico and Guatemala
GEOG 620	Geography of Latin America
HIST 560	Latin American Nations
HIST 561	Colonial Hispanic America
HIST 562	Modern Mexico
POLSC 622	Latin American Politics
SPAN 563	Introduction to the Literature of Spanish America
SPAN 566	Hispanic American Civilization
SPAN 752	Contemporary Spanish American Narrative
SPAN 772	Hispanic World Today

**Native American**

ANTH 570	American Indian Archaeology
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**C. Any United States ethnic groups and the ancestral cultures of those groups (all the courses listed under categories A and B, along with the following)****General**

ANTH 220	Introduction to Linguistic Anthropology
ANTH 516	Ethnomusicology
ANTH 519	Practical Anthropology
ANTH 676	Archaeology of the Old World
ANTH 685	Race and Culture
BIOL 320	Economic Botany
GEOG 100	World Regional Geography
GEOG 640	Geography of Europe
HIST 582	Modern Eastern Europe
POLSC 629	Development Policy and Administration
PSYCH 525	Social Psychology
SOCIO/	
SOCWK 510	Social Welfare as a Social Institution
SOCIO 740	Comparative Social Systems

**Asian**

ANTH/ECON/GEOG/HIST/POLSC/SOCIO 505 and 506	Introduction to the Civilizations of South Asian I and II
ANTH 545	Cultures of India and Pakistan
ART 420	History of South Asian Art
HIST 350	Gandhi and the Indian Revolution
HIST 504	History of Hinduism
GEOG 680	Geography of Asia
POLSC 511	Contemporary Chinese Politics
POLSC 623	South Asian Politics
POLSC 625	Southeast Asian Politics
POLSC 652	International Politics of South Asia
SOCIO 742	Society and Change in South Asia

**French**

FREN 510	Modern French Culture
FREN 514	French Civilization

**German**

GRMN 530	German Civilization
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**Jewish**

ENGL 280	American Ethnic Literature: Holocaust Literature
HIST 596	Holocaust: The Destruction of the European Jews

**Middle Eastern**

ARCH 601	Topics: Architecture and Urbanism of the Middle East
POLSC 624	Middle Eastern Politics
POLSC 653	International Politics of the Middle East

**Russian**

GEOG 650	Geography of the Soviet Union
HIST/	
RUSSN 250	Russian Culture and Civilization
HIST 564	The Russian Revolution and the Soviet System
HIST 591	History of Russia to 1801
POLSC 627	Soviet-Style Regimes

**Interdisciplinary courses**

**DAS/DED/DHE 160. Introduction to American Ethnic Studies.** (3) This course introduces students to the major concepts related to ethnicity and to some of the major American ethnic groups.

**ANTH 200. Introduction to Cultural Anthropology.** (3) This course introduces students to the general concepts of culture and cultural systems. For a complete description see the Anthropology section.

**DAS/DED/DHE 499. Senior Research Project in American Ethnic Studies.** (3) Guided research in American ethnic studies. Students prepare a research paper on a relevant subject of their choice. Each student is responsible for arranging to work with a member of the American ethnic studies faculty. Pr.: DAS/DED/DHE 160.

**DAS 560. Topics in American Ethnic Studies.** (1-4) I, II. Selected topics of special interest in American ethnic studies. Repeatable with change of topic. Pr.: DAS/DED/DHE 160.

**Credit and content**

All courses regularly offered for American ethnic studies credit have at least 40 percent or a major focus of content concerned with American ethnic groups, their ancestral cultures, or American ethnicity. Instructors and students of courses not regularly included in the American ethnic studies program may petition for credit on the basis of the same criteria.

Examples of specific courses for which the granting of American ethnic studies credit may vary are the following:

ANTH 420	Ethnography of Language
SOCIO 541	Wealth, Power, and Privilege
SOCIO 741	Social Differentiation and Stratification

In addition, departments offer courses on special topics, seminars, pro seminars, honors seminars, and independent studies that may apply for credit.

Relevant K-State-validated courses of transfer students will be accepted for American ethnic studies credit upon validation by the American Ethnic Studies Governance Board.

## Gerontology

Center for Aging  
1 Fairchild Hall  
532-5945

The rapid growth of an older population in the United States is creating an increasing demand for personnel who possess specialized training in gerontology in a variety of occupations and professions.

The secondary major in gerontology is a 24-hour program of study. It includes two

required courses, Introduction to Gerontology and Senior Seminar in Gerontology, and 18 semester hours from the approved list of gerontology electives offered in participating departments. Elective courses must be taken in a minimum of three separate departments.

Along with the secondary major, students can take an emphasis in long-term care administration. This emphasis requires completing the secondary major in gerontology, ACCTG 231 Accounting for Business Operations<sup>1</sup>, MANGT 420 Management Concepts, an approved 480 clock-hour internship (6 credit hours, DAS or DHE 515), SOCWK 610 Topics in Long-Term Care Administration, and at least one course in each of 10 training code areas as defined by the Kansas Board of Adult Care Administration. The adult care codes are listed in parentheses after each course description or title. With planning, the emphasis can be completed within 27 credit hours and a 6-credit-hour internship. Courses listed below will carry credit in the gerontology studies program and new courses will be added to the program as the curriculum is updated.

**Interdisciplinary courses**

**315. Introduction to Gerontology.** (3) I. Multidisciplinary introduction to the field of aging. Examines social, psychological, developmental, organizational, and economic aspects of aging. Theoretical, methodological, and applied issues of aging related to contemporary American society. Pr.: None. (codes 7, 9)

**415. Senior Seminar in Gerontology.** (3) II. Integration of course work in gerontology with in-depth project in special interest area. Pr.: Completion of 15 hours of course work in gerontology secondary major. (code 10)

**515. Long-Term Care Administration Internship.** (6) II. Includes: (a) field experience in the general administration of long-term care programs and/or facilities: planning, budgeting, program management, and service delivery; (b) exposure to federal and state standards and regulations governing long-term care; and (c) professional leadership development. Prior or concurrent enrollment in a 3-credit hour class in long-term care administration is also required. Pr.: Junior standing, 15 hours of gerontology, MANGT 420, ACCTG 231, completed or conc. enrollment in SOCWK 610, and GPA of 2.5 or above (3.0 or above in long-term course administration curriculum).

**Departmental course electives**

See the appropriate college sections of this catalog for further description.

**College of Agriculture****Horticulture**

HORT 525	Horticulture for Special Populations (code 7)
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**College of Architecture and Design****Architecture**

ARCH 730	Environment and Aging (codes 1, 7, 9)
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**Regional and community planning**

PLAN 315	Introduction to Planning <sup>4</sup> (codes 1, 2, 7, 9)
PLAN 761	Community Development <sup>4</sup> Workshop (var.)

**College of Arts and Sciences**

- DAS 315 Introduction to Gerontology (codes 7, 9)  
 DAS 415 Senior Seminar in Gerontology (code 10)  
 DAS 515 Long-term Care Administration Internship<sup>2</sup>

**Biology**

- BIOL 495B Topics in Biology: The Biology of Aging (code 5)

**English**

- ENGL 535 Literature of Aging

**History**

- HIST 520 Death and Dying in History

**Kinesiology**

- KIN 335 Physiology of Exercise (codes 5, 7)  
 KIN 796 Topics in Kinesiology<sup>3</sup>

**Psychology**

- PSYCH 520 Life Span Personality Development  
 PSYCH 715 The Psychology of Aging (codes 4, 6)

**Social work**

- SOCWK 566 Social Work in Aging Services (codes 5,7)  
 SOCWK 610 Topics in Long Term Care Administration (code 6)<sup>2</sup>

**Sociology**

- SOCIO 744 Social Gerontology: An Introduction to the Sociology of Aging (codes 6, 7)  
 SOCIO 944 Seminar in the Sociology of Aging

**Speech**

- SPPAT 605 Communication Disorders and Aging  
 THTRE 665 Theatre for Special Populations<sup>4</sup>

**College of Education****Counseling and educational psychology**

- EDCEP 862 Leisure Counseling

**Adult and continuing education**

- EDACE 782 Educational Gerontology

**College of Human Ecology**

- DHE 515 Long-term Care Administration Internship<sup>2</sup>

**Clothing, textiles, and interior design**

- ID 610 Housing for Special Needs  
 ID 751 Designing for Exceptional Needs (codes 1, 2, 7)

**Human development and family studies**

- HDFS 510 Human Development and Aging (codes 4, 5, 6, 7)  
 HDFS 654 Death and the Family (codes 5, 7)  
 HDFS 704 Seminar in Human Development and Family Studies (var.)<sup>3</sup>  
 HDFS 770 Economics of Aging  
 HDFS 845 Adult Development and Aging

**Foods and nutrition**

- FN 132 Basic Nutrition (code 5)  
 FN 718 Physical Health and Aging (codes 1, 2, 5)  
 FN 817 Nutrition and Aging

<sup>1</sup>Required for long-term care administration emphasis, but no credit as gerontology elective in secondary major.

<sup>2</sup>Required for long-term care administration emphasis.

<sup>3</sup>Center for Aging approval required for gerontology credit.

<sup>4</sup>Project approval from Center for Aging required.

# Industrial and Labor Relations

Berkeley R. Miller, Co-Director  
 255 Waters Hall  
 532-6865

Clive Fullagar, Co-Director  
 469 Bluemont Hall  
 532-6850

The secondary major in industrial and labor relations provides a valuable opportunity to obtain the academic background and skills pertinent to the negotiation and administration of labor contracts as well as those relating to dispute settlement in industrial, governmental, and institutional settings. There is an increasing demand for people with these skills in all sectors of the economy.

The secondary major in industrial and labor relations is a 28-hour interdisciplinary program of study, offered jointly by the Department of Management in the College of Business Administration and the Departments of Economics, Psychology, and Sociology, Anthropology, and Social Work in the College of Arts and Sciences. Twenty-two of the hours must be taken outside the student's primary major area. MANGT 330 and five additional courses are required as shown in group I below. In addition, two elective courses must be chosen from each of groups II and III below.

Business students interested in the secondary major in industrial and labor relations should contact Dr. Stan Elsea, Department of Management, 101 Calvin Hall, 532-6296.

**Required courses (16 hours)**

- ECON 620 Labor Economics  
 MANGT 330 Introductory Seminar  
 MANGT 530 Industrial and Labor Relations  
 MANGT 630 Labor Relations Law  
 PSYCH 560 Industrial Psychology  
 SOCIO 647 Sociology of Work

**Restricted electives (6 hours)**

- Two courses from:  
 ECON 540 Managerial Economics  
 MANGT 637 Industrial Conflict Resolution  
 SOCIO 546 Bureaucracy in Modern Societies  
 PSYCH 550 Group Dynamics

**Group electives**

Two courses are to be selected from the following groups (only one course may be chosen from any group):

**Group A**

- MANGT 531 Personnel and Human Resources Management  
 MANGT 622 Decision Analysis  
 MANGT 639 Advanced Labor Relations  
 ECON 627 Contemporary Labor Problems

**Group B**

- PSYCH 563 Gender Issues in the Workplace  
 PSYCH 625 Engineering Psychology  
 PSYCH 564 Psychology of Organizations

**Group C**

- SOCIO 550 Introduction to Social Interaction  
 SOCIO 570 Race and Ethnic Relations in the U.S.

**Group D**

- POLSC 616 Discrimination and the Law

# International Studies

Charles Bussing, Director  
 202 Dickens Hall  
 532-6327

The international studies program promotes understanding of the international community. The program encourages a substantial distribution of foreign and international course work under the direct, personal guidance of an interdisciplinary faculty committee. Students must enroll in another major before taking international studies as a secondary major.

Students who complete the secondary major in international studies are expected to include the following within their areas of knowledge or competency: speaking capability in a foreign language; basic geographic knowledge of the world; ability to understand and analyze cultures other than their own; some understanding of developmental processes; some understanding of international relations and processes of interaction; and some integration of their program of study into a meaningful and coherent whole.

Students must complete the equivalent of four semesters of a modern foreign language. They must also complete 24 hours of course work, distributed as follows:

**Geographic knowledge**

- GEOG 100 World Regional Geography

**Cultural understanding**

- ANTH 200  
 or 201 Cultural Anthropology

**Development**

At least one course marked D in the approved course list.

**International relations**

At least one course marked I in the approved course list.

**Program integration**

- DAS 425 Senior Research in International Studies or approved alternative.

During the senior year, the student will write a research paper or complete a project on an international topic. The research may be an honors thesis or design project in one of the participating colleges, or it may involve independent study. Students may enroll in DAS 425 or in an approved alternative course, such as GENAG 505 or ARCH 702. In all cases, the student must have the permission of a faculty member to supervise and evaluate the work. All students enrolled in "Senior Research in International Studies" must have their

topics approved by the director of the secondary major in international studies.

Depending on the number of students enrolled in the course during any given semester, special class sessions may be scheduled for participants to discuss their work and to share their preliminary findings. As part of the course requirements, students will be expected to present their final paper or project, or a summary of the same, at a meeting of students and faculty in international studies.

### Electives

The remaining 9 hours may be taken from the approved course listing. No more than 6 hours (of the 24) may be applied from a single discipline, and no more than 6 hours may be counted toward both a secondary major in an area studies program and in international studies. Students are encouraged to take courses in at least two of the following colleges: agriculture, architecture and design, arts and sciences, business, and human ecology. Students are encouraged to consult with their international studies advisor on the design and coherence of their international studies program.

Courses listed below are those for which students may receive credit in the international studies program. Alternative courses may be approved by petition to the director of the international studies program.

### Interdisciplinary course

**DAS 425. Senior Research in International Studies.** (3) I, II. A research paper or project on an international topic. In order to complete supervised independent study, students will make presentation of the final paper or project report. Pr.: Completion of 15 hours of course work in international secondary major.

### Departmental electives

#### College of Agriculture

AGRON 430	Tropical Agronomy	2
GENAG 505	Comparative Agriculture	I-4
AGEC 615	International Agricultural Development	3 D

#### College of Architecture and Design

ARCH 702	Architecture Design Studio VI	5
LAR 702	Landscape Architecture Design Studio VI	5
IAR 702	Interior Architecture Design Studio VI	5
ARCH 655	Foreign Seminar	var.

#### College of Arts and Sciences

##### Anthropology

ANTH 200	Introduction to Cultural Anthropology	3
ANTH 201	Introduction to Cultural Anthropology, Honors	4
ANTH 220	Introduction to Linguistic Anthropology	3
ANTH 505	Introduction to the Civilization of South Asia I	3
ANTH 506	Introduction to the Civilization of South Asia II	3
ANTH 507	Folk Cultures	3
ANTH 511	Cultural Ecology and Economy	3
ANTH 512	Political Organization in Folk and Nonliterate Cultures	3

ANTH 532	Mexican and Central American Indians	3
ANTH 536	Black Cultures of the Americas	3
ANTH 545	Cultures of India and Pakistan	3
ANTH 550	Cultures of Africa	3
ANTH 604	Culture and Personality	3
ANTH 633	Gender, Power, and International Development	3
ANTH 634	Indian Cultures of South America	3
ANTH 685	Race and Culture	3
ANTH 736	Applied Agricultural and Rural Change	3

##### Economics

ECON 505	Introduction to the Civilization of South Asia I	3
ECON 506	Introduction to the Civilization of South Asia II	3
ECON 636	Capitalism and Socialism	3
ECON 681	International Trade	3 I
ECON 682	Economics of Underdeveloped Countries	3 I

##### Geography

GEOG 440	Geography of Natural Resources	3
GEOG 450	Geography of Economic Behavior	3
GEOG 460	Future Worlds	3
GEOG 620	Geography of Latin America	3
GEOG 640	Geography of Europe	3
GEOG 650	Geography of the Soviet Union	3
GEOG 710	Geography of Hunger	3 D
GEOG 715	World Population Patterns	3
GEOG 730	World Agricultural Systems	3 D

##### History

HIST 505	Introduction to the Civilization of South Asia I	3
HIST 506	Introduction to the Civilization of South Asia II	3
HIST 543	The U.S. and World Affairs, 1776-Present	3
HIST 544	History of U.S.-Soviet Relations Since 1917	3 I
HIST 560	Latin American Nations	3
HIST 573	Twentieth-Century Europe	3
HIST 574	Europe Since World War II	3
HIST 577	European Diplomatic History Since Napoleon	3 I
HIST 595	Modern European Culture	3

##### Journalism and mass communications

JMC 670	International Communications	3
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##### Modern languages

FREN 502	French Literature in Translation	3
GRMN 502	German Literature in Translation	3
RSSN 504	Russian Literature in Translation: The 19th Century	3
SPAN 505	Spanish Literature in Translation	3
MLANG 507	European Literature in Translation	3
RUSSN 508	Russian Literature in Translation: The Soviet Period	3
FREN 514	French Civilization	3
GRMN 530	German Civilization	3
SPAN 565	Spanish Civilization	3
SPAN 566	Hispanic-American Civilization	3

##### Political science

POLSC 505	Introduction to the Civilization of South Asia I	3
POLSC 506	Introduction to the Civilization of South Asia II	3
POLSC 545	The Politics of Developing Nations	3 D
POLSC 621	European Politics	3
POLSC 622	Latin American Politics	3

POLSC 623	South Asian Politics	3
POLSC 624	Middle Eastern Politics	3
POLSC 625	Southeast Asian Politics	3
POLSC 626	African Politics	3
POLSC 627	Soviet-Style Regimes	3
POLSC 628	Comparative Security Establishments	3
POLSC 629	Administration in Developing Nations	3 D
POLSC 641	International Relations	3 I
POLSC 642	International Conflict	3 I
POLSC 645	International Politics of Europe	3 I
POLSC 647	International Law	3 I
POLSC 649	International Defense Strategies	3 I
POLSC 651	International Organization	3 I
POLSC 652	International Politics of South Asia	3 I
POLSC 653	International Politics of the Middle East	3 I

##### Sociology

SOCIO 505	Introduction to the Civilization of South Asia I	3
SOCIO 506	Introduction to the Civilization of South Asia II	3
SOCIO 633	Gender, Power, and International Development	3 D
SOCIO 734	Sociology of Agricultural Development	3 D
SOCIO 736	Applied Agricultural and Rural Change	3
SOCIO 740	Comparative Social Systems	3
SOCIO 742	Society and Change in South Asia	3

### College of Business Administration

FINAN 554	International Financial Management	3
MANGT 690	International Management	3
MKTG 544	International Marketing	3 I

### College of Human Ecology

FN 702	Nutrition in Developing Countries	3
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## Latin American Studies

Marcial Antonio Riquelme, Director  
304C Fairchild Hall  
532-5990

Students participating in the interdisciplinary secondary major in Latin American studies examine issues related to Latin America from a variety of perspectives. This interdisciplinary approach helps students understand the systemic nature of socioeconomic, technological, and environmental problems in Latin America and the value systems of the people involved.

A student from any college may choose the secondary major to complement course work in his or her major. Many courses may simultaneously meet the student's own college or major degree requirements. In this way, electives and required courses within a college curriculum may count towards the secondary major in Latin American studies.

Completion of the secondary major enhances student qualifications for

graduate study and employment in research, economic development, social action, trade, or diplomacy related to Latin America.

### Course requirements

#### Language requirement

Spanish IV or equivalent, or more advanced competence in Spanish or Portuguese.

#### Area courses

21 hours, including the Senior Seminar in Latin American Studies.

Courses must be taken in a minimum of four departments, with no more than 9 hours in any one department.

#### Interdisciplinary (required)

DAS 407 Senior Seminar in Latin American Studies

### Departmental electives

#### College of Agriculture

HORT 407 Comparative Agriculture: Latin America

#### College of Arts and Sciences

##### Anthropology

ANTH 432 The Indians of Mexico, Central America, and the Caribbean  
 ANTH 532 Central America: Peoples and Problems  
 ANTH 536 African-American Cultures  
 ANTH 555 Black Music of the Americas  
 ANTH 634 Indian Cultures of South America  
 ANTH 673 Pre-Columbian Civilizations of Mexico and Guatemala

##### Geography

GEOG 620 Geography of Latin America

##### History

HIST 560 Latin American Nations  
 HIST 561 Colonial Hispanic America  
 HIST 562 Modern Mexico

##### Modern languages

SPAN 563 Introduction to the Literature of Spanish America  
 SPAN 566 Hispanic-American Civilization  
 SPAN 751 Spanish-American Narrative to 1950  
 SPAN 752 Contemporary Spanish-American Literature  
 SPAN 755 Spanish-American Poetry and Drama  
 SPAN 772 Hispanic World Today

##### Political science

POLSC 622 Latin American Politics

##### Sociology

SOCIO 701 Problems in Sociology: Latin American Political Sociology  
 SOCIO 701 Problems in Sociology: Social Movements in Selected Latin American Countries

## South Asian Studies

Lelah Dushkin, Director  
 304 Fairchild Hall  
 532-5990

South Asian studies focus on geographic, linguistic, and cultural regions of Afghanistan, Bangladesh, Pakistan, India,

Nepal, Sri Lanka, Bhutan, and the Maldives Republic.

The basic South Asia courses are Introduction to South Asian Civilizations I and II, taught jointly by South Asia faculty from the Departments of History; Political Science; Geography; and Sociology, Anthropology, and Social Work. These courses may be taken by any undergraduate and credit may be received in any one of the participating departments. Advanced courses in South Asian studies and related subjects are taught in all of these departments and the Department of Economics.

Language training is offered in Hindi/Urdu, and instruction also may be available, upon sufficient demand, in other South Asian languages. These languages may be used to satisfy requirements for the bachelor of arts and higher degrees.

### Secondary major

Students completing a required number and distribution of language and area studies courses may earn a secondary major in South Asian studies.

The program is administered through the South Asia Center. Students who wish to have a secondary major in South Asian studies file an academic data sheet with the center. All courses in the program are approved by South Asia faculty, who have the responsibility to decide which courses are to be included in the program. Transfer students should apply to the South Asia Center to have their course work validated for this major. If a course is accepted by K-State, it may then be applied to the South Asian studies major.

The center faculty act as advisors to those students within this program. The advisory function, however, is limited to this program and does not replace the position of the student's first major advisor.

### Course requirements

#### Language requirement

The first two years of Hindi/Urdu or equivalent competency in a South Asian language.

URDU 171 Hindi/Urdu I  
 URDU 172 Hindi/Urdu II  
 URDU 273 Hindi/Urdu III  
 URDU 274 Hindi/Urdu IV

#### South Asian civilizations

One course required.

xxx 505 South Asian Civilizations I  
 xxx 506 South Asian Civilizations II

(Cross-listed in the six participating departments: anthropology, economics, geography, history, political science, and sociology.)

### Area course requirement

Four courses listed below in at least three fields. One of the four may be drawn from the auxiliary list with approval of the South Asia committee.

#### Area courses

##### Economics

ECON 699 Seminar in Economics: South Asia

##### History

HIST 350 Gandhi and the Indian Revolution  
 HIST 504 History of Hinduism  
 HIST 598 Topics in Non-Western History (South Asia)

##### Political science

POLSC 623 South Asian Political Systems  
 POLSC 652 International Politics of South Asia

##### Sociology/anthropology

SOCIO 742 Society and Change in South Asia  
 ANTH 545 Cultures of India and Pakistan

#### Auxiliary courses

AGEC 615 International Agricultural Development  
 ECON 636 Capitalism and Socialism  
 ECON 682 Economics of Underdeveloped Countries  
 POLSC 545 Politics of Developing Nations  
 POLSC 629 Administration of Developing Nations  
 SOCIO 734 Sociology of Agricultural Development  
 SOCIO 740 Comparative Social Systems  
 ANTH 507 Folk Cultures  
 ANTH 511 Cultural Ecology and Economy  
 MKTG 544 International Marketing  
 MANGT 690 International Business

### South Asia Center

The center also sponsors occasional cultural events, colloquia, visiting public speakers, a film series, courses and public lectures in the vicinity. It also provides audiovisual support, training, and consultation to elementary and secondary teachers.

## Women's Studies

Sandra Coyner, Director

Professors Gray, Hedrick, McElroy, Oukrop, Saal; Associate Professors Anderson, Benson, Coyner, Culley, Hausmann, Scott, Walker; Assistant Professors Coulson, Huff-Corzine, McGrath, Merrill, Thurston, Verschelden; Instructors Blash, Hubler, Kremer.

The women's studies program focuses on women, whose changing roles and expectations are the most profound and widespread social phenomenon of our time.

Courses in women's studies examine various aspects of women's lives, including not only the barriers and prejudices that still hold women back but also women's achievements against the odds. Some courses focus on the nature of sex differences and gender roles. Others focus on the interrelationships between women, gender roles, and the major institutions which shape our society. Humanities courses

explore images and achievements of women in a wide range of creative media. History and anthropology discuss interrelationships of women and men in various cultural contexts across time and around the world.

Women's studies are direct preparation for many careers that serve, counsel, or communicate about women. A secondary major in women's studies combines especially well with such majors as journalism, any form of counseling, or pre-law. Women's studies is also an excellent liberal arts concentration, forming a firm basis for graduate work in any liberal professional field.

### Course requirements

To complete the secondary major, a student must take two required courses (Introduction to Women's Studies and Senior Seminar in Women's Studies), and 18 semester hours in elective courses from the Colleges of Arts and Sciences, Education, or Human Ecology, for a total of 24 semester hours. Elective courses must be taken in at least two colleges. Courses in the women's studies program also may serve to meet general education and major requirements, and interdisciplinary courses may be counted as either humanities or social sciences.

### Interdisciplinary courses

**\*xxx 105. Introduction to Women's Studies.** (3) I, II. A systematic introduction to women's studies as an academic discipline, drawing research from humanities, social science, education, human ecology, and management to analyze images of women, status of women, sex differences, gender roles and stereotypes, patterns of success, women and relationships, current controversial issues affecting women, and feminism as a social and historical movement. An academic perspective on issues of equality and justice for women, emphasizing scholarship on how women perceive their own lives.

**\*xxx 405. Senior Seminar in Women's Studies.** (3) I. An intercollegiate, interdisciplinary course organized topically with students presenting papers which draw upon previous and concurrent academic experience and which approach a given topic with a consistent focus on the role of women. Provides supervised independent study and subsequent discussion, allowing students to integrate and order their perceptions about the unique roles, problems, and contributions of women. Pr.: Introduction to Women's Studies and 15 hours of women's studies courses.

**\*xxx 500. Topics in Women's Studies.** (var.) Exploration of an interdisciplinary topic in women's studies.

**\*xxx 505. Independent Study in Women's Studies.** (1-3) I, II. Independent, interdisciplinary, supervised studies in an area of women's studies which does not fall within the boundaries of a traditional department. May be repeated once for credit with change of topic. Pr.: Junior standing, consent of instructor(s), and approval of women's studies faculty.

**\*xxx 506. Contemporary Feminist Frameworks.** (3) II. Surveys major contemporary U.S. theories of gender and their development, including impact of feminist movement on the development of theory, interactions of race and gender, women's culture and men's roles. Compares approaches of social sciences and humanities. Pr.: Six hours of women's studies.

**\*xxx 605. Gender: An Interdisciplinary Overview.** (3) Advanced interdisciplinary overview of theory and scholarship on women and gender from disciplines in social sciences, humanities, and professions focusing on human beings. For students who already have some basic knowledge of women's studies.

\*To enroll, use one of these prefixes: DAS, College of Arts and Sciences; DED, College of Education; DHE, College of Human Ecology; GENBA, College of Business Administration.

### College of Arts and Sciences

#### Anthropology

ANTH 508 Male and Female: Cross-Cultural Perspectives  
ANTH 633 Gender, Power, and International Development

#### Art

ART 654 Women in Art  
ART 695 Topics in Art History (when offered as Women in Photography)

#### English

ENGL 425 Women in Literature  
ENGL 707 Medieval Literature (when offered as Images of Women in the Middle Ages)

#### History

HIST 512 Women in European History  
HIST 533 Topics in the History of the Americas (when offered as Gender Roles, Sexuality, and the American Medical Profession, 1800-Present; Women in Latin American History; or Women and the Family, 1607-1870.)  
HIST 541 Women in American History  
HIST 563 Topics in Comparative History (when offered as Feminism: History and Theory)  
HIST 598 Topics in Non-Western History (when offered as Women in the Middle East)  
HIST 928 Seminar in American History (when offered as Women's History)  
HIST 930 Seminar in Modern European History (when offered as Female Domesticity in Preindustrial Europe)

#### Journalism and mass communication

JMC 612 Women and the Media

### Modern languages

FREN 502 French Literature in Translation (when offered as Women in African Literature)

### Philosophy

PHILO 150 Introduction to the Philosophy of Feminism  
PHILO 525 Social Political Thought (when offered as Women in Western Thought)  
PHILO 665 Philosophy of Feminism

### Kinesiology

KIN 775 Seminar in Physical Education (when offered as Issues of Women and Sports)

### Political science

POLSC 606 Gender and Politics  
POLSC 799 Pro-Seminar in Political Science (when offered as Women and Law)

### Psychology

PSYCH 540 Psychology of Women  
PSYCH 543 Women and Mental Health Issues  
PSYCH 563 Gender Issues in the Workplace

### Social work

SOCWK 543 Women and Mental Health Issues  
SOCWK 610 Topics in Social Work (when offered as Violence Against Women or Women and Peace)

### Sociology

SOCIO 545 The Sociology of Women  
SOCIO 633 Gender, Power, and International Development

### Speech and theatre

SPCH 630 Topics in Rhetoric and Communication (when offered as Feminism and Rhetoric)  
THTRE 782 Women in Theatre

### College of Education

#### Educational administration

EDADM 786 Topics in Education (when offered as Programming for Women's Concerns)

#### Adult and continuing education

EDACE 750 Women, Education, and Work

#### Curriculum, instruction, and policy

EDCIP 735 Curriculum Materials for Nonsexist Teaching

### College of Human Ecology

#### Human development and family studies

HDFS 300 Problems in Family and Child Development (when offered as The Mature Woman: Middle Age and Later Years)  
HDFS 302 You and Your Sexuality  
HDFS 350 Family Relationships and Sex Roles  
HDFS 600 Economic Status of Women  
HDFS 708 Topics in Family and Child Development (when offered as The Legal Rights of Women)  
HDFS 865 Human Sexuality

# Agriculture

Walter Woods, Dean and Director of the Kansas Agricultural Experiment Station and the Kansas Cooperative Extension Service

114 Waters Hall  
532-7137

David J. Mugler, Associate Dean and Director of Academic Programs  
Lawrence H. Erpelding, Associate Director  
John B. Riley, Assistant Director

117 Waters Hall  
532-6151

The College of Agriculture offers 16 bachelor of science degree programs, 10 master of science programs, and nine programs leading to the Ph.D. In addition there are pre-forestry and pre-veterinary medicine programs and a two-year associate degree in retail floriculture. Many programs and options provide flexibility to meet the needs of students who will enter varied careers in the food chain and related agribusinesses.

## The profession

Professional agriculture is the application of the physical, biological, and social sciences and the principles of management to food production, food preservation and processing, crop and livestock marketing, culture of flowers and ornamentals, life processes of plants and animals, natural resources management, economic development, and related fields.

## Faculty

More than 95 percent of the instructional faculty of the College of Agriculture have Ph.D. degrees. All are actively involved in research and publish their findings regularly in scientific journals. They work closely with extension specialists. This integration of teaching, research, and extension helps ensure that courses are current and relevant.

## Facilities

Effective instruction in the application of basic sciences to modern agricultural industries requires land, buildings, livestock, and equipment. More than 4,000 acres of land are used for experimental work and for instruction.

A feed mill, flour mill, and bakery include modern equipment from eight countries. Well-equipped drafting rooms are used by milling students. Greenhouses and field plots provide plants for horticulture courses.

Modern animal industry and dairy and poultry buildings contain some of the latest equipment for teaching and research in nutrition, genetics, and food processing (meat, milk, eggs). Livestock of many breeds, plus various soil types, field crops, fruits, vegetables, and ornamentals, are used in teaching and research.

## Professional programs

Agribusiness—B.S.  
Agricultural economics—B.S., M.S., Ph.D.  
Agricultural education—B.S.  
Agricultural journalism—B.S.  
Agricultural technology management—B.S., M.S.  
Agronomy (crops and soils)—B.S., M.S., Ph.D.  
Animal sciences and industry—B.S., M.S., Ph.D.  
Bakery science and management—B.S.  
Entomology—M.S., Ph.D.  
Feed science and management—B.S.  
Food science—M.S., Ph.D.  
Food science and industry—B.S.  
Genetics—M.S., Ph.D.  
Grain science—M.S., Ph.D.  
Horticultural therapy—B.S.  
Horticulture—B.S., M.S., Ph.D.  
Milling science and management—B.S.  
Park resource management—B.S.  
Parks and recreation administration—B.S.  
Pest science and management—B.S.  
Plant pathology—M.S., Ph.D.  
Pre-forestry—two years  
Pre-veterinary medicine—three years  
Retail floriculture—two years, associate of agriculture degree

## Internships

Internships throughout the state and nation are available with agribusiness firms and agencies and in production agriculture to gain on-the-job experience. Specific internship requirements vary among departments and interdepartmental programs. Students may earn academic credit and money for approved internships. The number of internships in the College of Agriculture is growing as companies seek to attract K-State graduates.

## Extracurricular activities

Leadership, communication, and interpersonal skills are essential for today's agriculture graduate. K-State offers many opportunities to become involved on campus through departmental clubs, service organizations, student government, agricultural competition teams, and much more. Each contributes to greater personal and professional development.

## Scholarships

All students applying for College of Agriculture scholarships must complete the K-State scholarship application. Obtain an application from your high school counselor, community college financial aid office or the College of Agriculture, Office of Academic Programs, 117 Waters Hall.

By completing the university's scholarship application, you become eligible for all university, college, and departmental scholarships for which you are qualified. Scholarship applications should be submitted by February 1 to receive priority.

## General Requirements

### Selection of a major

Students usually select a curriculum or major when they enter the college. They are provided academic advisors in their major fields. Students enroll in general agriculture if they want to enter some part of professional agriculture but are not yet ready to identify a particular major. They are assigned an academic advisor in the academic programs office or an advisor in one of the academic departments. These students are urged to choose majors before the end of the freshman year.

The curriculum or major may be changed at almost any time and with relative ease, though a change after the sophomore year may delay graduation.

Electives permit adaptation of the program to the student's goals. The student should work with an advisor to develop the most beneficial and effective academic program.

Many students work part time at K-State laboratories, greenhouses, and farms. This experience adds greatly to students' learning and understanding.

### Selection of an option

Most major fields of study in agriculture provide for selection of groups of courses known as options. Some typical options include:

### Business and industries

Students who wish to emphasize business, marketing, and management related to agribusiness firms may select an option in business and industries. Course work includes classes in business administration and economics.

**Production/technical**

Those who plan to enter farming, ranching, horticultural production, or other technical positions in agriculture or agribusiness may select a production/technical option. Study in one of these options allows students to gain more depth in the technical aspects of their majors.

**Sciences/professional**

A science/professional option prepares students for research and graduate and professional schools. This option allows students to structure programs strong in the basic sciences and/or other areas that will enhance success in graduate and professional schools such as law and veterinary medicine.

Additional options are available in certain curricula or majors to allow students to develop specific strengths or specializations.

**Suggested humanities and social science electives (must be taken from more than one department):**

- College of Architecture and Design—any course in history or appreciation of architecture
- Art—courses in appreciation and theory
- Economics—above ECON 110 Economics I
- English—any except courses in composition
- Geography—any except GEOG 220 Environmental Geography I and GEOG 221 Environmental Geography II
- History—any course
- Human development and family studies—any course
- Modern languages—any course
- Music—any course in theory or appreciation of music
- Philosophy—any course
- Political science—any course
- Psychology—any course
- Sociology, anthropology, and social work—any course
- Speech—any course in theater and interpretation

**Suggested additional communications courses**

GENAG 410	Agricultural Student Magazine	2
ENGL 300	Expository Writing III	3
ENGL 516	Written Communications for the Sciences	3
SPCH 311	Business and Professional Speaking	3
SPCH 321	Public Speaking II	2
SPCH 325	Argumentation and Debate	3
SPCH 726	Seminar in Persuasion	3
JMC 275	News and Feature Writing	3
RTV 240	Audio I	3
RTV 250	Video I	3
MKTG 442	Sales Communications	3
EDSEC 706	Teaching Adults in Extension	3

## Program Choices

**General agriculture**

Students who are undecided regarding the selection of a major in agriculture may want to enroll in general agriculture. Courses taken in this area are selected with the help of an advisor to be applicable to any major in agriculture and to most other programs

offered at the university. Examples of course selections for first semester follow:

**Example I**

ENGL 100	Expository Writing I	3
GENAG 101	Ag Orientation	1
ASI 102	Principles of Animal Science	3
ASI	An ASI Lab	1
MATH 100	College Algebra	3
FOR 285	Introduction to Forestry	3
KIN 101	Principles of Physical Fitness	1
		<u>15</u>

**Example II**

AGEC 120	Agricultural Economics and Agribusiness	3
GENAG 101	Ag Orientation	1
CHM 110	General Chemistry	5
	<b>or</b>	
CHM 210	Chemistry I	4
ENGL 100	Expository Writing I	3
GRSC 100	Principles of Milling	3
KIN 101	Principles of Physical Fitness	1
		<u>15-16</u>

**Example III**

GENAG 101	Ag Orientation	1
ECON 110	Principles of Macroeconomics	3
EDSEC 300	Introduction to Agricultural Education	1
	<b>or</b>	
AGRON 220	Crop Science	4
PSYCH 110	General Psychology	3
ASI 302	Introduction to Food Science	3
		<u>15</u>

Various general education and agriculture courses can be substituted in the examples above, depending on the student's interest.

**Natural resource management**

Students interested in natural resource management can pursue programs in park resource management; parks and recreation management; range management; and soil and water conservation.

Majors in park resource management and parks and recreation administration can be earned in the Department of Horticulture, Forestry, and Recreation Resources.

Range management and soil and water conservation options are available through the Department of Agronomy.

These programs provide training for individuals interested in interpretation and application of ecological principles to environmental problems involving natural resources. Each program contains courses in the social sciences and humanities to help students become sensitive to the interactions between humans and their environmental surroundings. Courses in the physical and biological sciences help students understand and solve environmental problems, and courses in communications assist them in interpreting, conveying, and employing solutions.

**Pre-veterinary medicine program**

Students who satisfactorily complete the pre-veterinary medicine program and the first two years of the curriculum in veterinary medicine will be eligible for a

bachelor of science degree in the College of Agriculture. Pre-veterinary medicine requirements may also be completed in the College of Arts and Sciences.

GENAG 101	Ag Orientation	1
ENGL 100	Expository Writing I	3
ENGL 120	Expository Writing II	3
SPCH 105	Public Speaking IA	2
CHM 210	Chemistry I	4
CHM 230	Chemistry II	4
CHM 350	General Organic Chemistry	3
CHM 351	General Organic Chemistry Laboratory	2
BIOCH 521	General Biochemistry	3
BIOCH 522	General Biochemistry Laboratory	2
PHYS 113	General Physics I	4
PHYS 114	General Physics II	4
BIOL 198	Principles of Biology	4
BIOL 455	Microbiology (with lab)	4
BIOL 510	Embryology	3
BIOL 511	Embryology Laboratory	1
ASI 500	Genetics	3
	Electives	9
	Humanities and/or social science electives	12

**Dual degrees/dual majors**

The agribusiness complex of industries (processing, preservation, distribution, and retailing of farm-produced food, and manufacture and sale of farm equipment, feeds, and agricultural chemicals) employs a variety of professionally trained personnel. The type of education required varies with the nature of the work performed. A dual degree or a dual major may be appropriate, depending on the student's occupational objectives.

Dual degrees may be earned by a student who desires a B.S. degree in some discipline in agriculture along with a B.S. degree in some other college at K-State. To earn two B.S. degrees, the student must complete the requirements of each degree and a minimum of 150 semester hours.

Dual majors are completed by students who wish to complete two different programs of study in agriculture while earning a bachelor of science degree in agriculture. This approach allows the student to select two majors to give greater depth and breadth to the educational program. The student is required to complete the requirements for both majors and earns a bachelor of science degree in agriculture.

**Secondary majors**

Certain departmental courses have been approved for credit toward secondary majors in gerontology, international studies, and natural resources and environmental sciences. A listing of approved courses may be found in the Secondary Majors section of this catalog.

**Natural resources/environmental sciences option**

Increasing national and international concerns have generated opportunities for individuals to contribute to the resolution of environmental and resource problems.

These issues are so complex that they lie beyond the scope of any one discipline.

The natural resources and environmental science option broadens students' perspectives through course offerings and interaction with students and faculty from many disciplines. The option prepares students to apply broadly-based knowledge to the use, management, sustainability, and quality of soil, air, water, mineral, biological, and energy resources.

The NRS option includes entry requirements; at least five block courses selected from natural science, applied science, and social science/humanities offerings; and an interdisciplinary capstone course. Interested students should contact Steve J. Thien, acting director, 317B Throckmorton Hall, 532-7207.

### Agriculture honors program

Students who have attained a cumulative GPA of 3.5 or higher in 12 or more completed hours at Kansas State University will be invited to participate in the College of Agriculture Honors Program, typically at the end of their sophomore year. Community college transfers will be invited into the program following their first semester if they have met the GPA requirement.

The program provides honors students with greater curriculum flexibility, which encourages breadth and depth of study in one or more specific areas. It also exposes honors students to various areas of interest in agriculture. Each student in the program has a committee of three faculty members who assist the student in developing a program of study and in planning independent research activities.

Students seeking to enroll in the program will meet with the honors committee member from the department involved and, with an advisor, will develop an honors curriculum tailored to the student's particular goals. The student, with advice from the advisor, honors committee member, and other faculty member(s), will prepare a short proposal outlining the honors project. This proposal must be approved by the honors advisory committee of the College of Agriculture.

The honors advisory committee will review the proposals for possible scholarship funding priority. These honors project scholarships will be used exclusively for materials and supplies necessary for the completion of the student's honors project.

Students will enroll in the agriculture honors program (GENAG 000) each semester. Students will also enroll for up to 8 credits in a "special problems" course in the appropriate department to receive

credit for the honors project. In the senior year, students will enroll in GENAG 515 Honors Seminar for the presentation of their projects.

Completion of the honors project requires presentation of a summary of the project in an honors seminar and a report written in a style suitable for publication in a referred journal in an appropriate field.

## Agricultural Economics

Marc A. Johnson, Head  
Barry L. Flinchbaugh, Program Leader—  
Extension  
Arlo Biere, Undergraduate Program  
Coordinator  
Orlan Buller, Graduate Program  
Coordinator

Professors Barnaby, Barton,\* Biere,\* Borsdorf, Buller,\* Erickson,\* Fausett, Flinchbaugh, Johnson,\* L. Langemeier,\* Maxon, Norman,\* Phillips,\* Riley,\* Schlender, Schurle,\* and Williams;\* Associate Professors Burton,\* Darling, Featherstone,\* Grunewald,\* Kiser, Mintert,\* Schroeder,\* and Tierney; Assistant Professors Ables-Allison, Barkley,\* Carriker, DeLano, Dhuyvetter, Diebel, Duncan, Goodwin,\* Hugo, Lea, M. Lange-  
meier, Neils, Nelson, Vandevier, War-  
mann, Wilson, Worman, and Young; Instructor Beech; Emeriti: Professors Dun-  
bar, Figurski, Hess,\* Kelley,\* Knight,\* Koudele,\* Manuel,\* McCoy,\* McReynolds, Orazem,\* Parker, Pine,\* Schru-  
ben,\* Sjo,\* Sobering, Sorenson,\* Thomas,  
and Walker.

### Agribusiness

Bachelor of science in agribusiness  
127 semester hours

Bachelor of science in agriculture  
127 semester hours

Agribusiness is the study of the economics and management of agribusiness firms with attention given to the aspects unique to agribusiness. Some of those aspects are the risks and uncertainties of agricultural production, the heavy reliance on natural resources, the uniqueness of the institu-  
tions that govern food and agriculture, the competitive structures within the agribusi-  
ness sector, the technology of commercial agriculture and food processing, and the international dimensions of food and agriculture. The agribusiness curriculum emphasizes agribusiness courses in agricultural economics and foundation courses in business administration.

### Suggested schedule for first two years

#### First semester

ENGL 100	Expository Writing I	3
MATH 100	College Algebra	3
AGEC 105	Agricultural Economics and Agribusiness Orientation	1
KIN 101	Principles of Physical Fitness	1
Agricultural or food science elective*		3-4
Social science elective***		3
		14-15

#### Second semester

ENGL 120	Expository Writing II	3
MATH 205	Calculus and Linear Algebra	3
AGEC 120	Agricultural Economics and Agribusiness	3
SPCH 105	Public Speaking IA	2
Natural science elective****		4-5
		15-16

#### Third semester

ECON 110	Principles of Macroeconomics	3
Natural science elective****		4-5
Social science elective***		3
Humanities elective**		3
Communications elective (English course numbered 200 or above, speech course numbered 200 or above, or a modern language course)		3
		16-17

#### Fourth semester

AGEC 318	Agribusiness Management (for agribusiness majors)	
or		
AGEC 308	Farm and Ranch Management (for farm management majors)	
or		
Agricultural economics elective		3
ACCTG 231	Accounting for Business Operations	3
Agricultural or food science elective*		3-4
Humanities electives**		3
Social science electives***		3
		15-16

\*Select from the agricultural and food science electives below.

\*\*Select from history, music, art, English, philosophy, theatre, dance, and modern language.

\*\*\*Select from psychology, sociology, political science, anthropology, and history.

\*\*\*\*Select from General Chemistry, Principles of Biology, and General Physics.

#### Agricultural and food science electives

AGRON 220	Crop Science	
or		
HORT 200	Plant Science	4
AGRON 305	Soils	4
AGRON 330	Weed Management	3
ATM 300	Engineering in Agriculture	4
ASI 102	Principles of Animal Science	3
and		
ASI 103	Dairy Science	
or		
ASI 104	Poultry Science	
or		
ASI 105	Animal Science and Industry	1
ASI 300	Principles of Livestock Feeding	3
ENTOM 300	Economic Entomology	3
PLPTH 500	Principles of Plant Pathology	3
FOR 285	Introduction to Forestry	3
HORT 520	Fruit Production	3
HORT 560	Vegetable Crop Ecology	3
AGRON 340	Grain Grading	2
ASI 350	Meat Science	2
ASI 361	Meat Processing	2
ASI 302	Introduction to Food Science	3
GRSC 305	Fundamentals of Food Processing	
or		
ASI 305	Fundamentals of Food Processing	3

GRSC 100	Principles of Milling	3
GRSC 120	Introductory Bakery Technology	2
GRSC 121	Introductory Bakery Technology Laboratory	1
FN 132	Basic Nutrition	3
FN 301	Trends in Food Products	3

### Additional requirements for B.S. in agribusiness

ACCTG 241	Accounting for Investing and Financing	3
AGEC 490	Computer Applications	2
AGEC 500	Production Economics	3
AGEC 505	Agricultural Market Structures	3
AGEC 515	Agribusiness Marketing	3
AGEC 599	Agribusiness Management Strategies	3

### Agricultural economics electives (including at least one numbered 600 or above) 15

AGEC 410	Agricultural Policy	
AGEC 416	Agricultural Law and Economics	
AGEC 417	Rural Banking	
AGEC 420	Commodity Futures Markets	
AGEC 421	Livestock and Meat Marketing	
AGEC 422	Grain Marketing	
AGEC 513	Agricultural Finance	
AGEC 525	Natural Resource Economics	
AGEC 598	Farm Management Strategies	
AGEC 605	Price Analysis and Forecasting	
AGEC 610	Agricultural and Natural Resource Policy	
AGEC 615	International Agricultural Development	
AGEC 623	International Agricultural Trade	
AGEC 631	Principles of Transportation	
AGEC 632	Agribusiness Logistics	
AGEC 710	Advanced Agribusiness Management	
AGEC 712	Linear Programming Application	
AGEC 736	Natural Resource Policy	

### Two of the following 6

FINAN 450	Business Finance	
MANGT 420	Management Concepts	
MKTG 400	Marketing	

### Business elective 3

ECON 510	Intermediate Macroeconomics	
<b>or</b>		
ECON 530	Money and Banking	3
Agricultural and food science electives 4-6		
Statistics 3-6		
Free electives 10-14		

### Total including first two years 127

Either AGEC 513 or FINAN 450 must be included in the program of study.

## Agricultural economics

Agricultural economics is the study of the economic factors affecting agricultural production, food consumption, commodity marketing, farm management, natural resource use and management, and agricultural finance and trade.

### Farm management option

This option includes course work in livestock and crop production, agricultural mechanization, and in agricultural economics applied to farm management.

The suggested schedule for the first two years is the same as that for the agribusiness degree except that ASI 102 and a laboratory and AGRON 220 are the required agricultural science courses. The additional requirements are below.

AGEC 490	Computer Applications	2
AGEC 500	Production Economics	3
AGEC 505	Agricultural Market Structures	3
AGEC 513	Agricultural Finance	3
AGEC 598	Farm Management Strategies	3

### Agricultural economics electives (including at least one numbered 600 or above) 15

AGEC 410	Agricultural Policy	
AGEC 416	Agricultural Law and Economics	
AGEC 417	Rural Banking	
AGEC 420	Commodity Futures Markets	
AGEC 421	Livestock and Meat Marketing	
AGEC 422	Grain Marketing	
AGEC 515	Agribusiness Marketing	
AGEC 525	Natural Resource Economics	
AGEC 599	Agribusiness Management Strategies	
AGEC 605	Price Analysis and Forecasting	
AGEC 610	Agricultural and Natural Resource Policy	
AGEC 615	International Agricultural Development	
AGEC 623	International Agricultural Trade	
AGEC 631	Principles of Transportation	
AGEC 632	Agribusiness Logistics	
AGEC 710	Advanced Agribusiness Management	
AGEC 712	Linear Programming Application	
AGEC 736	Natural Resource Policy	

### ACCTG 241 Accounting for Financing and Investing 3

### AGRON 305 Soils 4

### ECON 510 Intermediate Macroeconomics

### or

### ECON 530 Money and Banking 3

### Statistics 3-6

### Advanced agricultural science electives (approved list available from department) 9

### Agricultural technology management electives (approved list available from department) 3-4

### Electives 6-11

### Total including first two years 127

## Specialty option

This option allows students to combine agricultural economics with a specialty of 15 hours in another department or field.

Requirements for the first two years are the same as for the agribusiness degree. Additional requirements are below.

### AGEC 490 Computer Applications 2

### AGEC 500 Production Economics 3

### AGEC 505 Agricultural Market Structures 3

### ACCTG 241 Accounting for Finance and Investing 3

### ECON 510 Intermediate Macroeconomics

### or

### ECON 530 Money and Banking 3

### Statistics 3-6

### Agricultural economics electives (including at least two numbered 598 or above) 21

### AGEC 308 Farm and Ranch Management

### or

### AGEC 318 Agribusiness Management

### AGEC 410 Agricultural Policy

### AGEC 416 Agricultural Law and Economics

### AGEC 417 Rural Banking

### AGEC 420 Commodity Futures Markets

### AGEC 421 Livestock and Meat Marketing

### AGEC 422 Grain Marketing

### AGEC 513 Agricultural Finance

### AGEC 515 Agribusiness Marketing

### AGEC 525 Natural Resource Economics

### AGEC 598 Farm Management Strategies

### AGEC 599 Agribusiness Management Strategy

### AGEC 605 Price Analysis and Forecasting

### AGEC 610 Agricultural and Natural Resource Policy

### AGEC 615 International Agricultural Development

### AGEC 623 International Agricultural Trade

### AGEC 631 Principles of Transportation

### AGEC 632 Agribusiness Logistics

### AGEC 710 Advanced Agribusiness Management

### AGEC 712 Linear Programming Application

### AGEC 736 Natural Resource Policy

### Specialization in a second department or field, at least 6 credit hours at 500 level or higher 15

### Electives 10-14

### Total including first two years 127

## Professional option

This option requires additional mathematics, statistics, or computer science to prepare the student for advanced studies in agricultural economics.

Requirements for the first two years are the same as for the agribusiness degree. Additional requirements are below.

### AGEC 490 Computer Applications 2

### AGEC 500 Production Economics 3

### AGEC 505 Agricultural Market Structures 3

### ACCTG 241 Accounting for Finance and Investing 3

### CIS 200 Fundamentals of Computer Programming 2

### Computer programming laboratory 2

### STAT 350 Business and Economic Statistics I 3

### STAT 351 Business and Economic Statistics II 3

### MATH 551 Applied Matrix Theory 3

### ECON 510 Intermediate Macroeconomics 3

### Agricultural economics electives (including at least two numbered 598 or above) 24

### AGEC 308 Farm and Ranch Management

### or

### AGEC 318 Agribusiness Management

### AGEC 410 Agricultural Policy

### AGEC 416 Agricultural Law and Economics

### AGEC 417 Rural Banking

### AGEC 420 Commodity Futures Market

### AGEC 421 Livestock and Meat Marketing

### AGEC 422 Grain Marketing

### AGEC 513 Agricultural Finance

### AGEC 515 Agribusiness Marketing

### AGEC 525 Natural Resource Economics

### AGEC 598 Farm Management Strategies

### AGEC 599 Agribusiness Management Strategies

### AGEC 605 Price Analysis and Forecasting

### AGEC 610 Agricultural and Natural Resource Policy

### AGEC 615 International Agricultural Development

### AGEC 623 International Agricultural Trade

### AGEC 631 Principles of Transportation

### AGEC 632 Agribusiness Logistics

### AGEC 710 Advanced Agribusiness Management

### AGEC 712 Linear Programming Application

### AGEC 736 Natural Resource Policy

### Electives 17-18

### Total including first two years 127

## Agricultural economics courses

### Undergraduate credit

#### AGEC 105. Agricultural Economics and Agribusiness

**Orientation.** (1) I, II. Introduction to agricultural economics and agribusiness programs, activities, resources, and careers. Required of all students beginning a major in agricultural economics or agribusiness at K-State. One hour lec. a week.

#### AGEC 120. Agricultural Economics and Agribusiness.

(3) I, II. A course suggested for all students interested in the agricultural economy. A study of economic principles, with emphasis on their application to the solution of farm, agribusiness, and agricultural industry problems in relationship to other sectors of the United States economy and foreign countries. No prerequisite. Three hours lec. a week.

#### AGEC 308. Farm and Ranch Management. (3) I.

Decision-making process, cost concepts, farm records and financial management, budgeting, time value of money, and whole farm/ranch planning. Two hours rec. and two hours lab. a week. Pr.: AGEC 120 or ECON 120.

**AGEC 318. Agribusiness Management.** (3) I, II. A study of marketing, production, risk, and financial management in agribusiness firms. Particular attention is given to the application of economic principles to the management of marketing and farm supply firms. Pr.: AGECE 120 or ECON 120.

**AGEC 410. Agricultural Policy.** (3) I. Analytical treatment of recent and current economic problems and governmental policies and programs affecting American agriculture; includes price and income, rural development, and rural poverty problems. Pr.: AGECE 120 or ECON 120 or ECON 110 and junior standing.

**AGEC 416. Agricultural Law and Economics.** (3) I. The legal framework for decision making by farm firms, families, and individuals; liabilities, real and personal property, contracts, uniform commercial code, organization of farm firms, intergenerational property transfers, water law, fence law, federal and state regulatory power, insurance, income tax, and social security. Three hours rec. a week. Pr.: ECON 110 and junior standing.

**AGEC 417. Rural Banking.** (3) II. Bank management in rural areas, place of rural banks in the banking system, asset appraisal, loan analysis, focused on banks serving the credit needs of farmers, small town businesses and rural consumers. Two hours rec. and two hours lab. a week, including guest speakers. Pr.: ECON 110 and ACCTG 231 or AGECE 308 or AGECE 318.

**AGEC 420. Commodity Futures Markets.** (2) I, II. The evaluation, function, mechanics analysis, and application of the commodity futures markets are discussed. Topics include fundamental commodity price analysis; technical analysis, hedging, and forward pricing applications; options on futures contracts; and sources, uses, and interpretation of commodity market information. Two hours rec. a week. Pr.: AGECE 120 or ECON 120.

**AGEC 421. Livestock and Meat Marketing.** (2) II. A study of the market structure and organization of the livestock meat economy, with emphasis on factors affecting prices, changing competitive market arrangements, and marketing problems of farmers and ranchers, market agencies, and processing firms. Two hours rec. a week. Pr.: AGECE 120 or ECON 120, and AGECE 420 or conc.

**AGEC 422. Grain Marketing.** (2) I. Price influences and relationships, market structure, buying and selling problems, domestic and export trade; grain trade organization and regulation. Two hours rec. a week, including field trips. Pr.: AGECE 120 or ECON 120, and AGECE 420 or conc.

**AGEC 441. Agricultural Economics and Agribusiness Seminar.** (Var.) Seminars of special interest will be offered upon sufficient demand in selected areas relating to agricultural economics and agribusiness or competitive teams qualifying for academic credit.

**AGEC 445. Agribusiness Internship.** (1-3) I, II, S. Approved and supervised work-study programs in various areas of agribusiness. Project reports required. Pr.: Junior standing and prior departmental approval.

**AGEC 490. Computer Applications in Agricultural Economics and Agribusiness.** (2) I, II. Applications of microcomputers to problems in agricultural economics and agribusiness. Emphasis on budgeting, cash flow, record keeping, financial analysis, statistical analysis, linear programming, and data analysis. Two hours rec. a week. Pr.: AGECE 105, AGECE 120 or ECON 120, and MATH 100.

## Undergraduate and graduate credit in minor field

**AGEC 500. Production Economics.** (3) I, II. Application of economic principles to problems of agriculture. Economic structure and aspects of American agriculture; analysis of demand, supply, production of agricultural products with particular reference to the firm. AGECE 505 is a continuation of this course and they are intended to be taken in consecutive semesters. Three hours rec. a week. Pr.: AGECE 120 or ECON 120 and MATH 205.

**AGEC 505. Agricultural Market Structures.** (3) I, II. Theory and application of economic principles to marketing problems in agriculture. Pricing of agricultural output and productive services under various forms of economic organization and competition; regional specialization, location, and trade; determinants of economic change; evaluation of economic and consumer welfare. Three hours rec. a week. Pr.: ECON 110 and AGECE 500.

**AGEC 513. Agricultural Finance.** (3) I. Analysis of capital investments, interpretation of financial statements, capital structure considerations for agricultural firms, and farm real estate pricing. Three hours rec. a week. Pr.: AGECE 308 or AGECE 318 and ACCTG 211.

**AGEC 515. Agribusiness Marketing.** (3) I. A broad view of marketing; food markets and consumption; marketing functions and institutions; prices, competition, and marketing costs; functional and organizational issues; food marketing regulations; commodity marketing. Three hours rec. a week. Pr.: AGECE 120 or ECON 120.

**AGEC 525. Natural Resource Economics.** (3) I. Emphasis on the application of welfare economics concepts in the study of current natural resource uses, policies, and problems. Introductory course for students interested in problems of natural resource use and environmental quality. Three hours rec. a week. Pr.: ECON 110 and junior standing.

**AGEC 541. Agricultural Economics and Agribusiness Seminar.** (Var.) Seminars of special interest will be offered upon sufficient demand in selected areas relating to agricultural economics and agribusiness.

**AGEC 598. Farm Management Strategy.** (3) I. A study of management concepts, tools, and decision strategies applied to farm firms. Alternative measures of farm business performances, as well as planning and evaluation techniques for an uncertain economic environment are examined. Three hours rec. a week. Pr.: AGECE 308, AGECE 500 and AGECE 513.

**AGEC 599. Agribusiness Management Strategy.** (3) II. This course integrates the risk, production, marketing, and financial management strategies of agribusiness firms. Special attention is given to the application of economic theory and quantitative analysis to business decision-making processes. In addition to case studies, a variety of analytical techniques will focus on both markets and firms involved in the production and marketing of food commodities. Three hours lec. a week. Pr.: AGECE 318, AGECE 500, AGECE 513 or FINAN 450, AGECE 515.

## Undergraduate and graduate credit

**AGEC 605. Price Analysis and Forecasting.** (3) II. The analysis of selected agricultural prices; application of regression analysis to price analysis, the role of futures markets and market efficiency, optimal hedging strategies, commodity option pricing, and price forecasting. Three hours rec. a week. Pr.: STAT 330 or 351; AGECE 490, AGECE 505 or ECON 520.

**AGEC 610. Agricultural and Natural Resource Policy.** (3) II. Analytical treatment of government intervention in agriculture. The role of the economist in policy formation. Welfare economics applications to specific agricultural and natural resource policies, including resource mobility and the role of education. Both domestic and international policies are considered. Pr.: AGECE 505 and AGECE 525 or AGECE 410.

**AGEC 615. International Agricultural Development.** (3) II. A study of principles of economic development and national and international policies that will stimulate development. Individual study is encouraged to meet student interests for understanding the problems and policies for agricultural development and the influence of such development on international policies of the United States. Three hours rec. a week. Pr.: ECON 110.

**AGEC 623. International Agricultural Trade.** (3) II. Applied economics of export marketing. Emphasis on international trade in agricultural products and understanding the international marketing system within which export sales of agricultural and food products take place. Three hours rec. a week. Pr.: AGECE 505.

**AGEC 631. Principles of Transportation.** (3) II, some S. The historical development and economic importance of rail, motor, air, water, and pipeline transportation in the United States—routes, services, rates, public regulation. Pr.: ECON 110.

**AGEC 632. Agribusiness Logistics.** (3) I. Planning for efficient use of transportation, storage and processing facilities in the handling of raw materials and products for agribusiness firms, controlling shipments and inventory in coordination with warehouse and handling operations, and scientific selection of routes, schedules, and equipment. Pr.: ECON 110 and junior standing.

**AGEC 641. Agricultural Economics and Agribusiness Seminar.** (Var.) Seminars of special interest will be offered upon sufficient demand in selected areas relating to agricultural economics and agribusiness. Pr.: Junior standing and consent of the instructor.

**AGEC 710. Advanced Agribusiness Management.** (3) I. Application of quantitative long-range planning tools for agribusiness. Two hours rec. and two hours lab a week. Pr.: AGECE 318 or graduate standing.

**AGEC 712. Linear Programming Applications in Agricultural Economics.** (3) II. Application of linear programming and related topics for decision analysis in agricultural firms. Pr.: AGECE 500.

**AGEC 736. Natural Resource Policy.** (3) I. Economic evaluation of resource use policies and impact of those policies on welfare economics. Applications of welfare economics concepts. Externalities are emphasized. For intermediate-level, upper-division undergraduates with a strong economics background, beginning graduate students in economics, and other graduate students. Pr.: Six credit hours in agricultural economics and economics, and junior standing.

**AGEC 740. Seminar in Agricultural Economics Analysis.** (Var.) Seminar on methods of economic analysis will be offered upon sufficient demand. Pr.: Consent of instructor.

**AGEC 750. Agricultural Economics and Agribusiness Problems.** (Var.) I, II, S. Pr.: Junior standing and consent of the instructor.

# Agricultural Education

Advisors—Harbstreet, Parmley, and Welton

## Agricultural education

Bachelor of science in agriculture  
132 semester hours

Agricultural education involves the broad study of agriculture including a core of course work in agricultural economics, agronomy, animal science, agricultural technology management, and horticulture.

Agricultural education is designed for students who wish to meet requirements to teach agriculture in a public school setting. Graduates in this option meet Kansas State Board of Education certification requirements. An area of occupational emphasis in agribusiness, agricultural production, agricultural technology management, horticulture, or natural resources is available.

Ten weeks during the first or second semester of the senior year are devoted to full-time student teaching. On-campus courses meet during the first six weeks of the semester. When student teaching in the spring, fall semester courses are moved to spring semester.

## Freshman

### First semester

SPCH 105	Public Speaking IA	2
ATM 151	Agricultural Mechanics Practices	2
EDSEC 300	Introduction to Agricultural Education	1
ENGL 100	Expository Writing I	3
MATH 100	College Algebra	3
KIN 101	Principles of Physical Fitness	1
	Agricultural science/agricultural technology management electives	4
		<u>16</u>

### Second semester

CHM 110	General Chemistry	5
ENGL 120	Expository Writing II	3
AGEC 120	Agricultural Economics and Agribusiness	3
HOR1 200	Plant Science	4
	or	
AGRON 220	Crop Science	4
		<u>15</u>

## Sophomore

### First semester

ACCTG 231	Accounting for Business Operations	3
BIOL 198	Principles of Biology	4
CIS 110	Introduction to Personal Computing	3
	or	
CIS 200	Fundamentals of Computer Programming plus lab	4
	or	
STAT 320	Elements of Statistics	3
EDCEP 215	Educational Implications of Growth and Development	3
ASI 102	Principles of Animal Science	3
		<u>16-17</u>

### Second semester

AGRON 305	Soils	4
ATM 351	Engine and Tractor Power	3
ASI 300	Principles of Livestock Feeding	3
	or	
ASI 500	Genetics	3
EDSEC 400	Leadership and Personal Development	1
	Social science electives	3
	Humanities electives	3
		<u>17</u>

## Junior

### First semester

AGEC 308	Farm and Ranch Management	3
EDCEP 315	Educational Psychology	3
EDSP 323	Exceptional Students in the Secondary School	2
EDSEC 376	Core Teaching Skills and Lab	3
EDSEC 505	Field Experience/Agricultural Education	1
EDSEC 620	Principles of Vocational Education	3
ANTH 200	Introduction to Cultural Anthropology	3
		<u>18</u>

## Second semester

EDSEC 477	Middle Level/Secondary Reading	2
EDSEC 420	Block II Lab	1
EDSEC 621	Program Planning in Vocational Education	3
ATM 659	Agricultural Mechanics Methods	3
EDETC 318	Instructional Media and Technology	2
	Humanities electives	3
	Agricultural science/agricultural technology management electives	3
		<u>17</u>

## Senior

### First semester

EDSEC 503	Teaching Adults Agriculture	1
EDCIP 455	Teaching in a Multicultural Society	1
EDCEP 525	Interpersonal Relations in the Schools	1
EDSEC 500	Methods of Teaching Agriculture	2
EDSEC 586	Teaching Participation in the Secondary School and Professional Development Seminar	10
		<u>15</u>

### Second semester

AGEC 318	Agribusiness Management	3
	Agronomy and/or horticulture course	3
	Agricultural science/agricultural technology management elective	4
	Humanities electives	2
	Social science electives	3
	Agricultural technology management courses	3
		<u>18</u>

# Agricultural Journalism

Advisor—Erpelding

## Agricultural journalism

Bachelor of science in agriculture  
127 semester hours

The major in agricultural journalism prepares students for various communication positions in newspaper, magazine, radio-television, public relations, and agricultural information. Students in agricultural journalism have access to the Associated Press wire service, FM radio facilities, desktop publishing equipment, television studio and portable equipment, and photographic equipment and laboratory.

Enrollment in all skills courses in the School of Journalism and Mass Communications requires a minimum of 2.5 GPA based on completion of at least 30 hours at the 100 level or above.

Students majoring in this curriculum take the following courses:

### General requirements

ENGL 100	Expository Writing I	3
ENGL 120	Expository Writing II	3
SPCH 105	Public Speaking IA	2
GENAG 101	Ag Orientation	1
MATH 100	College Algebra	3
ECON 110	Principles of Macroeconomics	3
CHM 110	Chemistry I	4
	<b>or</b>	
CHM 210	General Chemistry	5
KIN 101	Principles of Physical Fitness	1
	Humanities and/or social sciences	12

### Departmental requirements

Students must complete a total of 30 credit hours in agricultural courses. Area requirements are:

#### Agriculture core

Select any four courses from the following:

AGRON 305	Soils	4
HORT 200	Plant Science	4
	<b>or</b>	
AGRON 220	Crop Science	4
ASI 102	Principles of Animal Science	3
AGEC 120	Agricultural Economics and Agribusiness	3

Any course in agricultural engineering

ENTOM 300	Economic Entomology	3
	<b>or</b>	
ENTOM 305	Livestock Entomology	2
	<b>or</b>	
ENTOM 320	Horticultural Entomology	3
PLPTH 500	Principles of Plant Pathology	3
FOR 375	Introduction to Natural Resource Management	3
ASI 302	Introduction to Food Science	3

#### Biological sciences

Required:		
BIOL 198	Principles of Biology	4
	<b>or</b>	
BIOL 210	General Botany	4
One of the following:		
ASI 500	Genetics	3
BIOL 201	Organismic Biology	5
BIOL 220	Bacteriology and Man	3
BIOL 303	Ecology of Environmental Problems	3

#### Statistics and computer science

Select one course from the following:		
CIS 110	Introduction to Personal Computing	3
CIS 200	Fundamentals of Computer Programming	2
	<b>and</b>	
	Computer language lab (200 level)	2
STAT 340	Biometrics I	3
STAT 350	Business and Economic Statistics I	3
	<b>or</b>	
STAT 330	Elementary Statistics for the Social Sciences	3

#### Physical science

Select one course from the following:		
BIOCH 265	Introductory Organic and Biological Chemistry	5
BIOCH 201	Elementary Biochemistry	3
BIOCH 521	General Biochemistry	3
CHM 230	Chemistry II	4
CHM 350	General Organic Chemistry	3
CHM 531	Organic Chemistry I	3
GEOG 100	Introductory Geology	3
GEOG 220	Environmental Geography I	4

#### Business administration and agricultural economics

Required:		
ACCTG 231	Accounting for Business Operations	3
One of the following:		
ACCTG 241	Accounting for Investing and Financing	3
AGEC 318	Agribusiness Management	3
ECON 530	Money and Banking	3
ECON 631	Principles of Transportation	3
MANGT 202	Small Business Operation	3
MANGT 390	Business Law I	3
MANGT 420	Management Concepts	3
MKTG 400	Marketing	3
MKTG 542	Sales Management	3
All other courses in AGECEC with a 300 or higher course number		

#### Agricultural specialization

In consultation with the advisor, the student will decide to study one area of agriculture in depth. The student will take two courses above the introductory level (advanced courses are defined as those with a prerequisite in that agriculture department).

#### Agricultural electives

Students may choose any other courses in the College of Agriculture to complete the 30 hours of agriculture.

#### Journalism

Students must complete a minimum of 30 hours in journalism and mass communications courses. Maximum journalism hours allowed is 36.

#### Journalism core

These 18 hours are required of all students. Enrollment in all skills courses, including News and Feature Writing, requires a minimum of 2.5 GPA based on completion of at least 30 hours at the 100 level or above.

JMC 235	Mass Communication in Society
JMC 275	News and Feature Writing

JMC 280	Editing and Design
JMC 500	Advanced News and Feature Writing
JMC 565	Law of Mass Communications
JMC 575	History of Journalism
	<b>or</b>
JMC 570	Ethics of Mass Communications

Journalism electives—remaining 12 to 18 hours in journalism may be chosen by the student in consultation with the faculty advisor.

# Agricultural Technology Management

Faculty—Baugher, Chung,\* Clark,\* Heber,\* Huang,\* Manges,\* Schrock,\* Slocombe,\* Spillman,\* and Steichen.\*

## Agricultural technology management

Bachelor of science in agriculture  
127 semester hours

Agricultural technology management emphasizes the application and integration of agricultural/biological sciences, agricultural engineering systems, and business to manage human and natural resources in the production and processing of food and agricultural products. It prepares men and women for technical management positions in food and agricultural industries that require an understanding of both technology and management. Agricultural technology management graduates are typically employed in technical sales, agricultural product and food processing, manufacturing technology, and technical services.

The technological courses are applications-oriented, and focus on practical experience in food processing systems, soil and water management, power and machinery systems, electrical systems and electronics, and agricultural building systems. Business courses include accounting, marketing, management, law and finance, and economics. Supporting courses provide a foundation of mathematics, chemistry, and computer and communication skills. Technical electives are available to develop a degree program that meets personal career objectives.

The curriculum is administered by the Department of Agricultural Engineering and leads to the bachelor of science degree in agriculture with a major in agricultural technology management.

### General requirements

ENGL 100	Expository Writing I	3
ENGL 120	Expository Writing II	3
SPCH 105	Public Speaking IA	2
KIN 101	Principles of Physical Fitness	1
GENAG 101	Ag Orientation	1
ECON 110	Principles of Macroeconomics	3

AGEC 120	Agricultural Economics and Agribusiness .....	3
	<b>or</b>	
ECON 120	Principles of Microeconomics .....	3
MATH 100	College Algebra .....	3
MATH 150	Plane Trigonometry .....	3
MATH 205	General Calculus and Linear Algebra .....	3
CHM 110	General Chemistry .....	5
	<b>or</b>	
CHM 210	Chemistry I .....	4
BIOL 198	Principles of Biology .....	4
PHYS 113	General Physics I .....	4
PHYS 114	General Physics II .....	4
ME 212	Engineering Graphics I .....	2
CIS 110	Introduction to Personal Computing .....	3
ACCTG 231	Accounting for Business Operations .....	3
HORT 200	Plant Science .....	4
	<b>or</b>	
AGRON 220	Crop Science .....	4
AGRON 305	Soils .....	4

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**Departmental requirements**

AFM 351	Engine and Tractor Power .....	3
ATM 440	Introduction to Food Engineering Technology .....	3
ATM 450	Functional Components of Machinery .....	3
ATM 511	Agricultural Building Systems .....	3
ATM 558	Soil Erosion and Sediment Pollution Control .....	3
ATM 563	Electrical Systems and Controls .....	3

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**Humanities and social science electives**

Humanities and social science electives .....	12
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**Free electives**

Free electives .....	1-2
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**Communication elective**

Select one of the following:

ENGL 415	Written Communication for Engineers .....	3
ENGL 516	Written Communication for the Sciences .....	3

A second semester of modern language can substitute for the communication elective.

**Option requirements**

A specific option requires a minimum of 6 hours of additional agricultural technology management course work.

A total of 35 hours is required. Requirements for the various options are listed below.

**Production option**

ASI 102	Principles of Animal Science .....	3
BIOCH 265	Introduction to Organic and Biological Chemistry .....	5
ATM electives (other than ATM 300 and required courses) .....	9	
An additional course in biology, plant pathology, entomology, or genetics .....	3	
Business administration or agricultural economics elective .....	3	
Technical elective .....	3	

Choose at least 9 hours from one of these three groups: animal sciences, crop and soil sciences, or agricultural economics

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**Animal sciences**

ASI 300	Principles of Livestock Feeding .....	3
ASI 318	Fundamentals of Nutrition .....	3

ASI 320	Principles of Feeding (cannot take 300 and 320) .....	3
ASI 500	Genetics .....	3
ASI 515	Beef Science .....	3
ASI 524	Sheep Science .....	2
ASI 535	Swine Science .....	3
ASI 545	Range Livestock Management .....	2
ENTOM 305	Livestock Entomology .....	2
Other ASI courses may be selected with consent of the advisor.		

**Crop and soil sciences**

AGRON 330	Weed Management .....	3
AGRON 375	Soil Fertility .....	3
AGRON 385	Soil Fertility Lab .....	2
AGRON 501	Range Management .....	3
AGRON 520	Grain Production .....	3
AGRON 525	Crop and Soil Management .....	3
AGRON 635	Soil Conservation .....	3
AGRON 746	Physical Properties of Soils .....	3
ENTOM 300	Economic Entomology .....	3
PLPTH 500	Principles of Plant Pathology .....	3
Other agronomy, horticulture, entomology, and plant pathology courses may be selected with consent of the advisor.		

**Agricultural economics**

Any agricultural economics course numbered 300 or above.

**Business and industry option**

ASI 102	Principles of Animal Science .....	3
	<b>or</b>	
ASI 302	Introduction to Food Science .....	3
ATM electives (other than ATM 300 and required courses) .....	6	
Agricultural economics electives (300 and above) .....	9	
Free electives .....	5	

Choose two of the following:

ACCTG 241	Accounting for Investing and Financing .....	3
MKTG 400	Marketing .....	3
MANGT 420	Management Concepts .....	3

Choose at least 6 hours from this list:

ACCTG 241	Accounting for Investing and Financing .....	3
MKTG 400	Marketing .....	3
MKTG 450	Consumer Behavior .....	3
MANGT 390	Business Law I .....	3
MANGT 420	Management Concepts .....	3
FINAN 450	Business Finance .....	3
ECON 510	Intermediate Macroeconomics .....	3
ECON 530	Money and Banking .....	3
ECON 681	International Trade .....	3
IE 501	Industrial Management .....	3
IE 502	Industrial Management II .....	3
Any AGECE course 300 and above.		

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Other economics or business administration courses may be selected with consent of the advisor.

**Process operations option**

BIOCH 265	Introduction to Organic and Biological Chemistry .....	5
ASI 302	Introduction to Food Science .....	3
ATM 441	Introduction to Food Engineering Technology Lab .....	1
ATM electives (other than ATM 300 and required courses) .....	9	
ASI 411	Introductory Food Chemistry .....	3
ASI 694	Food Plant Management .....	2
	<b>or</b>	
MANGT 420	Management Concepts .....	3

Choose 11 or 12 hours from this list:

ATM 651	Managing Farm Grains and Forage .....	3
AGEC 515	Agribusiness Marketing .....	3
ASI 430	Food Products Evaluation .....	3
ASI 502	Principles of Dairy Foods Processing .....	4
ASI 606	Instrumental Analysis of Food and Agricultural Products .....	2

ASI 694	Food Plant Management .....	3
ASI 725	Food Analysis .....	3
GRSC 500	Milling Technology I .....	4
GRSC 505	Cereal and Feed Analysis .....	3
GRSC 602	Cereal Science .....	3
GRSC 651	Food and Feed Plant Sanitation .....	4
GRSC 655	Flour and Feed Mill Construction .....	3
GRSC 710	Fundamentals of Grain Storage .....	2
GRSC 715	Fundamentals of Processing Grains for Food .....	3

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Other food or process related courses may be selected with consent of advisor.

**Agricultural technology management courses****ATM 020. Agricultural Technology Management****Assembly.** (0) I, II. Presentation of professional problems and practices by students, faculty, and professionals associated with agricultural technology and systems. One hour lec. a month.**Undergraduate credit****ATM 151. Agricultural Mechanics Practices.** (2) I, II.

An introduction to mechanics practices and skills basic to the repair, maintenance, and construction of tools and equipment. Includes arc, mig, and oxyacetylene welding, soldering, tool conditioning, and hot and cold metal work. Six hours lab a week.

**ATM 300. Engineering in Agriculture.** (4) I, II.

An introduction to the application of basic engineering principles concerning agricultural power and machinery, soil and water conservation and irrigation, agricultural structures, and the use of electricity when applied to circuits, controls, motors, and crop conditioning, handling, and storage systems. Three hours rec. and two hours lab a week. Pr.: MATH 100.

**ATM 323. Tillage, Planting, and Crop Harvesting****Systems.** (3) I, II. Recitation *only* of ATM 324 and ATM 325 to include operation, adjustment, and maintenance of primary and secondary tillage machinery; planting, herbicide, and fertilizer equipment; grain and forage harvesting machinery. Emphasis on tillage, planting, and crop harvesting systems. Student cannot receive credit for ATM 323 and ATM 324 or ATM 325. Three hours rec. a week. Pr.: AGRON 305.**ATM 324. Tillage and Planting Machinery.** (2) I, II.

Primary and secondary tillage machinery power requirements and field operations; planting equipment, herbicide placement and incorporation, fertilizer application, tillage-planting systems, and cost analysis. Three hours rec. and two hours lab a week for first half of semester. Pr.: AGRON 305.

**ATM 325. Crop Harvesting and Handling Systems.** (2)

I, II. Grain harvesting machinery, fundamentals of operation, adjustment, and maintenance. Hay, forage, and crop residue handling systems; machine components, machine operation and maintenance, system selection and cost. Three hours rec. and two hours lab a week for second half of semester.

**ATM 351. Engine and Tractor Power.** (3) I, II.

Operating principles of the internal combustion engine, ignition, fuel and lubricating systems, engine cooling, hydraulics, tune-up, maintenance, and tractor efficiency. Small engine power units and farm tractors receive greatest emphasis. Two hours rec. and three hours lab a week. Pr.: MATH 100.

**ATM 440. Introduction to Food Engineering****Technology.** (3) I. Material and energy balances with application to food processing. Fluid flow and heat transfer in food processing. Thermodynamic properties and laws. Conc. enrollment in ATM 441 is urged. Three hours rec. a week. Pr.: PHYS 113 or 115 and MATH 210 or 205.**ATM 441. Introduction to Food Engineering****Technology—Laboratory Exercises.** (1) I. Laboratory experiments supplementing ATM 440. Three hours lab a week. Pr. or conc.: ATM 440.

**ATM 450. Functional Components of Machinery.** (3) II. Components used to transmit power on machinery and to perform functional operations. Emphasis on bearing and hydraulic systems; gear, chain, belt, and power-take-off drives. Three hours rec. a week. Pr.: PHYS 113.

**ATM 460. Internship in Agricultural Technology Management.** (1-3) I. Intern programs in various areas of agricultural technology management. One hour of credit for each four weeks of supervised and evaluated off-campus work experience with cooperating employers. Written report required. A maximum of 3 hours may be applied to a B.S. in agricultural technology management. Pr.: Junior standing.

### Undergraduate and graduate credit in minor field

**ATM 511. Agricultural Building Systems.** (3) II. Concepts and fundamentals related to agricultural building systems including structural materials, beam and column strength, environmental control for plants and animals, farmstead layouts, crop storage, livestock and plant production facilities, and waste management. Three hours rec. a week. Pr.: PHYS 113 or 115 or CIIM 110.

**ATM 526. Agricultural and Industrial Hydraulics.** (2) I. This course is concerned with hydraulics and pneumatics as applied to agricultural and industrial equipment. Major emphasis is given to operating principles, components, accessories, fluids, circuits, and system maintenance. Two hours rec. a week. Pr.: MATH 100.

**ATM 527. Agricultural and Industrial Hydraulics Lab.** (1) I. Laboratory experiences supplementing ATM 526. Two hours lab a week. Pr. or conc.: ATM 526.

**ATM 558. Soil Erosion and Sediment Pollution Control.** (3) II. Water and wind erosion; estimating soil loss; estimating runoff rate and volume; laying out and checking terraces, waterways and farm ponds; agricultural surveying; and conservation planning. Two hours rec. and three hours lab a week. Pr.: MATH 100 and AGRON 305.

**ATM 563. Electrical Systems and Controls.** (3) I. Principles and distribution of electric power; electric load determination, service equipment selection, and circuit wiring; and selection of controls and motors. Two hours rec. and three hours lab a week. Pr.: PHYS 114 or 115.

### Undergraduate and graduate credit

**ATM 615. Problems in Agricultural Technology Management.** (Var.) I, II, S. Problems in the application of technical principles to agricultural technology management. Pr.: Approval of instructor.

**ATM 630. Agricultural Machinery Management.** (3) II, in odd years. Considerations related to selection, operation, repair, maintenance, and replacement of agricultural machinery. Emphasis on effective use of computers for decision support. Two hours rec. and three hours lab a week. Pr.: CIS 110, ATM 351 or 323 or 324 or 325.

**ATM 651. Managing Farm Grain and Forage.** (3) I. Principles of grain and forage conditioning and storage. Structures and equipment for quality preservation. Two hours rec. and three hours lab a week. Pr.: MATH 100 and junior standing.

**ATM 653. Irrigation Practices.** (3) I. Principles and practices of irrigation involved in the setup and operation of various irrigation systems on the farm. Two hours rec. and three hours lab a week. Pr.: AGRON 305.

**ATM 659. Agricultural Mechanic Methods.** (3) I, II. Methods of teaching agricultural mechanics at the high school level. This includes management procedure, curriculum planning, facilities, and organization of equipment and tools. The preparation of exercise sheets, organization, and presentation of class lessons is em-

phasized. Three hours rec. and four hours lab a week for first half of semester. Pr.: Conc. enrollment in student teaching.

**ATM 660. Farm Animal-Waste Management.** (3) II. Current practices, knowledge, and problems relating to disposal or use of farm animal wastes. Attention is given to environmental, ecological, and socio-economic consequences of alternative ways in which such wastes are accumulated, handled, and cycled back into the environment. Three hours rec. a week. Pr.: CHM 110 or 210.

**ATM 670. Private Water Supply and Waste Management.** (2) I. Principles of water supply development, pressurized systems, distribution systems, water treatment, and domestic sewage disposal. Two hours rec. a week. Pr.: CHM 110 or 210.

**ATM 702. Topics in Agricultural Technology Management.** (1) S. The selection, operational theory, repair, maintenance, adjustment, and application of equipment and materials for agricultural systems. This course will include a series of subjects covering timely topics and may be repeated as needed. Instructional materials, teaching aids and advanced methodology will be developed with respect to the topic. Pr.: ATM 659.

## Agronomy

(Crops, soils, range management, soil and water conservation)

G. L. Posler,\* Head

S. J. Thien,\* Assistant Head—Teaching

D. A. Whitney,\* Extension State Leader

Professors Kilgore, Kirkham,\* Lamond,\* Liang,\* Owensby,\* Paulsen,\* Posler,\* Regehr,\* Schapaugh,\* Sears,\* Shroyer,\* Skidmore,\* Stone,\* Swallow, Thien,\* Vanderlip,\* Welch,\* and Whitney,\* Associate Professors Armbrust,\* Bramel-Cox,\* Claassen, Cox,\* Ehler,\* Fick,\* Fjell, Havlin,\* Hickman, Janssen, Maddux,\* Mikesell, Moshier,\* Ohlenbusch, Ransom,\* and Schwab;\* Assistant Professors Brotmarkle, Burchett, Devlin, Duncan, Fritz,\* Gordon,\* Hagen,\* Ham,\* Heer, Horak,\* Kluitenberg,\* Kok, Marsh, Martin, Peterson, Pierzynski,\* Rice,\* and Skinner;\* Assistant Agronomist Roozeboom and Schaffer; Emeriti: Professors Barnett,\* Bidwell,\* Bieberly, Bohannon, Casady,\* Dicken, Edelblute, Heyne,\* Hobbs,\* Lyles,\* Mader,\* Russ,\* Smith,\* Sorenson,\* Wassom,\* Withee,\* and Woodruff;\* Associate Professors Atkinson, Harper, Overley, and Walter; Assistant Professors Lundquist and Moore; Instructor Dickerson.

### Agronomy

Bachelor of science in agriculture  
127 semester hours

Agronomy includes crop, soil, weed, range, and environmental sciences. Students in agronomy have diverse interests including crop production and physiology; crop breeding; soil management, fertility, and conservation; soil and water quality; physical and chemical properties of soils; forages; and range management.

### Requirements

Students majoring in agronomy are required to complete the following basic courses, plus those in the option that the student selects.

ENGL 100	Expository Writing I	3
ENGL 120	Expository Writing II	3
SPCH 105	Public Speaking IA	2
GENAG 101	Ag Orientation	1
MATH 100	College Algebra	3
ECON 110	Principles of Macroeconomics	3
AGRON 220	Crop Science	4
AGRON 305	Soils	4
CHM 210	Chemistry I	4
CIIM 230	Chemistry II	4
Organic chemistry		3-5
PHYS 115	Descriptive Physics	4
BIOL 198	Principles of Biology	4
	or	
BIOL 210	General Botany	4
ENTOM 300	Economic Entomology	3
CIS 110	Introduction to Personal Computing	3
	or	
AGRON 455	Computer Applications in Agronomy	3
KIN 101	Principles of Physical Fitness	1
	Humanities and/or social sciences electives	9
	Communications elective	2-3

### Options

Additional courses required for specific options:

#### Business and industry option

AGFC 120	Agricultural Economics and Agribusiness	3
AGRON 330	Weed Management	3
AGRON 360	Crop Growth and Development	3
AGRON 375	Soil Fertility	3
AGRON 385	Soil Fertility Lab	2
ASI 102	Principles of Animal Science	3
STAT 350	Business and Economics Statistics I	3
	Agricultural economics or business	12
ACCTG 231	Accounting for Business Operations	3
PLPTH 500	Principles of Plant Pathology	3

One of the following:

BIOL 529	Fundamentals of Ecology	3
ASI 500	Genetics	3
AGRON 645	Soil Microbiology	4
BIOL 455	General Microbiology	4
BIOL 500	Plant Physiology	4

#### Production option

AGRON 330	Weed Management	3
AGRON 360	Crop Growth and Development	3
AGRON 375	Soil Fertility	3
AGRON 385	Soil Fertility Lab	2
ASI 500	Genetics	3
BIOL 500	Plant Physiology	4
STAT 340	Biometrics I	3
AGEC 120	Agricultural Economics and Agribusiness	3
PLPTH 500	Principles of Plant Pathology	3
ACCTG 231	Accounting for Business Operations	3
	or	
AGEC 308	Farm and Ranch Management	3
ASI 102	Principles of Animal Science	3
	Agricultural technology management electives	3-4

One of the following:

AGRON 645	Soil Microbiology	4
BIOL 455	General Microbiology	3
BIOL 529	Fundamentals of Ecology	3
GEOL 100	Introductory Geology	3

#### Range management option

MATH 150	Plane Trigonometry	3
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PHYS 115	Descriptive Physics .....	4
	<b>or</b>	
PHYS 113	General Physics I .....	4
BIOL 500	Plant Physiology .....	4
BIOL 529	Fundamentals of Ecology .....	3
BIOL 551	Taxonomy of Flowering Plants .....	4
ENTOM 300	Economic Entomology .....	3
GEOL 100	Introductory Geology .....	3
POLSC 110	Introduction to Political Science ...	3
SOCIO 211	Introduction to Sociology .....	3
AGRON 501	Range Management .....	3
AGRON 515	Soil Genesis and Classification .....	3
AGRON 560	Field Identification of Range and Pasture Plants .....	1
AGRON 660	Range Research Techniques .....	3
AGRON 670	Range Management Problems .....	3
AGRON 681	Range Ecology .....	3
AGRON 790	Range Management Planning .....	3
ASI 102	Principles of Animal Science .....	3
ASI 515	Beef Science .....	3

One of the following:

AGRON 762	Range Grasses .....	2
AGRON 760	Field Course in Range Management.....	2
ASI 615	Range Livestock Management .....	2

#### Science option

AGEC 120	Agricultural Economics and Agribusiness .....	3
AGRON 330	Weed Management .....	3
AGRON 360	Crop Growth and Development .....	3
AGRON 375	Soil Fertility .....	3
AGRON 385	Soil Fertility Lab .....	2
ASI 102	Principles of Animal Science .....	3
ACCTG 231	Accounting for Business Operations .....	3
PLPTH 500	Principles of Plant Pathology .....	3
BIOL 500	Plant Physiology .....	4
ASI 500	Genetics .....	3
	<b>or</b>	
GEOL 100	Introductory Geology .....	3
CHM 271	Chemical Analysis .....	4
STAT 340	Biometrics .....	3
MATH 150	Plane Trigonometry .....	3
MATH 220	Analytic Geometry and Calculus I ..	4
PHYS 113	General Physics I .....	4
PHYS 114	General Physics II .....	4

#### Soil and water conservation option

MATH 150	Plane Trigonometry .....	3
BIOL 201	Organismic Biology .....	5
	<b>or</b>	
BIOL 500	Plant Physiology .....	4
BIOL 455	General Microbiology .....	3
	<b>or</b>	
AGRON 645	Soil Microbiology .....	4
BIOL 529	Fundamentals of Ecology .....	3
ENTOM 300	Economic Entomology .....	3
Mathematics or statistics elective	.....	3-4
GEOL 100	Introductory Geology .....	3
GEOL 130	Elementary Geology Laboratory .....	1
POLSC 110	Introduction to Political Science ...	3
AGEC 525	Natural Resources Economics .....	3
AGRON 360	Crop Growth and Development .....	3
AGRON 375	Soil Fertility .....	3
AGRON 501	Range Management .....	3
AGRON 515	Soil Genesis and Classification .....	3
AGRON 635	Soil Conservation and Management .....	3
AGRON 746	Physical Properties of Soils .....	3
Humanities/social science elective	.....	3

All students majoring in agronomy must take a minimum of 28 hours in agronomy, a portion of which can be tailored to their interests and career intentions.

Research center, laboratory, and greenhouse facilities are used by the Department of Agronomy for both research and instruction.

## Agronomy courses

### Undergraduate credit

**AGRON 220. Crop Science.** (4) I. Principles underlying practices used in the culture of corn, grain sorghum, wheat, and soybeans. A basic course for majors in agronomy and others interested in crop production. Three hours lec. and two hours lab a week. Not open to students with credit in HORT 200.

**AGRON 305. Soils.** (4) I, II. Fundamental chemical, physical, and biological properties of soils; their formation, fertility, and management. Three hours lec. and two hours lab a week. Pr.: CHM 110 or 210.

**AGRON 315. Properties of Soil.** (1) I, II. Soil development and classification and the nature of soil physical properties. Three hours lec. and two hours lab a week for first five weeks of the semester. Not open to agriculture majors.

**AGRON 330. Weed Management.** (3) I. For those interested in crop production, crop protection, and agricultural education. Considers the origin of weeds, their relations to crops, and control systems emphasizing cultural practices and herbicides. Includes weed identification. Two hours lec. and two hours lab a week.

**AGRON 335. Environmental Quality.** (3) I. An examination and survey of topics in environmental quality. Includes classification of soil, air, and water pollutants and their interaction with the environment, including the human food chain. Discussion of remediation techniques, risk assessment, and environmental legislation. Three lectures a week. Pr.: CHM 110 or 210.

**AGRON 340. Grain Grading.** (2) I. Procedures for grading grains, emphasizing soybeans, corn, wheat, and sorghum. Identification and evaluation of kernel damage and other conditions determining grades of these grains. Four hours lab a week.

**AGRON 350. Crop and Seed Quality.** (2) II. Identification of crops and weeds by seed and vegetative characteristics. Grain grading of soybeans, corn, sorghum, and wheat. Four hours lab a week.

**AGRON 360. Crop Growth and Development.** (3) I. Comparative growth and development of warm- and cool-season monocot and dicot crops. Environmental influences on growth and development processes and management techniques to minimize stresses. Three lec. a week. Pr.: AGRON 220 and 305.

**AGRON 375. Soil Fertility.** (3) II. Detailed information on the plant nutrition, soil fertility, and fertilizer management of the essential macro- and micronutrients. The influence of numerous soil biological, physical, and chemical properties on plant nutrient availability to crops will be emphasized. Three hours rec. a week. Pr.: AGRON 220 and 305.

**AGRON 385. Soil Fertility Laboratory.** (2) II. Detailed information on (1) the chemical methods utilized in routine soil testing and plant analysis, (2) field soil sampling techniques, (3) fertilizer recommendations, and (4) fertilizer response functions. Soil chemistry and computer laboratory exercises are designed to reinforce the theoretical principles presented in lectures. One hour lec. and two hours lab a week. Pr.: AGRON 375 or conc. enrollment.

**AGRON 400. Undergraduate Topics in Agronomy.** (1-3) I, II, S. Special topics in agronomy not completely treated in other courses. Pr.: Consent of instructor.

**AGRON 405. Internship in Agronomy.** (1-3) I. Intern programs in various areas of agronomy. One hour credit for each four weeks of supervised and evaluated work experience with cooperating employers. A maximum of 3 hours may be applied to a B.S. in agronomy. Pr.: AGRON 220 and 305.

**AGRON 415. Soils Judging.** (1) I. Techniques employed in writing descriptions of soil morphology and in classifying soils for intercollegiate soils judging. Six hours lab a week for the first half of the semester.

Pr.: AGRON 305. May be repeated to a maximum of 2 hours.

**AGRON 420. Field Course in Weed Science.** (1) II. A laboratory and field course pertaining to weed identification, sprayer calibration, herbicide action, and herbicide performance. Pr.: AGRON 330 or equiv.

**AGRON 430. Tropical Agronomy.** (2) Intercession. A study of the soils and plant materials of tropical areas and the production of principal crops. Systems of agriculture and problems of agricultural production in tropical regions. Pr.: AGRON 220 or HORT 200 and AGRON 305.

**AGRON 455. Computer Applications in Agronomy.** (3) I, II. Application of computer technology to plant and soil science. Emphasis on use of current software in managing data and knowledge useful to crop production. Three hours lec. a week. Pr.: AGRON 220 and 305.

## Undergraduate and graduate credit in minor field

**AGRON 501. Range Management.** (3) I. Fundamental ecological principles of production, conservation, and use of grasslands. Application of these fundamental principles to range management. Three hours rec. a week.

**AGRON 515. Soil Genesis and Classification.** (3) II. Study of the factors and processes of soil formation, classification of soils according to soil taxonomy, and use of soil survey information. Required field trips. Two hours rec. and three hours lab a week. Pr.: GEOL 100 and AGRON 305 or consent of instructor.

**AGRON 520. Grain Production.** (3) II. An upper-level course for those interested in grain production in the Central Plains. Pest control, limiting factors, and planting factors will be considered in view of climatic conditions and crop plant growth habit. From this, a crop production strategy will be developed for each crop. Pr.: AGRON 220 and 375.

**AGRON 550. Forage Management and Utilization.** (3) II. Production and utilization of forage crops. Development of forage programs for livestock production, including pasture and stored forages. Three hours rec. a week. Pr.: AGRON 220 and junior standing.

**AGRON 551. Forage Management and Utilization Laboratory.** (1) II. Identification of forage species, techniques for estimating forage quality, forage physiology, and field trips. One two-hour lab a week. Pr.: Completion of or conc. enrollment in AGRON 550.

**AGRON 560. Field Identification of Range and Pasture Plants.** (1) I, in odd years. Identification of range pasture plants through exposure to them in their natural environment. Pr.: AGRON 220 or BIOL 210 or consent of instructor.

**AGRON 599. Agronomy—The Profession.** (1) II. An overview of opportunities, responsibilities, and challenges for the professional agronomist. Discussion of current topics and important issues in crops and soils, range management, and soil and water resources. Open only to seniors.

## Undergraduate and graduate credit

**AGRON 600. Crop Problems.** (Var.) I, II, S. Studies may be chosen in: genetics, crop improvement, forages, ecology, weed control, plant physiology, or crop production.

**AGRON 615. Soil Problems.** (Var.) I, II, S. Studies may be chosen in: chemistry, physics, conservation, fertility, genesis, morphology, or classification.

**AGRON 630. Principles of Crop Improvement.** (3) II. Basic plant breeding techniques used to genetically improve crops for use by man and procedures to increase, distribute, and maintain breeding stocks and varieties. Two lec. and one two-hour lab a week. Pr.: AGRON 220 and ASI 500.

**AGRON 635. Soil Conservation and Management.** (3) I. Principles, mechanics, and prediction of water and wind erosion. Influence of soil erosion on soil productivity and environmental quality. Conservation management technologies for erosion control and sustaining soil productivity. Legislation and land-use planning for soil conservation. Course requires microcomputer skills. Two hours rec. and 1 three-hour lab a week. Pr.: AGRON 305.

**AGRON 645. Soil Microbiology.** (4) I. The nature and function of soil microorganisms in the soil ecosystem. The role of soil microbial activity to soil organic matter, mineral transformations, plant nutrition, and environmental quality. Three hours rec. and two hours lab a week. Pr.: AGRON 305 or BIOL 455.

**AGRON 660. Range Research Techniques.** (3) I, in even years. Discussion of quantitative and qualitative procedures used to study vegetation. Includes application, advantages, and disadvantages of these methods. Use of statistical techniques for sampling, analysis, and presentation of data. Two hours rec. and one three-hour lab a week. Pr.: AGRON 501 and STAT 320.

**AGRON 670. Range Management Problems.** (Var.) I, II, S.

**AGRON 681. Range Ecology.** (3) II, in even years. Application of ecological principles to range ecosystem management. Study of plant-soil-animal interactions with rangelands, and discussion of plant succession, environmental influences, and ecological concepts. Two hours rec. a week and one lab credit consisting of field trips to representative range areas. Pr.: AGRON 501 and BIOL 529.

**AGRON 705. Chemical Properties of Soils.** (3) I. A study of soils as a chemical and colloidal system, including their chemical and mineralogical composition and reactions occurring in them. Three hours rec. a week. Pr.: AGRON 305, GEOL 100.

**AGRON 716. Herbicide Interactions.** (3) II, in even years. A study of systems and physiological processes in plants and soils as they affect herbicide fate and activity and are affected by herbicides. Research methodology and literature will also be discussed and evaluated. Pr.: AGRON 330 and BIOL 500 or equiv.

**AGRON 720. Advanced Weed Ecology.** (3) II, in odd years. A study of advanced weed ecology topics including weed/crop interference, weed growth and development, herbicide resistance, biological control, and ecological approaches to weed management. Three lec. a week. Pr.: AGRON 330.

**AGRON 735. Plant Nutrient Sources.** (3) II. An examination and survey of plant nutrient sources. Includes the processes involved in the formulation of chemical fertilizers, the physical and chemical properties of various fertilizer materials, assessment of available nutrients in non-commercial fertilizer materials, and the relative environmental impacts of various plant nutrient sources. Three hours rec. a week plus two one-half day field trips. Pr.: AGRON 375.

**AGRON 746. Physical Properties of Soils.** (3) II. The properties of soils as affected by their physical environment, including water content, temperature, soil structure, and aeration. Two hours rec. and two hours lab a week. Pr.: AGRON 305.

**AGRON 760. Field Course in Range Management.** (2) S. A summer field and lecture course dealing with the principles of range ecology as applied to range management practices; emphasis on field techniques for range plant identification and mensuration, range site evaluation, range condition classification, plant succession, and the impact of various range management practices. Two-week field course given jointly by Kansas State University and Fort Hays State University. Pr.: AGRON 501, BIOL 529. Suitable field experience may be substituted for these prerequisites with consent of instructor.

**AGRON 762. Range Grasses.** (2) I, in even years. Field and laboratory study of range and pasture plants, with special emphasis on grasses and their distinguishing characteristics. One hour rec. and two hours lab a week. Pr.: BIOL 198 or 210.

**AGRON 770. Plant Genetics.** (3) I. Concepts and application of basic genetic principles in higher plants. Probability, linkage, chromosome aberrations, aneuploidy analysis, gene transfer in wide crosses, tissue culture and crop improvement, and genetics of disease resistance. Three hours rec. a week. Pr.: ASI 500.

**AGRON 790. Range Management Planning.** (3) II, in odd years. Inventory and analysis of rangeland resources and development of detailed management plan. Emphasizes range management principles and practices useful in maximizing production from rangelands. Two hours rec. a week and one lab credit including field trips to ranch operations. Pr.: AGRON 501.

## Animal Sciences and Industry

Jack G. Riley,\* Head  
Curtis L. Kastner,\* Research Coordinator  
Larry R. Corah,\* State Leader Extension  
Miles McKee, Teaching Coordinator

Professors Adams,\* Bolsen,\* Brent,\* Call, Corah,\* Craig,\* Cunningham,\* Davis,\* Dikeman,\* Drake, Dunham, Fung,\* Harbers,\* Henderson, Hines,\* Hunt,\* Kastner,\* Kropf,\* McKee, Morrill,\* Nagaraja,\* Riley,\* Schafer, Schalles,\* and Zoellner; Associate Professors Brandt,\* Brazle, Cochran,\* Harmon,\* Jeon,\* Kuhl, Minton,\* Nelssen,\* Nichols, Roberts, Shirley, Simms,\* Spaeth, and Stevenson;\* Assistant Professors Arns,\* Blasi, Bolze, Eck, Goodband,\* Hancock,\* Hoover, Martin, Michaels, Raub,\* S. Smith,\* Tokach, and Unruh;\* Instructors W. Jackson and Lewis; Assistant Instructors Johnson, Krehbiel, Pool, and Scheele; Emeriti: Professors Bassette, Claydon, Farmer, Francis, Good, Kahrs, Koch, McCormick, Moyer, Norton, Orwig, Richardson, E. Smith, W. Smith, Ward, and Wheat.

### Animal sciences and industry Bachelor of science in agriculture 127 semester hours

Courses in the department give instruction in selection, breeding, feeding, management, and marketing of beef and dairy cattle, horses, poultry, sheep, and swine, as well as instruction in the processing and use of the products these animals and birds provide. Options of study are available in animal products, business, communications, pre-veterinary/science, and production-management.

In addition to classrooms, office space, and laboratories located in Weber and Call Halls, the department maintains several animal and poultry units within easy access

to the campus that house the beef and dairy cattle, horses, swine, sheep, and poultry used for teaching and research.

### General requirements

ENGL 100	Expository Writing I	3
ENGL 120	Expository Writing II	3
SPCH 105	Public Speaking IA	2
GENAG 101	Ag Orientation	1
MATH 100	College Algebra	3
ECON 110	Principles of Macroeconomics	3
CHM 210	Chemistry I	4
<b>or</b>		
CHM 110	General Chemistry	5
KIN 101	Principles of Physical Fitness	1
BIOL 198	Principles of Biology	4
ASI 102	Principles of Animal Science	3
ASI 318	Fundamentals of Nutrition	3
ACCTG 231	Accounting for Business Operations	3
<b>or</b>		
AGEC 308	Farm and Ranch Management*	3
Humanities and/or social sciences electives**		
Communications elective**		
ASI seminar elective**		

\*AGEC 308 may be substituted for ACCTG 231 in the production-management option only.

\*\* To be selected from the approved list in consultation with advisor.

### Options

Additional courses required for specific options:

#### Animal products option

ASI 302	Introduction to Food Science	3
BIOL 455	Microbiology	4
CHM 230	Chemistry II	4
BIOCH 265	Introductory Organic and Biological Chemistry	5
Agriculture electives		
Agricultural economics or business electives		
Mathematics/statistics/computer science electives		
ASI 103	Dairy Science	1
<b>or</b>		
ASI 104	Poultry Science	1
<b>or</b>		
ASI 105	Animal Sciences and Industry	1
ASI 411	Introductory Food Chemistry	3
ASI 607	Food Microbiology	4
ASI 725	Food Analysis	3

Select 20 hours from the following:

ASI 305	Fundamentals of Food Processing	3
ASI 315	Livestock and Meat Evaluation	3
ASI 350	Meat Science	3
ASI 361	Meat Processing	2
ASI 370	Principles of Meat Evaluation	2
ASI 395	Classification, Grading, and Selection of Meats	2
ASI 405	Fundamentals of Milk Processing	3
ASI 430	Food Products Evaluation	3
ASI 500	Genetics	2
ASI 502	Principles of Dairy Foods Processing	4
ASI 533	Anatomy and Physiology	4
ASI 599	Animal Science Internship	1-3
ASI 605	Fresh Meat Operations	3
ASI 610	Processed Meat Operations	2
ASI 630	Egg Science	2
ASI 635	Poultry Meat Technology	2
ASI 671	Meat Selection and Utilization	2
ASI 695	Quality Assurance of Food Products	3
ASI 777	Meat Technology	4
ATM 440	Introduction to Food Engineering Technology	3
ATM 441	Introduction to Food Engineering Technology Laboratory Exercises	1

Select one of the following:

ASI 515	Beef Science	3
ASI 524	Sheep Science	3
ASI 535	Swine Science	3
ASI 621	Dairy Cattle Management	3

ASI 645	Poultry Management	3	ASI 550	Dairy Bacteriology	4	ASI 103	Dairy Science	1
ASI 694	Food Plant Management	2	ASI 635	Poultry Meat Technology	2		<b>or</b>	
<b>Business option</b>			Select one of the following:			ASI 104	Poultry Science	1
AGEC 120	Agricultural Economics and Agribusiness	3	ASI 510	Animal Breeding Principles	3		<b>or</b>	
ASI 500	Genetics	3	ASI 655	Behavior of Domestic Animals	3	ASI 105	Animal Sciences and Industry	1
ASI 533	Anatomy and Physiology	4	ASI 735	Environmental Physiology of Farm Animals	3	ASI 320	Principles of Feeding	3
ACCTG 241	Accounting for Investing and Financing	3	Select two of the following:		ASI 400	Farm Animal Reproduction	4	
Agriculture electives		6-12	ASI 515	Beef Science	3	ASI 510	Animal Breeding Principles	3
Business electives		6	ASI 521	Horse Science	3	Select one of the following:		
Agricultural economics electives		12	ASI 524	Sheep Science	3	ASI 350	Meat Science	3
Mathematics/statistics/computer science elective		3	ASI 535	Swine Science	3	ASI 361	Meat Processing	2
ASI 103	Dairy Science	1	ASI 621	Dairy Cattle Management	3	ASI 601	Milk Secretion*	3
	<b>or</b>		ASI 645	Poultry Management	3	ASI 630	Egg Science**	2
ASI 104	Poultry Science	1	<b>Pre-veterinary/science option</b>		Select one of the following:			
	<b>or</b>		ASI 103	Dairy Science	1	ASI 315	Livestock and Meat Evaluation	3
ASI 105	Animal Sciences and Industry	1	ASI 104	Poultry Science	1	ASI 405	Fundamentals of Milk Processing*	3
ASI 320	Principles of Feeding	3	ASI 105	Animal Sciences and Industry	1	ASI 502	Principles of Dairy Foods Processing*	4
ASI 400	Farm Animal Reproduction	4	ASI 320	Principles of Feeding	3	ASI 550	Dairy Bacteriology*	4
Select one of the following:			ASI 400	Farm Animal Reproduction	4	ASI 635	Poultry Meat Technology**	2
ASI 350	Meat Science	3	Agriculture electives		9	Select one of the following:		
ASI 361	Meat Processing	2	Agricultural economics or business elective		3	ASI 315	Livestock and Meat Evaluation	3
ASI 601	Milk Secretion*	3	Select 7 hours from the following:		ASI 405	Fundamentals of Milk Processing*	3	
ASI 630	Egg Science**	2	ASI 500	Genetics	3	ASI 502	Principles of Dairy Foods Processing*	4
Select one of the following:			ASI 533	Anatomy and Physiology	4	ASI 550	Dairy Bacteriology*	4
ASI 315	Livestock and Meat Evaluation	3	BIOL 455	Microbiology	4	ASI 635	Poultry Meat Technology**	2
ASI 405	Fundamentals of Milk Processing*	3	BIOL 510	Embryology	3	Select three of the following:		
ASI 502	Fundamentals of Dairy Foods Processing*	4	BIOL 511	Embryology Laboratory	1	ASI 515	Beef Science	3
ASI 550	Dairy Bacteriology*	4	Select 12 hours from the following:		ASI 521	Horse Science	3	
ASI 635	Poultry Meat Technology**	2	CHM 230	Chemistry II	4	ASI 524	Sheep Science	3
Select two of the following:			CHM 350	General Organic Chemistry	3	ASI 535	Swine Science	3
ASI 515	Beef Science	3	CHM 351	General Organic Chemistry Laboratory	2	ASI 621	Dairy Cattle Management*	3
ASI 521	Horse Science	3	BIOCH 201	Elementary Biochemistry	3	ASI 645	Poultry Management**	3
ASI 524	Sheep Science	3	BIOCH 521	General Biochemistry	3	ASI 655	Behavior of Domestic Animals	3
ASI 535	Swine Science	3	BIOCH 522	General Biochemistry Laboratory	2	Required for dairy students*		
ASI 621	Dairy Cattle Management*	3	Select two of the following:		ASI 396	Dairy Cattle Judging	2	
ASI 645	Poultry Management**	3	PHYS 113	General Physics I	4	ASI 609	Dairy Cattle Nutrition	2
Required for dairy students:			PHYS 114	General Physics II	4	Required for poultry students**		
ASI 396	Dairy Cattle Judging	2	STAT 340	Biometrics I	3	ASI 310	Poultry Judging	2
ASI 510	Animal Breeding Principles	3	MATH 205	General Calculus and Linear Algebra	3	ASI 614	Swine and Poultry Nutrition	2
ASI 609	Dairy Cattle Nutrition	2	MATH 210	Technical Calculus I	3			
Required for poultry students:**			MATH 220	Analytic Geometry and Calculus I	4			
ASI 310	Poultry Judging	2	Select one of the following:					
ASI 614	Swine and Poultry Nutrition	2	ASI 350	Meat Science	3			
<b>Communications option</b>			ASI 361	Meat Processing	2			
ASI 500	Genetics	3	ASI 601	Milk Secretion	3			
ASI 533	Anatomy and Physiology	4	ASI 630	Egg Science	2			
Agriculture electives		8-16	Select one of the following:					
Agricultural economics or business elective		3	ASI 315	Livestock and Meat Evaluation	3			
Mathematics/statistics/computer science elective		3	ASI 405	Fundamentals of Milk Processing	3			
JMC 235	Mass Communications in Society	3	ASI 550	Dairy Bacteriology	4			
JMC 275	News and Feature Writing	3	ASI 635	Poultry Meat Technology	2			
JMC 280	Editing and Design	3	Select one of the following:					
JMC 500	Advanced News and Feature Writing	3	ASI 510	Animal Breeding Principles	3			
JMC 565	Law of Mass Communications	3	ASI 655	Behavior of Domestic Animals	3			
RTV 300	Radio-Television and Society	3	ASI 735	Environmental Physiology of Farm Animals	3			
Communications electives		6	Select two of the following:					
ASI 103	Dairy Science	1	ASI 515	Beef Science	3			
	<b>or</b>		ASI 521	Horse Science	3			
ASI 104	Poultry Science	1	ASI 524	Sheep Science	3			
	<b>or</b>		ASI 535	Swine Science	3			
ASI 105	Animal Sciences and Industry	1	ASI 621	Dairy Cattle Management	3			
ASI 300	Principles of Livestock Feeding	3	ASI 645	Poultry Management	3			
ASI 400	Farm Animal Reproduction	4	<b>Production-management option</b>					
Select one of the following:			AGEC 120	Agricultural Economics and Agribusiness	3			
ASI 350	Meat Science	3	ASI 500	Genetics	3			
ASI 361	Meat Processing	2	ASI 533	Anatomy and Physiology	4			
ASI 601	Milk Secretion	3	BIOCH 265	Introductory Organic and Biological Chemistry	5			
ASI 630	Egg Science	2	Agriculture electives		6-12			
Select one of the following:			Agricultural economics or business electives		12			
ASI 315	Livestock and Meat Evaluation	3	Mathematics/statistics/computer science elective		3			
ASI 405	Fundamentals of Milk Processing	3						

\*For students pursuing dairy interest

\*\*For students pursuing poultry interest

## Animal sciences and industry courses Undergraduate credit

**ASI 061. Concepts and Practices in Animal Science.** (1-3) I, II, S. Individual work in the various fields of study available in animal sciences and industry.

**ASI 102. Principles of Animal Science.** (3) I, II. Basic principles which apply to animal agriculture; survey of the industry; types, purposes, and products of livestock; principles of breeding, selection, nutrition, lactation, reproduction, management, and marketing. Three hours rec. a week. ASI 103, 104, and 105 are companion courses.

**ASI 103. Dairy Science.** (1) I, II. Application of basic principles of animal agriculture to dairying. Two hours lab a week. Pr.: ASI 102 or conc. enrollment.

**ASI 104. Poultry Science.** (1) I, II. Application of basic principles of animal agriculture to the poultry industry. Two hours lab a week. Pr.: ASI 102 or conc. enrollment.

**ASI 105. Animal Sciences and Industry.** (1) I, II. A study of the breeding and market types and classes of livestock including a comparison of the live animal and carcass evaluation. Two hours lab a week. Pr.: ASI 102 or conc. enrollment.

**ASI 110. Bovine Artificial Insemination.** (1) On sufficient demand. Designed to make student proficient in artificially inseminating the cow.

**ASI 235. Principles of Animal Disease Control.** (3) II. A study of the factors that influence animal health and disease control. For students majoring in agriculture and other fields. Three hours lec. a week. Pr.: ASI 102, 533, and sophomore standing. Same as SM 235.

**ASI 300. Principles of Livestock Feeding.** (3) II. Practical application of nutritional principles to the feeding of livestock; feedstuff evaluation; nutritive requirements; basic ration formulation and evaluation.

Not open to ASI majors other than communication option. Student cannot apply credit for both ASI 300 and 320 toward a B.S. degree. Pr.: CHM 110 or equiv.

**ASI 301. Farrier Science.** (2) I. Application of farrier's principles and practices. The anatomy and physiology of the lower leg and hoof are thoroughly studied and basic static and dynamic biomechanics of the horse are addressed. Corrective, therapeutic and performance, and specific shoeing and trimming techniques are practiced. One hour lecture and four hours lab a week. Pr.: Consent of instructor.

**ASI 302. Introduction to Food Science.** (3) I, II. This course is the beginning course in food science designed to acquaint the student with the breadth and scope of the food industry and the role of science in the preservation, processing, and utilization of foods. Three hours lec. a week.

**ASI 305. Fundamentals of Food Processing.** (3) II. The study of some basic ingredients used in food processing, principles of preserving and processing of foods, and food packaging. Food science and industry majors should take before the senior year. Taught in cooperation with the Departments of Horticulture, and Grain Science and Industry. Pr.: A course in chemistry.

**ASI 310. Poultry and Poultry Product Evaluation.** (2) I, in even years. Apply knowledge of physical and anatomical characteristics for evaluating poultry for egg and meat production. Evaluation of ready-to-cook poultry products as well as eggs on their exterior, interior, and broken-out appearance according to the latest USDA standards. Two two-hour labs a week. Pr.: ASI 104.

**ASI 315. Livestock and Meat Evaluation.** (3) I, II. Evaluation of slaughter livestock and their carcasses as related to economically efficient production of red meat. Evaluation of breeding livestock on visual appraisal and performance records. A study of growth and the effects of nutrition, environment, and hormones on growth patterns. Breeds of livestock and performance programs will be studied. One hour lec. and four hours lab a week. Pr.: ASI 102 and 105; or consent of instructor.

**ASI 318. Fundamentals of Nutrition.** (3) I, II. Elementary principles of comparative nutrition of farm animals. Three hours rec. a week. Pr.: BIOCH 120 or CHM 350.

**ASI 320. Principles of Feeding.** (3) I, II. Application of basic nutrition principles to the feeding of beef cattle, sheep, and swine; feedstuff evaluation; nutrient requirements; ration formulation and practical feeding problems. Two hours rec. and two hours lab a week. Pr.: ASI 318.

**ASI 325. Aptitude and Performance Appraisal of Horses.** (2) II. Evaluation of athletic performance capabilities of horses including influence of heredity, and conformation, training, and other environmental effects; use of records and visual appraisal for selection; industry trends in breeding and showing; oral and written defense of judgments. Four hours of lab a week. Pr.: ASI 105.

**ASI 340. Principles of Meat Science.** (2) I, II, S. An overview of the meat industry for off-campus students using a videotaped format. Food science and animal science majors cannot substitute this course for ASI 350. Pr.: A course in biology is recommended.

**ASI 350. Meat Science.** (3) I, II. An introduction to the red meat industry relating the fundamental properties of muscle structure, chemistry, and physiology to meat quality, composition, processing, nutritional value, and marketing. The laboratory will demonstrate the conversion of animals to meat and by-products, and meat processing technology. Two hours lec. and two hours lab a week. Pr.: BIOL 198.

**ASI 361. Meat Processing.** (2) I, II. A student participation course in processing live animals into meat and by-products. Interrelates all phases of modern slaughter techniques, inspection, and related operations. Pr.: ASI 350.

**ASI 370. Principles of Meat Evaluation.** (2) I. The use of subjective and objective standards to evaluate beef, lamb, and pork carcasses and wholesale cuts for both quality and yield of edible portion as they relate to value and consumer acceptance.

**ASI 385. Wool Grading and Evaluation.** (1) I. A study of factors determining the commercial grades of wool and the desired fleece qualities of sheep, practice in judging and grading wool. Three hours lab a week. Pr.: ASI 102.

**ASI 395. Classification, Grading, and Selection of Meats.** (2) I. Advanced study in the evaluation and classification of carcasses and wholesale cuts of beef, lamb, and pork. Application of grade standards to beef, lamb, and pork carcasses. Three hours lab a week. Pr.: ASI 370.

**ASI 396. Dairy Cattle Judging.** (2) II. An introduction to the principles of evaluating dairy cattle on the basis of their physical characteristics. Interpretation of the official dairy cow unified score card. Training includes preparation and presentation of oral defense on one's placing of four cow classes. Pr.: ASI 102 and 103.

**ASI 399. ASI Quadrathlon.** (1) II. Active participation in the ASI Quadrathlon involving oral presentations, written exams, practical application of animal knowledge, and a quiz bowl. Fifteen hours for presentations will be designated each spring. No more than 2 credits earned in this course may apply towards graduation.

**ASI 400. Farm Animal Reproduction.** (4) I. Basic reproductive anatomy and physiology of cattle, horses, pigs, poultry, and sheep during the first half of the semester provides a solid basis for reproduction management topics which occupy the second half of the course. Three hours rec. and three hours lab a week. Pr.: ASI 102.

**ASI 405. Fundamentals of Milk Processing.** (3) II, in odd years. A study of fundamentals of processing, quality assurance, inspection, and marketing of fluid milk and related products in a modern market milk enterprise. Two hours lec. and one three-hour lab a week. Pr.: One course in microbiology.

**ASI 411. Introductory Food Chemistry.** (3) II. The basic composition, structure, and properties of foods and the chemistry of changes occurring during processing, storage, and utilization. Two hours lec. and three hours lab a week. Pr.: BIOCH 265 or 201.

**ASI 420. Advanced Dairy Cattle Judging.** (1) I. Three hours lab a week. Pr.: ASI 396.

**ASI 422. Livestock Sales Management.** (1) On sufficient demand. Hands-on experience in the planning, promotion, and production of a purebred livestock sale. Pr.: Junior standing.

**ASI 425. Horse Training and Management.** (2) I. Inherited and learned behavior and psychological aspects of behavior modifications used in training horses. Emphasis on application of actual training techniques for training young horses and teaching advanced maneuvers to older horses. Modern management practices which allow maximum efficiency in training. One hour lec. and three hours lab a week. Pr.: ASI 325.

**ASI 430. Food Products Evaluation.** (3) II. Fundamentals of sensory evaluation of dairy, poultry products, meat, and other agricultural food products. Study of taste, smell, texture, visual appearance, and other senses related to organoleptic examination and its application to the food processing industry. Introduction to sensory testing methods, including sampling techniques and test forms. Two hours lec. and two hours lab a week. Pr.: ASI 302.

**ASI 450. Principles of Livestock Selection.** (2) I. Origin, development, characteristics, and adaptation of different breeds of livestock, with special emphasis on the selection of market and breeding animals. Four hours lab a week. Pr.: ASI 315.

**ASI 470. Form and Function in Livestock.** (2) I. A detailed study of animal form and type; influence of type upon function; special training in presenting orally the relative merits of animals of all breeds. Pr.: ASI 450.

**ASI 490. Microcomputer Applications in Animal Sciences and Industry.** (3), I, II. Applications of microcomputer techniques to the solutions of problems in animal science and related food industries. Includes use of existing software packages for breakeven analysis, animal identification and health records, feed ration analysis, farm/ranch accounting, and electronic communication with agriculture computer services. Current trends in farm computer use (hardware and software) will also be covered. Two hours lec. and two hours lab a week. Pr.: Junior standing.

## Undergraduate and graduate credit in minor field

**ASI 500. Genetics.** (3) I, II, S. Variation, Mendelian inheritance, and related subjects. Three hours lec. a week. Pr.: BIOL 198 or 210.

**ASI 502. Principles of Dairy Foods Processing.** (4) II, in even years. The application of chemical, microbiological, and physical principles to the conversion of milk into concentrated and dry milk products, hard and soft cheeses, frozen desserts, and butter. Three hours lec. and one three-hour lab a week. Pr.: A course in microbiology and ASI 411.

**ASI 503. Topics in Comparative Pathology.** (1-3) I, II, S. Selected topics in diseases of laboratory animals, wildlife, and fish for non-veterinary students. Pr.: BIOL 198. Same as AP 500.

**ASI 504. Equine Reproduction Management.** (2) II. Theory and practice in reproductive management and breeding techniques of the horse. Includes basic reproductive physiology of the stallion and mare, demonstration and practice in semen collection and processing, teasing systems, natural and artificial breeding techniques, management, and record keeping. Six hours lab a week. Pr.: ASI 400 and senior standing.

**ASI 510. Animal Breeding Principles.** (3) I, II. The genetic principles in evaluation, selection, and mating systems used in beef, dairy, sheep, swine, poultry, and horse breeding. Intended for ASI majors. Three hours lec. a week. Pr.: ASI 500.

**ASI 512. Gestation of Farm Animals.** (2) I. A detailed study of gestation using the bovine as a model. Lecture covers factors affecting the physiological events of gestation and management of the pregnant animal. The laboratory provides practical training in following the development of the bovine fetus in utero. Pr.: Senior standing and consent of instructor.

**ASI 515. Beef Science.** (3) I, II. A comprehensive course covering all phases of the beef cattle industry. Practical application of nutrition, breeding, physiology of reproduction, risk management, merchandising, and related areas. Special emphasis on management systems of raising, growing, and finishing beef cattle. Pr.: Senior standing.

**ASI 521. Horse Science.** (3) II. A study of the light horse industry in the U.S., structure, types and breeds of horses, selection, nutrition, management, performance, breeding, and health. Three hours lec. a week. Pr.: ASI 318.

**ASI 524. Sheep Science.** (3) I. Application of scientific management principles to the sheep industry. Breeding, reproduction, nutrition, health, facilities, and economic aspects as related to sheep production. Two hours lec. and two hours lab a week. Pr.: Junior standing.

**ASI 533. Anatomy and Physiology.** (4) II. General anatomy and physiology of the domestic animals. Three hours rec. and three hours lab a week. Same as AP 530.

**ASI 534. Introduction to Pharmacology of Farm Animals.** (2) II, in even years. The study of the basic principles of pharmacology as related to the proper and safe use of drugs and chemicals by the livestock industry. Same as AP 531.

**ASI 535. Swine Science.** (3) I, II. Application of basic scientific principles to the economical production of pork. Recommendations are made in breeding, reproduction, nutrition, health, housing, marketing, and management of swine production units of varying sizes. Two hours lec. and two hours lab a week. Pr.: Senior standing.

**ASI 550. Dairy Bacteriology.** (4) I. Application of the principles of bacteriology to the production and processing of quality milk and dairy products. Consideration of the general characteristics of microorganisms in dairy products. Relationships of bacteria in milk to public health. Two hours lec. and two two-hour labs a week. Pr.: BIOCH 265 or equiv.

**ASI 580. Animal Sciences and Industry Seminar.** (1) I. Open only to senior students majoring in animal sciences and industry. One hour rec. a week.

**ASI 581. Dairy Seminar.** (1) II. Study of dairy periodicals, bulletins, literature, and current research. Written and oral presentation of information on a dairy topic will be required of all students. One hour rec. a week. Pr.: Junior standing in dairy production.

**ASI 599. Animal Science Internship.** (1-6) I, S. Industry work-study experiences in beef cattle, sheep, dairy cattle, swine, horse, or poultry production operations or in animal food products plants. Pr.: Permission of supervising faculty member.

## Undergraduate and graduate credit

**ASI 601. Milk Secretion.** (3) I. Anatomy and histology of the mammary gland. Physiology of lactation, milk constituents, and management practices that alter quality and quantity. Contemporary milking practices and mastitis control. Two hours lec. and two hours lab a week. Pr.: ASI 103, 318, and 533.

**ASI 605. Fresh Meat Operations.** (3) I. Provides information and exposure to fresh meat operations, including: fabrication, yields, costs, quality assurance, packaging, marketing of fresh meat and by-products. Two hours lec. and three hours lab a week. Pr.: ASI 350.

**ASI 606. Instrumental Analysis of Food and Agricultural Products.** (2) Spring intersession. A two-week course presenting modern instrumental methods currently available for analysis of food and agricultural products. Pr.: PHYS 115 and BIOCH 201.

**ASI 607. Food Microbiology.** (4) I. This course deals with the identification, enumeration, and characterization of bacteria, yeast, and mold associated with foods and food processing. Effects of physical and chemical agents on microorganisms will be studied. Microbiological problems in food spoilage, food preservation, food fermentation, and food-borne diseases will be discussed. Two hours lec. and two two-hour labs a week. Pr.: BIOL 455.

**ASI 609. Dairy Cattle Nutrition.** (2) I. Application of principles of nutrition to feeding dairy cattle; least cost formulation of balanced rations; discussion of current dairy cattle nutrition research. One hour lec. and two hours lab a week. Pr.: ASI 320.

**ASI 610. Processed Meat Operations.** (2) II. An intensive course in processed meats, relating the science, technology, and quality control of curing, smoking, and sausage manufacture. One hour rec. and two hours lab a week. Pr.: ASI 350.

**ASI 611. Beef Cattle and Sheep Nutrition.** (2) II. A detailed study of the nutrient requirements of beef cattle and sheep for various stages of growth, reproduction, and lactation. Emphasis will be given to interrelationships between nutrition, disease, management, and environment. Diets will be formulated using a wide range of feed ingredients to produce optimum

production at minimum cost. Current beef cattle and sheep nutrition research will also be reviewed. One hour lec. and two hours lab a week. Pr.: ASI 320.

**ASI 612. Horse Nutrition.** (2) I. A detailed study of the nutrient requirements of horses for various stages of growth, work, reproduction, and lactation. Ration formulation using various feed ingredients. Relationships among nutrition, feed-related diseases, environment, and management. Review of current horse nutrition research. One hour lec. and two hours lab a week. Pr.: ASI 320.

**ASI 614. Swine and Poultry Nutrition.** (2) I. A detailed study of nutrient requirements of swine and poultry, for various stages of production. Lectures will include interrelationships between nutrition and other factors (environment, management, and disease) that affect performance. Labs will emphasize evaluation of feed ingredients, diets, premixes, and base mixes. One hour lec. and two hours lab a week. Pr.: ASI 320.

**ASI 615. Range Livestock Nutrition and Management.** (2) II. A detailed study of nutritional management concepts relevant to range livestock production. Emphasis will be directed toward discussion of range forage quality, range forage intake, nutrient requirements of range livestock, supplementation systems, grazing systems, computer-aided management procedures, stocking rates, and reproductive management. Two hours lec. a week. Pr.: ASI 320.

**ASI 620. Livestock Production and Management.** (2) II. Student involvement in laboratory exercises related to practical livestock production and management. One hour rec. and four hours lab a week. Pr.: Appropriate ASI course (515, 521, 525, or 535).

**ASI 621. Dairy Cattle Management.** (3) II. Integration of agronomic, biologic, and economic aspects of dairying with dairy farm layout, planning, operation, and analysis. A field study trip and a dairy farm analysis report are required. Two hours rec. and two hours lab a week. Pr.: ASI 102 and 103 and senior standing.

**ASI 630. Egg Science.** (2) I, in even years. Emphasis on the technical problems in processing and distribution of shell eggs and egg products. This course covers the chemistry and microbiology of shell eggs and egg products. Processing operations and basic principles of quality assurance are covered. Importance of new product development is discussed. Pr.: ASI 104 and 302.

**ASI 635. Poultry Meat Technology.** (2) II, in odd years. Emphasis on the many technical problems that exist between production and consumption during the processing and marketing of poultry meat and poultry meat products. Two hours lec. a week. Pr.: ASI 104 and 302.

**ASI 645. Poultry Management.** (3) II, in odd years. A detailed study of the production and management practices involved in commercial poultry and game bird enterprises. Two hours rec. and one three-hour lab a week. Pr.: ASI 102, 104, and junior standing.

**ASI 655. Behavior of Domestic Animals.** (3) I. Behavior associated with domestication. Effects of selective breeding, physical and social environments, and developmental stage on social organization, aggressive behavior, sexual behavior, productivity, and training of domestic animals. Physiology of behavior and abnormal behavior considered briefly. Pr.: BIOL 198.

**ASI 661. Animal Sciences and Industry Problems.** (1-3) I, II, S. Work offered in: animal breeding, animal nutrition, beef cattle production, dairy production, horse production, livestock evaluation, meats, poultry, sheep production, swine production. Pr.: Consent of instructor.

**ASI 671. Meat Selection and Utilization.** (2) I. Emphasis on meat cut selection criteria and identification, grades, fabricated meat, institutional cuts, specification writing, preservation, and meat preparation. One hour lec.-rec. and two hours lab a week. Pr.: FN 300 or 501, or HRIMD 320 or 440.

**ASI 694. Food Plant Management.** (2) I. A study of business management practices involved in a food plant operation; organization, plant operations, personnel, production control, purchasing, cost control, sales, and legal aspects of a food operation. Pr.: Junior standing.

**ASI 695. Quality Assurance of Food Products.** (3) I. The role of the control laboratory in maintaining standards and quality of dairy and food products and ingredients. Tests and techniques for evaluating quality and sanitation and for compliance with regulatory requirements. Two hours rec. and one three-hour lab a week. Pr.: One course in bacteriology.

**ASI 702. Animal Nutrition and Diet Formulation.** (2) I. Application of basic nutrition principles, diet formulation, and diet adequacy for livestock, poultry, pets, and exotic animals. Includes practical feeding problems encountered by producers and veterinarians. Pr.: ASI 318 and first-year standing in the College of Veterinary Medicine.

**ASI 710. Physiology of Reproduction in Farm Animals.** (2) I. This course offers an in-depth study of the anatomical and physiological aspects of reproduction in farm and laboratory animals including endocrine interrelationships controlling reproductive cycles and gamete production. Literature studies and periodic laboratories deal with experimental techniques used in animal reproduction and contemporary animal production practices. One hour lec. and two hours lab a week. Pr.: ASI 400.

**ASI 713. Rapid Methods and Automation in Microbiology.** (2) Spring intersession. Rapid methods and automation is a dynamic area in applied microbiology dealing with the study of improved methods in the isolation, detection, characterization, and enumeration of microorganisms and their products in clinical, food, industrial, and environmental samples. The knowledge and techniques of this course are useful for students interested in medical, food, industrial, and environmental microbiology for early detection of beneficial as well as harmful microorganisms in their work.

**ASI 715. Chemistry of Foods.** (3) I. Relationship of chemical composition to properties and to physical and chemical stability of foods. Special attention will be given to dairy and poultry products, red meats, vegetables, and cereal grains. Pr.: BIOCH 521, 522.

**ASI 725. Food Analysis.** (3) I. Principles, methods, and techniques necessary for quantitative, physical, and chemical analyses of food and food products. The analyses will be related to standards and regulations for food processing. Two hours lec. and three hours lab a week. Pr.: ASI 411.

**ASI 730. Silage Technology.** (2) I. A study of silage fermentation, nutrient conservation, aerobic deterioration process, factors affecting silage quality, and chemical analysis used to evaluate silage. Discussion of techniques used in silage research and assigned readings within the silage literature. Two hours lec. a week. Pr.: ASI 320.

**ASI 735. Environmental Physiology of Farm Animals.** (3) II. A detailed study of the effects of the environment on animal physiology and performance efficiency. Three hours lec. a week with frequent laboratory demonstrations. Pr.: AP 530.

**ASI 749. Advanced Animal Breeding.** (3) II. Application of genetic principles to livestock improvement, selection methods, mating systems, heritability estimates, and methods of analyzing genetic data. Three hours lec. a week. Pr.: ASI 500 and three hours in statistics.

**ASI 750. Poultry Seminar.** (1) I, in even years. Required of all students majoring in poultry science. Also required of graduate students. One hour rec. or conference a week. Pr.: ASI 102 and 104.

**ASI 777. Meat Technology.** (4) II. Meat composition, meat product safety and spoilage, quality assurance, meat processing techniques, sausage and formed

products, color, packaging, plant planning and organization, field trip. Three hours lec. and three hours lab a week. Pr.: ASI 350 and 361; senior or graduate standing.

**ASI 799. Graduate Internship in Animal Sciences and Industry.** (1-4) I, S. In-depth work-study experiences in beef cattle, sheep, dairy cattle, swine, horse, or poultry production operations or in animal food products plants. Pr.: Permission of supervising faculty member.

## Entomology

C. Michael Smith, Head

Professors Bauernfeind, Blocker,\* Broce,\* Brooks, Cress,\* Elzinga,\* Harvey,\* Hatchett,\* Hopkins,\* McGaughey,\* Mock,\* Sloderbeck, and Wilde;\* Associate Professors Beeman,\* Buschman,\* Higgins,\* Howard,\* Kadoum,\* Lippert, Margolies,\* Nechols,\* and Reese;\* Assistant Professors Dick, Dover,\* Flinn,\* and Hagstrum;\* Emeriti: Professors Gates, DePew, Horber, Mills, and Thompson.

Entomology is the study of insects and related arthropods. Applied entomology stresses their relations to plants and animals, including humans. Courses fall into two groups: broad, general courses suitable for any student; and professional courses that provide training for research, teaching, and administration in colleges, experiment stations, health services, government agencies, industry, foundations, and private practice.

Students majoring in other fields may have a special interest in entomology as part of their curriculum. Courses 300 or 312 and 313 or 314 or 305 are recommended.

### Entomology science

Bachelor of science in agriculture under the pest science and management curriculum, which includes the entomology science option.

Students interested in protecting plants from insects, plant diseases, and weeds should consider the pest management or business and industries option of the pest science and management curriculum.

Students particularly interested in insects as a subject of special study, including insects in relation to plants, humans, or animals, and students anticipating graduate work should consider the entomology science option of the pest science and management curriculum.

Students majoring in this option take, in addition to the general requirements for the pest science and management curriculum, the following:

#### Entomology courses

ENTOM 312	General Entomology	2
ENTOM 313	General Entomology Lab	1

ENTOM 660	External Insect Morphology	3
ENTOM 710	Insect Taxonomy	3
ENTOM 767	Insect Pest Management	3

#### Other agriculture and biology courses

ASI 500	Genetics	3	
BIOL 198	Principles of Biology	4	
BIOL 201	Organismic Biology	5	
BIOL 455	Microbiology	5	
BIOL 529	Fundamentals of Ecology	3	
or			
BIOL 631	Ecology	3	
Approved electives			20

#### Physical sciences and mathematics

MATH 150	Plane Trigonometry	3
STAT 340	Biometrics I	3

Select one of the following:

CHM 531	Organic Chemistry I	3
CHM 532	Organic Chemistry Lab	2

or

CHM 350	General Organic Chemistry	3
CHM 351	General Organic Chemistry Lab	2

Select one of the following:

BIOCH 521	General Biochemistry	3
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and

BIOCH 522	General Biochemistry Lab	2
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or

BIOCH 525	Plant Biochemistry Lab	2
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or

BIOCH 201	Elementary Biochemistry	3
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and

BIOCH 202	Elementary Biochemistry Lab	2
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Select one of the following:

MATH 220	Analytical Geometry and Calculus I	4
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or

CIS 200	Fundamentals of Computer Programming	2
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and

CIS 201	FORTTRAN Language Laboratory	2
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Select one of the following:

PHYS 113	General Physics I	4
PHYS 114	General Physics II	4

or

PHYS 115	Descriptive Physics	4
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### Entomology courses

#### Undergraduate credit

**ENTOM 300. Economic Entomology.** (3) II. Classification, life histories, habits, and principles of control of important economic insects. For agriculture majors. Two hours lec. and two hours lab a week.

**ENTOM 305. Livestock Entomology.** (2) I. Biology and behavior of insects and other pests attacking livestock, poultry, pets, and wildlife. Current recommendations for control are discussed. For students interested in livestock production, feedlot management, dairy and poultry science, and pre-veterinary medicine, as well as other agricultural curricula. Two hours lecture-demonstration a week.

**ENTOM 306. Livestock Entomology Laboratory.** (1) I. One two-hour lab a week.

**ENTOM 312. General Entomology.** (2) I, II. A basic study of insects and related arthropods, their structure, physiology, behavior, and relations to plants and animals, including man. Two hours rec. a week.

**ENTOM 313. General Entomology Laboratory.** (1) I, II. Identification, food preferences, and habitat preferences of the common insects. Two hours a week.

**ENTOM 314. Insect and Arachnid Identification.** (3) I. Offered 1992 or even years. Pr.: ENTOM 312 or conc. enrollment. (Not open to entomology science option majors in pest science and management curriculum.) Identification of common insects and arachnids. Two three-hour labs a week.

**ENTOM 320. Horticultural Entomology.** (3) I. Biological principles and management considerations for insect and related arthropods affecting horticulture. Practical application of classification and life history information for accurate recognition, monitoring, and pest management decisions. Control tactics, and conservation of beneficial species. Two hours lec. and two hours lab a week.

### Undergraduate and graduate credit

**ENTOM 612. Insect Pest Diagnosis.** (2) I. Offered 1991 or odd years. Diagnosis of plant damage by insects and mites, recognition of harmful insects and mites and beneficial insects. Emphasis on field crop pests but pests of other crops will be considered if there is sufficient interest. One hour lec. and two hours lab a week. Pr.: ENTOM 314 or 710.

**ENTOM 620. Insecticides: Properties and Laws.** (2) II. Offered 1992 or even years. Study of chemical and biological properties of insecticides. Formulations, use, safety, environmental impact, and federal and state laws regulating pesticides. Two hours lec. a week. Pr.: CHM 190.

**ENTOM 651. Internship in Crop Protection.** (1-2) I. On-the-job training in various areas of crop protection. One hour credit for each four weeks of supervised work. A maximum of 2 credits may be applied towards a B.S. in pest science and management. Credit is allowed only for approved work-study programs. Pr.: Junior standing in pest science and management curriculum; or AGRON 330, ENTOM 312, and PLPTH 500.

**ENTOM 652. Seminar in Crop Protection.** (1) II. A discussion of modern developments in the use of integrated pest management. Pr.: AGRON 330, ENTOM 312, and PLPTH 500. One hour discussion a week.

**ENTOM 706. External Insect Morphology.** (3) I. Offered 1992 or even years. External form, structure, and anatomy; leading theories of form and structure from generalized to specialized conditions. One hour lec. and six hours lab a week. Pr.: ENTOM 300 or 312 and 313.

**ENTOM 710. Insect Taxonomy.** (3) II. Offered 1991 and alternate years. Families in all orders and some lower categories; principles of insect collecting and collection management; introduction of principles of phylogeny and classification for students not specializing in taxonomy. One hour lec. and six hours lab a week. Pr.: ENTOM 300 or 312 and 313; ENTOM 706 recommended but not required; insect collection desirable.

**ENTOM 767. Insect Pest Management.** (3) I. A presentation of the items necessary to consider in order to develop a sound pest management program, from identification of a problem to recommendations made to growers for dealing with a pest. Two hours lec. and one lab a week. Pr.: ENTOM 300 or ENTOM 312.

**ENTOM 799. Problems in Entomology.** (Var.) I, II, S. For nonthesis or nondissertation studies. Work in various fields of entomology. Pr.: Consent of instructor.

## Food Science and Industry

Advisors: Dikeman, Fung, Harbers, Hunt, Jeon, Kastner, Kropf, Roberts, Smith, and Unruh, Animal Sciences and Industry; Faubion, Klopfenstein, and Walker, Grain Sciences and Industry.

### Food science and industry

Bachelor of science in food science and industry  
127 semester hours

This curriculum deals with all aspects of the food industry—both theoretical and practical—from producing raw materials through processing and packaging to marketing finished foods. The curriculum balances fundamental principles and practical applications of food science within a flexible program that permits students to tailor education to personal career goals. The program is certified by the Institute of Food Technologists.

Graduates are needed to manage and supervise sophisticated food manufacturing industries that produce poultry, fresh and processed meat, dairy products, bakery goods, frozen and canned fruits and vegetables, confections, and snack foods.

Imaginative and well-trained people are needed in research and product development to create new and innovative products and processes. Some graduates work with producers to improve the quality of raw materials. Persons trained in quality assurance are needed to help food processors meet more stringent consumer and government requirements. Others are involved in selling, merchandising, advertising, or managing food operations. Government regulatory agencies also hire food scientists to assure public health, nutrition, and food labeling. Some food science graduates work in international food agencies.

The curriculum includes four options: science, processing, business, and processing technology. All options are built around a science-based core curriculum.

The science option prepares students for product development, technical service, food safety, and quality assurance by giving students background in mathematics, chemistry, microbiology, computer science, as well as food science.

The processing option emphasizes processing techniques and involves experiences in the commodity areas of bakery and cereal science; dairy, meat, and poultry products; and fruit and vegetable processing.

The business option prepares students for management through courses in accounting, business law, marketing, business finance, management, personnel, labor relations, consumer behavior, and sales, in addition to food science courses.

The processing technology option emphasizes food engineering systems, materials, circuitry, graphics, and data processing, as well as food science.

Scholarships are available through the Institute of Food Technologists and the College of Agriculture.

### General requirements

ENGL 100	Expository Writing I	3
ENGL 120	Expository Writing II	3
SPCH 105	Public Speaking 1A	2
KIN 101	Principles of Physical Fitness	1
ECON 110	Principles of Macroeconomics	3
MATH 100	College Algebra	3
MATH 205	General Calculus and Linear Algebra	3
	<b>or</b>	
MATH 210	Technical Calculus I	3
STAT 320	Elements of Statistics	3
	<b>or</b>	
STAT 340	Biometrics I	3
	<b>or</b>	
STAT 350	Business Economics Statistics I	3
BIOL 198	Principles of Biology	4
BIOL 455	General Microbiology	5
ASI 607	Food Microbiology	4
CHM 210	Chemistry I	4
CHM 230	Chemistry II	4

### Core food science courses

ASI 305	Fundamentals of Food Processing	3
ASI 411	Introductory Food Chemistry	3
	<b>or</b>	
FN 501	Food Science	3
ASI 615	Food Analysis	3
	<b>or</b>	
FN 790	Food Research Technology	3
ATM 440/ ET 440	Introduction to Food Engineering Technology	3
ATM 440/ ET 441	Food Engineering Technology Laboratory	1
FN 502	Principles of Nutrition	3
	Two listed processing electives	4-9
	Social sciences/humanities electives	9

### Options

Additional courses required for specific options:

#### Business option

PHYS 115	Descriptive Physics	4
CHM 350	General Organic Chemistry	3
	<b>and</b>	
CHM 351	General Organic Chemistry Lab	2
BIOCH 521	General Biochemistry	3
ACCTG 231	Accounting for Business Operations	3
ACCTG 241	Accounting for Investing and Financing	3
MKTG 400	Marketing	3
MANGT 420	Management Concepts	3
	Professional electives	15
	Business electives (besides ACCTG 231 and 241, MKTG 400, and MANGT 420)	12
	Free electives	3-8

Total hours from the College of Business Administration cannot exceed 27.

#### Processing option

PHYS 115	Descriptive Physics	4
	<b>or</b>	
PHYS 113	General Physics I	4
CHM 350	General Organic Chemistry	3
	<b>and</b>	
CHM 351	General Organic Chemistry Lab	2
BIOCH 521	General Biochemistry	3
	<b>and</b>	
BIOCH 522	General Biochemistry Lab	2
	Professional electives	13
	Processing and/or technology electives	24
	Free electives	0-5

#### Science option

PSYCH 110	General Psychology*	3
PHYS 113	General Physics I	4
CHM 350	General Organic Chemistry	3
	<b>and</b>	
CHM 351	General Organic Chemistry Lab	2

BIOCH 521	General Biochemistry	3
	<b>and</b>	
BIOCH 522	General Biochemistry Lab	2
	Professional electives	30
	Free electives	7-12

\*Satisfies 3 of the 9 hours of social science electives.

### Processing technology option

MATH 150	Plane Trigonometry	3
MATH 211	Technical Calculus II	3
PHYS 113	General Physics I	4
PHYS 114	General Physics II	4
CHM 350	General Organic Chemistry	3
	<b>and</b>	
CHM 351	General Organic Chemistry Lab	2
BIOCHM 521	General Biochemistry	3
	<b>and</b>	
BIOCHM 522	General Biochemistry Lab	2
	Professional electives	3
	Processing and/or technology electives	24
	Free electives	0-5

### Electives

#### Business electives

ACCTG 231	Accounting for Business Operations	3
ACCTG 241	Accounting for Investing and Finance	3
AGEC 120	Agricultural Economics and Agribusiness	3
AGEC 318	Agribusiness Management	3
AGEC 410	Agricultural Policy	3
AGEC 420	Commodity Futures Markets	2
AGEC 421	Livestock and Meat Marketing	2
AGEC 422	Grain Marketing	2
AGEC 505	Agricultural Market Structures	3
AGEC 515	Agribusiness Marketing	3
ASI 694	Food Plant Management	2
CIS 200	Fundamentals of Computer Programming	3
	Computer language lab (200 level)	1
ECON 120	Principles of Microeconomics	3
FINAN 450	Business Finance	3
MANGT 202	Small Business Operations	3
MANGT 390	Business Law I	3
MANGT 420	Management Concepts	3
MANGT 530	Labor Legislation	3
MANGT 531	Personnel and Wage Administration	3
MKTG 400	Marketing	3
MKTG 450	Consumer Behavior	3
MKTG 541	Retailing	3
MKTG 542	Sales Management	3
MKTG 640	Marketing Research	3
MKTG 545	Marketing Channels	3
	Other professional electives can be substituted as appropriate.	

#### Food science electives

ASI 302	Introduction to Food Science	3
ASI 430	Food Products Evaluation	3
ASI 606	Instrumental Analysis of Food and Agricultural Products	2
ASI 630	Egg Science	2
ASI 635	Poultry Meat Technology	2
ASI 694	Food Plant Management	2
ASI 695	Quality Assurance of Food Products	3
ASI 713	Rapid Methods and Automation in Microbiology	2
FN 301	Trends in Food Products	3
FN 612	Principles of Food Product Development and Control	3
FN 616	Principles of Food Demonstration	3
FN 620	Sensory Analysis of Foods	3
FN 680	Seminar in Foods and Nutrition	2
FN 720	Food Systems	3
FN 750	Nutritional Aspects of Food Processing and Preparation	3
GENAG 630	Food Science Problems	V
GRSC 120	Introduction to Bakery Technology	2

# Grain Science and Industry

Charles Deyoe,\* Head

Professors Behnke,\* Deyoe,\* Eustace,\* Hosene,\* McElhiney,\* Pedersen,\* Ponte,\* Seib,\* Walker,\* and Wetzel;\* Adjunct Professors Hoover, Chung,\* Lookhart, and Vetter;\* Associate Professors Faubion,\* Haque\* (temporary), and Klopfenstein;\* Adjunct Associate Professors Bolte, and Seitz;\* Assistant Professors Acasio (temporary) and Curran; Adjunct Assistant Professors Bennett and Rogers; Instructor Gwartz; Instructors (temporary) Pudden, Reddy, and Shelke; Emeriti: Professors Balding,\* Farrell,\* Schoeff,\* Ward,\* and Wilcox;\* Associate Professor Wingfield;\* Assistant Professor Miller.

The Department of Grain Science and Industry offers three curricula: a bachelor of science in bakery science and management; a bachelor of science in feed science and management; and a bachelor of science in milling science and management. In the baking science and milling science curricula, an option may be selected in administration, chemistry, or operations. The feed science curriculum has specialization electives emphasizing administration or engineering. This department also participates in the food science and industry curriculum.

## Bakery science and management

Bachelor of science in bakery science and management  
130 semester hours

### Freshman

#### Fall semester

GENAG 101	Ag Orientation	1
GRSC 100	Principles of Milling	3
CHM 210	Chemistry I	4
ENGL 100	Expository Writing I	3
MATH 100	College Algebra	3
KIN 101	Principles of Physical Fitness	1
		<b>15</b>

#### Spring semester

CHM 230	Chemistry II	4
ECON 110	Principles of Macroeconomics	3
ENGL 120	Expository Writing II	3
MATH 150	Plane Trigonometry	3
GRSC 120	Introduction to Bakery Technology	2
		<b>15</b>

### Sophomore

#### Fall semester

SPCH 105	Public Speaking IA	2
BIOL 198	Principles of Biology	4
	Social science electives	3
	Option A, B, or C electives	7
		<b>16</b>

GRSC 602	Cereal Science	3
GRSC 651	Food and Feed Plant Sanitation	4
GRSC 661	Qualities of Feed and Food Ingredients	3
HORT 792	Handling and Processing Fruits and Vegetables	3
<b>Nutrition electives</b>		
FN 603	Maternal and Child Nutrition	3
FN 610	Nutrition Throughout the Life Cycle	3
FN 635	Nutrition and Exercise	3
FN 700	Community Nutrition	3
FN 702	Nutrition in Developing Countries	3
FN 710	Bionutrition	3
FN 712	Diet Therapy	3
FN 750	Nutritional Aspects of Food Processing and Preparation	2-3
GRSC 705	Nutritional Properties of Cereals and Legumes	3

### Processing electives

All courses must have labs.

ASI 350	Meat Science	3
ASI 361	Meat Processing	2
ASI 405	Fundamentals of Milk Processing	3
ASI 502	Principles of Dairy Food Processing	4
ASI 605	Fresh Meat Operations	3
ASI 610	Processed Meats Operations	2
ASI 671	Meat Selection and Utilization	2
ASI 725	Meat Packing Plant Operations	2-3
ASI 777	Meat Technology	4
ET 640	Food Processing Operations	5
FN 300	Food Preparation and Meal Management	4
GRSC 100	Principles of Milling	3
GRSC 625	Flour and Dough Testing	3
GRSC 635	Baking Science I	2
	<b>and</b>	
GRSC 636	Baking Science I Lab	2
GRSC 737	Baking Science II	2
	<b>and</b>	
GRSC 738	Baking Science II Lab	1

### Technology electives

ATM 450	Functional Components of Machinery	3
ATM 526	Agricultural and Industrial Hydraulics	3
ATM 563	Electrical Systems and Controls	3
ET 410	Properties of Engineering Materials	2
ET 411	Properties of Engineering Materials Lab	1
ET 415	Computer Applications in Engineering Technology	2
ET 431	Electrical Circuit Technology I	4
ET 512	Mechanics of Fluids	3
ET 514	Energy Conversion Technology	3
ET 640	Food Processing Operations	5
IE 372	Computers and Data Processing	2
ME 212	Engineering Graphics I	2
ME 560	Engineering Economics	3

## General Agriculture

David J. Mugler,\* Associate Dean and

Director of Academic Programs

Lawrence H. Erpelding, Associate Director

John B. Riley,\* Assistant Director

### General agriculture courses

#### Undergraduate credit

**GENAG 101. Ag Orientation.** (1) I. Objectives, organization, and procedures of the College of Agriculture and the university are studied. Historical developments and projected trends in agriculture and the application of basic sciences to agriculture are presented. Required of freshmen in agriculture.

**GENAG 200. Topics in Agriculture.** (0-3) On sufficient demand. Selected issues in agriculture. May be repeated with change in topics.

**GENAG 390. Agricultural Employment.** (1) I, II. Assists the agriculture student in developing a career blueprint; understanding job markets and techniques to obtain employment including recruitment/placement services, resume construction, personal interviewing, and job offer evaluation and analysis; and monitoring involved in career planning.

**GENAG 410. Agricultural Student Magazine.** (1-5) I, II. Planning, interviewing, and preparing stories, headlines, layouts, and editing, for the *Kansas State Agriculturist* published by students in the College of Agriculture. Pr.: JMC 275.

#### Undergraduate and graduate credit

**GENAG 500. Food Science Seminar.** (1) I. Review of recent developments in the food science industry and in food science research. Food science literature and intradepartmental research will provide source material. Required of all food science undergraduates in agriculture.

**GENAG 505. Comparative Agriculture.** (1-4) Intersession. A travel-study program which is intended to acquaint students with agriculture of other countries and other parts of the U.S. and how it differs from Midwest-Great Plains agriculture relative to climate, crops, soils, livestock practices, marketing, and cultural attitudes toward agriculture. Pr.: Consent of instructor.

**GENAG 510. Internship in Farm Broadcasting.** (3) I, II. For advanced students interested in practical application of mass media principles and techniques. May include public affairs reporting, field interviewing, and supervised production of mass media materials. Pr.: Junior standing.

**GENAG 515. Honors Presentation.** (1) I, II, S. Presentation of completed teaching or extension activity, research project, or demonstration project. Pr.: Successfully completed honors proposal and permission of honors advisor.

**GENAG 582. Natural Resources/Environmental Sciences Project (NRES).** (3) I, II. A comprehensive project in NRES. Requires integration of information and understanding acquired in NRES secondary major courses. Students must prepare and present written and oral reports. Three hours rec. a week. Pr.: All writing and oral communications courses required for major. Pr. or conc.: 15 hours of approved courses in NRES secondary major. Cross-listed with DAS 582 and DEN 582.

**GENAG 630. Food Science Problems.** (1-3) I, II, S. Research or related work with others, or a literature search. Written reports are required. Any field of food science for which the student has adequate background. Pr.: ASI 302 and junior standing.

**GENAG 770. Professional Journalism Practicum.** (1-4) For advanced students. Supervised practical work in the area of professional journalism and mass communications. Includes laboratory investigation, field work, and internships. Pr.: JMC 380 or RTV 330 and consent of supervising instructor.

**GENAG 780. Current Topics in Agriculture.** (1-3) On sufficient demand. Selected topics studied to provide an in-depth understanding of current agricultural issues. May be repeated with change in topics. Pr.: Completion of baccalaureate degree.

**Spring semester**

BIOL 455	General Microbiology	4
Social science electives		6
STAT 320	Elements of Statistics	3
Option A, B, or C electives		4
		<b>17</b>

**Junior****Fall semester**

GRSC 591	Commercial Feed and Food Manufacturing Internship	2
GRSC 636	Baking Science I Lab	2
ASI 607	Food Microbiology	4
Option A, B, or C electives		7
		<b>17</b>

**Spring semester**

GRSC 737	Baking Science II	2
GRSC 738	Baking Science II Lab	1
GRSC 602	Cereal Science	3
Option A, B, or C electives		10
		<b>16</b>

**Senior****Fall semester**

GRSC 670	Bakery Layout	1
ATM 440	Introduction to Food Engineering Technology	3
Option A, B, or C electives		13
		<b>17</b>

**Spring semester**

GRSC 625	Flour and Dough Testing	3
GRSC 651	Food and Feed Plant Sanitation	4
GRSC 701	Practicum Baking Techniques	1
Option A, B, or C electives		9
		<b>17</b>

**Options****Administration option (A)**

GRSC 505	Cereal and Feed Analysis	3
BIOCH 265	Introduction to Organic and Biological Chemistry	4
ECON 120	Principles of Macroeconomics	3
MATH 205	General Calculus and Linear Algebra	3
PHYS 113	General Physics I	4
PHYS 114	General Physics II	4
CIS 110	Introduction to Personal Computing	3
ACCTG 231	Accounting for Business Operations	3
ACCTG 241	Accounting for Investment and Finance	3
GRSC 630	Management Applications in the Grain Processing Industries	3
MKTG 400	Marketing	3
FINAN 450	Business Finance	3
Electives		5

And 6 hours from the following:

ECON 530	Money and Banking	3
ECON 620	Labor Economics	3
ACCTG 312	Cost Accounting	3
MANGT 530	Industrial and Labor Relations	3
MANGT 531	Personnel and Human Resource Management	3
MKTG 450	Consumer Behavior	3
MKTG 542	Sales Management	3
MANGT 630	Labor Relations Law	3
FINAN 650	Capital Budgeting	3
IE 501	Industrial Management	3

**Chemistry option (B)**

GRSC 505	Cereal and Feed Analysis	3
BIOCH 521	General Biochemistry	3
BIOCH 522	General Biochemistry Lab	2
CHM 271	Chemical Analysis	4
CHM 500	Descriptive Physical Chemistry	3
CHM 531	Organic Chemistry I	3
CHM 532	Organic Chemistry I Lab	2
CHM 550	Organic Chemistry II	3
CHM 551	Organic Chemistry II Lab	2
MATH 220	Analytic Geometry and Calculus I	4

MATH 221	Analytic Geometry and Calculus II	4
PHYS 213	Engineering Physics I	5
PHYS 214	Engineering Physics II	5
Electives		7

**Operations option (C)**

BIOCH 265	Introduction to Organic and Biological Chemistry	5
MATH 220	Analytic Geometry and Calculus I	4
MATH 221	Analytic Geometry and Calculus II	4
MATH 222	Analytic Geometry and Calculus III	4
GRSC 610	Electricity and Control for Milling Processes	3
ME 212	Engineering Graphics I	2
PHYS 213	Engineering Physics I	5
PHYS 214	Engineering Physics II	5
CE 231	Statics A	3
CE 331	Strength of Materials A	3
GRSC 630	Management Applications in the Grain Processing Industries	3
ME 513	Thermodynamics I	3
Electives		6

**Feed science and management**

**Bachelor of science in feed science and management**  
127 semester hours

**Freshman****Fall semester**

GENAG 101	Ag Orientation	1
GRSC 100	Principles of Milling	3
CHM 210	Chemistry I	4
ENGL 100	Expository Writing I	3
MATH 100	College Algebra	3
KIN 101	Principles of Physical Fitness	1
		<b>15</b>

**Spring semester**

CHM 230	Chemistry II	4
ENGL 120	Expository Writing II	3
MATH 150	Plane Trigonometry	3
SPCH 105	Public Speaking IA	2
Required courses*		3
		<b>15</b>

**Sophomore****Fall semester**

GRSC 110	Flow Sheets	2
BIOL 198	Principles of Biology	4
ECON 110	Principles of Macroeconomics	3
Required courses*		7
		<b>16</b>

**Spring semester**

ASI 318	Fundamentals of Nutrition	3
ENTOM 312	General Entomology	2
ENTOM 313	General Entomology Lab	1
Social science electives		6
Required courses*		5
		<b>17</b>

**Junior****Fall semester**

GRSC 510	Feed Technology I	4
GRSC 661	Qualities of Feed and Food Ingredients	3
Required courses*		9
		<b>16</b>

**Spring semester**

GRSC 651	Feed Plant Sanitation	4
GRSC 750	Feed Technology II	4
Required courses*		8
		<b>16</b>

**Senior****Fall semester**

GRSC 650	Concepts of Modern Feed Mill Design	3
Required courses*		13
		<b>16</b>

**Spring semester**

GRSC 505	Cereal and Feed Analysis	3
GRSC 610	Electricity and Control for Milling Processes	3
GRSC 630	Management Applications	3
Required courses*		7
		<b>16</b>

\*Including specialization electives

**Required courses**

AGEC 420	Commodity Futures Marketing	2
AGEC 422	Grain Marketing	2
BIOCH 265	Introduction to Organic and Biological Chemistry	5
MATH 205	General Calculus and Linear Algebra	3
PHYS 113	General Physics I	4
PHYS 114	General Physics II	4
STAT 320	Elements of Statistics	3
CIS 110	Introduction to Personal Computing	3
ACCTG 231	Accounting for Business Operations	3
ENGL 516	Written Communication for the Sciences	3

**Specialization electives**

GENAG 390	Agricultural Employment	1
GRSC 520	Extrusion Processing in the Food and Feed Industries	4
GRSC 591	Commercial Feed and Food Manufacturing Internship	2
GRSC 655	Cereal Food Plant Design and Construction	3
GRSC 751	Air Handling in Grain Processing	3
GRSC 790	Grain Science Problems	2
ECON 530	Money and Banking	3
MATH 220	Analytic Geometry and Calculus I	4
MATH 221	Analytic Geometry and Calculus II	4
ACCTG 241	Accounting for Investment and Finance	3
ACCTG 312	Cost Accounting	3
FINAN 450	Business Finance	3
MANGT 390	Business Law I	3
MANGT 530	Industrial and Labor Relations	3
MANGT 531	Personnel and Human Resource Management	3
MANGT 630	Labor Relations Law	3
MKTG 542	Sales Management	3
IE 501	Industrial Management	3
Free electives		6

**Milling science and management**

**Bachelor of science in milling science and management**  
130 semester hours

**Freshman****Fall semester**

GENAG 101	Ag Orientation	1
GRSC 100	Principles of Milling	3
CHM 210	Chemistry I	4
ENGL 100	Expository Writing I	3
MATH 100	College Algebra	3
KIN 101	Principles of Physical Fitness	1
		<b>15</b>

**Spring semester**

CHM 230	Chemistry II	4
ENGL 120	English Composition II	3
MATH 150	Plane Trigonometry	3
SPCH 105	Public Speaking IA	2
ECON 110	Principles of Macroeconomics	3
Option A, B, or C electives		2
		<b>17</b>

**Sophomore**

**Fall semester**

GRSC 110	Flow Sheets	2
BIOL 198	Principles of Biology	4
CIS 110	Introduction to Personal Computing or equivalent	3
Social science elective		3
Option A, B, or C electives		4
		<b>16</b>

**Spring semester**

GRSC 500	Milling Technology I	4
BIOL 455	General Microbiology	4
GRSC 505	Cereal and Feed Analysis	3
Social science electives		3
Option A, B, or C electives		3
		<b>17</b>

**Junior**

**Fall semester**

AGRON 340	Market Grading Cereals	2
Social science electives		3
Option A, B, or C electives		12
		<b>17</b>

**Spring semester**

GRSC 602	Cereal Science	3
STAT 320	Elements of Statistics	3
GRSC 651	Food and Feed Plant Sanitation	4
Option A, B, or C electives		6
		<b>16</b>

**Senior**

**Fall semester**

GRSC 635	Baking Science I	2
GRSC 636	Baking Science I Lab	2
Option A, B, or C electives		12
		<b>16</b>

**Spring semester**

Option A, B, or C electives		16
		<b>16</b>

**Options**

**Management option (A)**

ACCTG 231	Accounting for Business Operations	3
ACCTG 241	Accounting for Investment and Financing	3
AGEC 120	Agricultural Economics and Agribusiness	3
AGEC 318	Agribusiness Management	3
AGEC 420	Commodity Futures	2
AGEC 422	Grain Marketing	2
BIOCH 265	Introduction to Organic and Biological Chemistry	5
GRSC 625	Flour and Dough Testing	3
GRSC 630	Management Applications in the Grain Processing Industries	3
GRSC 730	Milling Technology II	2
MATH 205	General Calculus and Linear Algebra	3
PHYS 115	Descriptive Physics	4
SPCH 311	Business and Professional Speaking	3
Free electives		7

Select 9 hours from the following:

ACCTG 312	Cost Accounting	3
AGEC 513	Agricultural Finance	3
AGEC 515	Agribusiness Marketing	3
AGEC 632	Agricultural Business Logic	3
AGEC 710	Advanced Agribusiness Management	3
ENGL 516	Written Communication for the Sciences	3
GENAG 390	Agricultural Employment	3
MANGT 390	Business Law I	3
MANGT 420	Management Concepts	3
MANGT 530	Industrial and Labor Relations	3
MANGT 531	Personnel and Human Resources Management	3
MANGT 630	Labor Relations Law	3

**Chemistry option (B)**

ME 210	Engineering Graphics	2
GRSC 625	Flour and Dough Testing	3
BIOCH 521	General Biochemistry	3
BIOCH 522	General Biochemistry Lab	2
CHM 271	Chemical Analysis	4
CHM 500	Descriptive Physical Chemistry	3
CHM 531	Organic Chemistry I	3
CHM 532	Organic Chemistry I Lab	2
CHM 550	Organic Chemistry II	3
CHM 551	Organic Chemistry II Lab	2
MATH 220	Analytic Geometry and Calculus I	4
MATH 221	Analytic Geometry and Calculus II	4
PHYS 213	Engineering Physics I	5
PHYS 214	Engineering Physics II	5
Electives		10

**Operations option (C)**

GRSC 610	Electricity and Control for Milling Processes	3
GRSC 630	Management Applications for the Grain Processing Industries	3
GRSC 640	Advanced Flow Sheets	2
GRSC 655	Cereal Food Plant Design and Construction	3
GRSC 730	Milling Technology II	4
GRSC 785	Advanced Flour and Feed Technology	3
BIOCH 265	Introduction to Organic and Biological Chemistry	5
MATH 210	Technical Calculus I	3
MATH 211	Technical Calculus II	3
PHYS 213	Engineering Physics I	5
PHYS 214	Engineering Physics II	5
CE 231	Statics A	3
ATM 440	Introduction to Food Engineering Techniques	3
ME 210	Engineering Graphics I	2
Free electives		8

**International Grains Program**

C. W. Deyoe, Director

The International Grains Program promotes the marketing of wheat, corn, soybeans, sorghum, and other U.S. grains. As part of the effort to expand existing markets and to develop new ones for those agricultural commodities, program participants are trained in the processing and handling of U.S. food and feed grains, instructed in the use of the end products, and given a thorough understanding of the workings of the U.S. grain marketing system.

**Grain science and industry courses**

**Undergraduate credit**

**GRSC 100. Principles of Milling.** (3) I, II. Introduction to flour and feed milling processes. Two hours lec. and three hours lab a week. Pr.: One and one-half units of high school algebra.

**GRSC 110. Flow Sheets.** (2) I, II. The construction and assembling of a flow sheet. Six hours lab a week. Pr.: GRSC 100, ME 212.

**GRSC 120. Introductory Bakery Technology.** (2) II. An introduction to bakery science and technology. The processes used to produce baked goods on a large scale are emphasized. The products discussed include breads, dinner rolls, buns, sweet rolls, cakes, pastries, doughnuts, crackers, and cookies. Films and tours of bakeries are used to introduce students to the equipment and operations used to manufacture baked goods. Two hours lec. a week. Pr.: MATH 100.

**GRSC 121. Introductory Bakery Technology**

**Laboratory.** (1) II. This course provides experience in the production of various types of bakery foods, including: breads, white and dark; layer cakes; foam cakes; danish pastry; puff pastry; pies; and doughnuts. Formulations and functions of ingredients used to make these products will be discussed. Processing equipment designed to efficiently produce bakery foods will be studied and operated by the students. Three hours lab a week. Pr.: GRSC 120 or conc. enrollment.

**GRSC 305. Fundamentals of Food Processing.** (3) II.

The study of some basic ingredients used in food processing, principles of preserving and processing of foods, and food packaging. Pr.: A course in chemistry.

**Undergraduate and graduate credit in minor field**

**GRSC 500. Milling Technology I.** (4) II. Principles and practices of wheat flour milling with full-scale equipment including grain storage, blending, cleaning, conditioning plant, and a modern pneumatic 240 hundred weight flour mill, with instrumentation and air conditioning, etc. Two hours lec. and six hours lab a week. Pr.: GRSC 100 and 110.

**GRSC 505. Cereal and Feed Analysis.** (3) II. Methods of analyzing and testing cereal grains, cereal, and feed products. One hour lec. and six hours lab a week. Pr.: CHM 230 and BIOCH 120.

**GRSC 510. Feed Technology I.** (4) I. Introduction to the engineering of formula feed manufacture, including principles of conveying, grinding, mixing, pelleting, and the formulation of concentrates, premixes, and rations using a digital computer. Three hours lec. and three hours lab a week. Pr.: ASI 318 and GRSC 110.

**GRSC 520. Extrusion Processing in the Food and Feed Industries.** (4) II

The course is designed to provide the student with an understanding of extrusion technology and the ability to apply it to product development and production through a "hands-on" approach. Major emphasis is on laboratory exercises in which students will operate pilot scale extrusion equipment to produce readily-recognizable commercial products such as cheese curls, breakfast cereals, pasta, pet food, etc. Emphasis will also be placed on process and product development, analysis and problem solving techniques. Three hours of lec. plus one three-hour lab. a week. Pr.: Junior standing and STAT 320 preferred.

**GRSC 591. Commercial Feed and Food Manufacturing Internship.** (2) I.

A practical application of feed and food manufacturing technology during an eight-week summer internship with an active commercial feed and food manufacturing company. The course will stress applied aspects of commercial feed and food manufacturing, which can include, but not be limited to, plant operations, maintenance, personnel and labor relations, business management, warehousing, ingredient procurement, quality assurance, and fleet management. Pr.: GRSC 510 or 500 or 635.

**Undergraduate and graduate credit**

**GRSC 602. Cereal Science.** (3) I, II. The characteristics of cereals, legumes, and their products. Three hours lec. a week. Pr.: BIOCH 120.

**GRSC 610. Electricity and Control for Milling Processes.** (3) II.

Major emphasis will be given to application of electricity to machinery for grain processing and electrical code. Two hour lec., two hour lab. Pr.: Either GRSC 500, 510, or 635.

**GRSC 625. Flour and Dough Testing.** (3) II.

Physical and chemical methods used in evaluating wheat flour and dough. One hour lec. and six hours lab a week. Pr.: GRSC 602.

**GRSC 630. Management Applications in the Grain Processing Industries.** (3) II. This course deals with management principles and their specific application to the processing industries. Industry and allied trade personnel in management positions will give a number of lectures in their field of expertise. Special emphasis is placed on grain industry organizations, labor contracts, supervision, scheduling and planning, regulatory agencies, and cost control. Three hours lec. a week. Pr.: ECON I and either GRSC 510, GRSC 500, GRSC 120, or consent of instructor. Junior standing.

**GRSC 635. Baking Science I.** (2) I. Introduction to properties of ingredients used in baking, reactions of ingredients during processing into baked products. Two hours lec. a week. Pr.: BIOCH 120.

**GRSC 636. Baking Science I Laboratory.** (2) I, II. Laboratory exercises in theory and production of yeast-leavened baked products. Six hours lab a week. Pr.: GRSC 635 or conc. enrollment.

**GRSC 640. Advanced Flow Sheets.** (2) II. Design of flow diagrams for dry milling processes. Uses a combination of methods that lead to practical applications and analytical techniques. Six hours lab a week. Pr.: GRSC 500 or 510.

**GRSC 650. Concepts of Modern Feed Mill Design.** (3) I. Principles of modern feed mill design, feasibility, and equipment selection for plant improvements and new plant construction. Emphasis is placed on the effects of design on plant operating efficiency, product quality, and manufacturing costs. Pr.: GRSC 510, junior standing.

**GRSC 651. Food and Feed Plant Sanitation.** (4) II. Sanitation in relation to processing, handling, and storage of human and animal foods. Emphasis on contaminants, control of causative agents, equipment and plant design, applicable laws and regulations. Three hours lec. and three hours lab a week. Pr.: Minimum of eight hours of biological science; junior standing.

**GRSC 655. Cereal Food Plant Design and Construction.** (3) I. Drawing assignments relative to the building, or modification, of food plants. Emphasis is also given to practical information regarding plant construction project design and management. Power transmission systems design and sheet metal pattern layouts, relative to cereal foods plants, are covered through problem assignments and CAD software programs. Two hours lec. and three hours lab. a week. Pr.: ME 212, senior status in grain science, either GRSC 500 or 730.

**GRSC 661. Qualities of Feed and Food Ingredients.** (3) I. Physical and nutritional properties of feed and food ingredients and the effects of origin, processing, storage, and other factors upon them. Three hours lec. a week. Pr.: BIOCH 120.

**GRSC 670. Bakery Layout.** (1) I. Equipment used to produce bakery foods is studied, and the students prepare a bakery layout. Two-hour lab. Pr.: PHYS 113, and GRSC 635 and GRSC 636.

**GRSC 701. Practicum in Bakery Technology.** (1) A one-week intensive course during the January intersession. Lectures and hands-on laboratory experience with commercial production scale baking equipment for breads and rolls, cookies and crackers, and cakes and sweet doughs. Restricted to upper class bakery science and management majors.

**GRSC 710. Fundamentals of Grain Storage.** (2) I. Interrelationships of moisture, molds, and insects in grain and products in storage; changes occurring in storage; proper drying, storage, control of insects, rodents, birds. Pr.: GRSC 602 or 661.

**GRSC 725. Feed Manufacturing Processes.** (3) II. Study of the technical phases of formula feed manufacturing, equipment design and function, effect of processing and ingredients on nutritional acceptability of feeds and quality control. Two hours lec. and three hours lab a week. Pr.: MATH 100, MATH 150, and ASI 318.

**GRSC 730. Milling Technology II.** (2) I. Advanced studies of the entire gradual reduction system of wheat flour milling and the many unit process systems that constitute the milling system. The theory and practices of wheat conditioning, drying, and aeration are elaborated upon. Two hours lec. a week. Pr.: GRSC 500.

**GRSC 731. Milling Technology II Laboratory.** (2) I. The processes for milling other grains such as corn, oats, sorghum, different classes of wheat, and rye are studied in theory and by practice on small-scale laboratory milling units. Six hours lab a week. Pr. GRSC 730 or conc. enrollment.

**GRSC 737. Baking Science II.** (2) II. Advanced study of the basic properties, chemical and biological reactions of ingredients used in production of bakery products. Special emphasis is placed on the fundamental principles of biological and chemical leavening and the rheological properties of dough batters and ingredients. Two hours lec. a week. Pr.: GRSC 635.

**GRSC 738. Baking Science II Laboratory.** (1) II. A laboratory course to accompany GRSC 737. Three hours lab a week. Pr.: GRSC 737 or conc. enrollment.

**GRSC 750. Feed Technology II.** (4) II. Advanced study of engineering principles of feed plant production, materials handling, grinding, pelleting, and other major processing operations. Three hours lec. and three hours lab a week. Pr.: GRSC 510, PHYS 114 or PHYS 214, and one course each in statistics and computer programming.

**GRSC 751. Air Handling in Grain Processing.** (3) II. Emphasis is given to pneumatic conveying, exhaust systems, and air handling in the grain processing industry. Two hours lec. and three hours lab a week. Pr.: MATH 210 and PHYS 213.

**GRSC 785. Advanced Flour and Feed Technology.** (3) II. Design and use of exhaust systems, pneumatic conveying systems, bins and hoppers, and the practical applications of electrical interlocking, instrumentation, and microprocessors to automatic mill control. Also other subjects such as sound measurement and explosion detection and prevention are covered. Two hours lec. and three hours lab a week. Pr.: GRSC 730 or 750.

**GRSC 790. Grain Science Problem.** (Var.) I, II, S. Pr.: Consent of staff.

## Horticulture, Forestry, and Recreation Resources

Thomas D. Warner, Head  
Raymond Aslin, State Forester  
Frank Morrison, Horticulture Extension Program Leader  
John Strickler, Forestry Extension Program Leader

Professors Clayberg,\* Geyer,\* Jennings,\* Leuthold, Loucks, Marr,\* Mattson,\* Morrison,\* Naughton, Nighswonger, Pair,\* Pinkerton, Strickler, van der Hoeven, and Warner; Associate Professors Albrecht,\* Aslin, Bratton, Cable,\* Gould, Hellman,\* Hensley,\* Khatamian,\* Kimmins, Long,\* Lynch, Rajashekar,\* Rowland, and Wiest,\* Assistant Professors Allison, Atchison, Bruckerhoff, Fry,\* Gast,\* Kunkel, Lamont,\* Mazzola, New, Stevens, Steven-

son, Strine, and Wischer; Instructor Reid; Emcriti: Professors Campbell, Greig, and Keen.

### Horticulture programs

K-State offers four-year curricula in horticulture and horticultural therapy and a two-year program in retail floriculture. The Department of Horticulture, Forestry, and Recreation Resources also helps administer two interdepartmental programs: pest science and management and food science and industry.

### Horticulture

Bachelor of science in agriculture  
127 semester hours

Horticulture is the science and art of growing plants for intensive food production, aesthetic value, environmental improvement, or social-therapeutic effects. Students, in consultation with faculty advisors, may select courses of study in horticultural industries or horticultural science.

All students in the curriculum are required to take a core of general courses in addition to the agricultural and horticultural courses. Within each option the student is advised to take specific courses and restricted electives necessary for career goals.

### General education requirements

ENGL 100	Expository Writing I	3
ENGL 120	Expository Writing II	3
SPCH 105	Public Speaking IA	2
MATH 100	College Algebra*	3
ECON 110	Principles of Macroeconomics	3
CHM 210	Chemistry I	4
	or	
CHM 110	General Chemistry	5
BIOL 210	General Botany	4
	or	
BIOL 198	Principles of Biology	4
KIN 101	Principles of Physical Fitness	1
	Humanities and/or social sciences	9
	Communications electives	3
ACCTG 231	Accounting for Business Operations	3
	Organic chemistry electives**	3-5
	Mathematics/statistics/ computer science electives	3-4
BIOL 500	Plant Physiology**	4

\*Students in the science option take calculus.

\*\*Students in landscape design suboption take a surveying elective (3 hours) and have a biology elective of 3-4 hours.

### Horticulture and agriculture requirements

GENAG 101	Ag Orientation	1
HORT 110	Introduction to Horticulture*	1
HORT 200	Plant Science	4
AGRON 305	Soils	4
	Entomology electives	3-4
PLPTH 500	Principles of Plant Pathology	3

\*Required of all freshman and sophomore majors

**Horticultural science option**

The horticultural science option trains students for professional positions requiring advanced degrees. Students in this option receive a horticultural background with additional emphasis in physical and biological sciences. Students electing this option take the general education requirements, horticulture and agriculture requirements, and the following additional requirements:

ASI 500	Genetics	3
CHM 230	Chemistry II	4
PHYS 115	Descriptive Physics	4
Calculus electives		3
STAT 340	Biometrics I	3
Computer science elective		4
BIOCH 521	General Biochemistry	3
BIOCH 522	General Biochemistry Lab	2
BIOL 500	Plant Physiology	4
HORT 520	Fruit Production	3
HORT 560	Vegetable Crop Production	3
HORT 570	Greenhouse Management	3
Horticulture specialization electives		17
Free electives		16

**Horticultural industries option**

The horticultural industries option trains students interested in the production and maintenance of horticultural crops and the related businesses. Students receive a broad background in horticulture and concentrate in one of six horticultural suboptions: fruit/vegetable, greenhouse management, landscape management, landscape design, nursery management, and turf management.

Students in this option take the general education requirements, horticulture and agriculture requirements, and the following additional requirements:

HORT 350	Plant Propagation	3
HORT 520	Fruit Production*	3
HORT 560	Vegetable Crop Production*	3
HORT 612	Turf Management	3
Business electives		9
Free electives		8-13

\*In turf, landscape design, and landscape management, students take either HORT 520 or HORT 560.

**Other requirements for the different suboptions are:**

**Fruit/vegetable suboption**

HORT 570	Greenhouse Management	3
HORT 575	Nursery Management	3
HORT 582	Pesticide Application Technology	3
Horticulture specialization electives		20

**Greenhouse management suboption**

HORT 460	Bedding and Foliage Plants	4
HORT 570	Greenhouse Management	3
HORT 575	Nursery Management	3
HORT 582	Pesticide Application Technology	3
HORT 625	Floriculture	4
Horticulture specialization electives		12

**Landscape management suboption**

HORT 374	Woody Plant Material I	3
HORT 375	Woody Plant Material II	3
HORT 450	Landscape Development	3
HORT 508	Landscape Maintenance	3
Horticulture specialization electives		20

**Landscape design suboption**

HORT 374	Woody Plant Material I	3
HORT 375	Woody Plant Material II	3
HORT 450	Landscape Development	3
HORT 508	Landscape Management	3
ENVD 205	Design Graphics I	2
<b>or</b>		
ENVD 212	Studio for Environmental Design and Graphics	3
<b>or</b>		
ENVD 560	Accelerated Design and Graphics	3
Horticulture specialization electives		17

**Nursery management suboption**

AGRON 330	Weed Management	3
HORT 374	Woody Plant Material I	3
HORT 375	Woody Plant Material II	3
HORT 570	Greenhouse Management	3
HORT 575	Nursery Management	3
HORT 582	Pesticide Application Technology	3
Horticulture specialization electives		11

**Turf management suboption**

HORT 460	Bedding and Foliage Plants	4
HORT 374	Woody Plant Material I	3
HORT 582	Pesticide Application Technology	3
HORT 617	Turfgrass Management Lab	2
AGRON 375	Soil Fertility	3
Horticulture specialization electives		17

**Horticultural therapy**

Bachelor of science in agriculture  
127 semester hours

Courses are required in general education, horticulture and agriculture, horticultural therapy, and humanities and/or social sciences. Specialization electives may be selected in community-based programs, corrections, gerontology, education, developmental disabilities, or mental health. Clinical internships are required during the senior year at approved psychiatric hospitals, rehabilitation centers, veterans administration hospitals, correctional agencies, geriatric and retirement centers, or community-based agencies.

**General education requirements**

ENGL 100	Expository Writing I	3
ENGL 120	Expository Writing II	3
SPCH 105	Public Speaking IA	2
GENAG 101	Ag Orientation	1
<b>or</b>		
HORT 110	Introduction to Horticulture	1
MATH 100	College Algebra	3
ECON 110	Principles of Macroeconomics	3
CHM 110	General Chemistry	5
BIOL 210	General Botany	4
KIN 101	Principles of Physical Fitness	1
KIN 275	First Aid-Multi/CPR	1
STAT or CIS elective		3-4

**Horticulture and agriculture requirements**

HORT 180	Basic Floral Design Concepts	3
HORT 200	Plant Science	4
HORT 255	Introduction to Horticultural Therapy	1
HORT 460	Bedding and Foliage Plants	4
HORT 374	Woody Plant Materials I	3
HORT 400	Plant Propagation	3
Ornamental horticulture elective		2-4
HORT 520	Fruit Production	3
HORT 525	Horticulture for Special Populations	3
HORT 530	Horticultural Therapy Seminar	1
HORT 535	Horticultural Therapy Field Techniques	3
HORT 560	Vegetable Crop Production	3
HORT 570	Greenhouse Management	3

AGRON 305	Soils	4
PLPTH 500	Principles of Plant Pathology	3
Entomology electives		2-4

**Humanities and/or social science requirements**

PSYCH 110	General Psychology	3
SOCIO 211	Introduction to Sociology	3
Group methods elective		3
PSYCH 505	Abnormal Psychology	3
EDCEP 215	Educational Implications of Growth and Development	3
Art electives		2
Specialization electives		15

**Internship requirement**

HORT 540	Horticultural Therapy Field Experiences	12
Electives		6-8

**Retail floriculture**

Associate of agriculture degree  
62 hours

This is a technical program combining supervised practical training with university course work in preparation for employment and management in a retail flower shop. The first phase of instruction is at Kansas State University, where the course sequence is completed during four semesters. The student serves an apprenticeship at a selected retail florist business. Every effort is made to approve a florist shop in a city of the student's choice. The apprentice will be an employee of the flower shop during one semester of training and will receive a salary sufficient to meet normal living expenses.

**First semester (fall)**

BIOL 210	General Botany	4
HORT 110	Introduction to Horticulture	1
HORT 180	Basic Floral Design Concepts	3
HORT 255	Introduction to Horticultural Therapy	1
HORT 299	Flower Judging	1
HORT 325	Indoor Plants and Flowers	2
ART 100	Design I	2
KIN 101	Principles of Physical Fitness	1
		<u>15</u>

**Second semester (spring)**

HORT 200	Plant Science	4
HORT 380	Advanced Floral Design Concepts	1
ART 200	Design II	2
ENGL 100	Expository Writing I	3
Communications elective		3
		<u>15</u>

**Third semester (fall)**

ENGL 120	Expository Writing II	3
ECON 110	Principles of Macroeconomics	3
HORT 460	Bedding and Foliage Plants	4
HORT 570	Greenhouse Management	3
MATH 100	College Algebra	3
<b>or</b>		
CIS 110	Introduction to Personal Computing	3
		<u>16</u>

**Summer term**

HORT 290	Florist Shop Internship	1
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**Fourth semester (spring)**

PSYCH 110	General Psychology	3
ACCTG 231	Accounting for Business Operations	3
	Business electives	6
	Social science elective	3
		<u>15</u>

**Forestry and recreation resources**

Society faces a future of making potentially infinite demands upon finite natural resources. Appropriate management of America's natural and recreation resources will require the best efforts of dedicated, trained professional managers. A basic objective of natural resource managers is to provide essential goods and services while maintaining the highest environmental standards. A primary focus of recreation and park professionals is the supply of quality leisure opportunities that lead to an enhanced "quality of life."

Three programs are offered: a two-year pre-forestry curriculum and four-year programs in parks and recreation administration and park resource management leading to a bachelor of science degree.

Hours earned in the pre-forestry program can be transferred to most other universities offering degrees in forestry. The university has a reciprocal agreement with the University of Missouri at Columbia, which waives out-of-state tuition for pre-forestry transfers.

**Pre-forestry**

Two-year program

**Freshman**

**Fall semester**

BIOL 210	General Botany	4
ENGL 100	Expository Writing I	3
ENGL 120	Expository Writing II	3
SPCH 106	Public Speaking I	3
MATH 100	College Algebra*	3
FOR 285	Introduction to Forestry	3
	Electives	1-2
		<u>17-18</u>

**Spring semester**

CHM 110	General Chemistry	5
	<b>or</b>	
CHM 210	Chemistry I	4
ENGL 120	Expository Writing II	3
MATH 150	Plane Trigonometry*	3
GEOL 100	Introduction to Geology	3
FOR 210	Forestry Graphics	2
KIN 101	Principles of Physical Fitness	1
		<u>16-17</u>

\*Students with proper mathematics background are encouraged to substitute calculus for these courses.

**Sophomore**

**Fall semester**

AGRON 305	Soils	4
FOR 330	Dendrology I	2
FOR 311	Forestry Instruments	2
STAT 340	Biometrics I	3
FOR 321	Forestry Resource Topics	1
ECON 110	Principles of Macroeconomics	3
	Electives	3
		<u>18</u>

**Spring semester**

PHYS 115	Descriptive Physics	4
ECON 120	Principles of Microeconomics	3
FOR 340	Dendrology II	2
CE 212	Elements of Engineering Surveying	3
CIS 110	Introduction to Personal Computing	3
	<b>or</b>	
FOR 385	Computer Applications in NRM	3
		<u>18</u>

**Park resource management**

Bachelor of science in agriculture  
130 semester hours

**Freshman**

**Fall semester**

GENAG 101	Ag Orientation	1
ENGL 100	Expository Writing I	3
MATH 100	College Algebra	3
PRRM 210	Introduction to Parks and Recreation Professions	2
	General Chemistry	5
CHEM 110	General Chemistry	5
SPCH 106	Public Speaking I	3
		<u>17</u>

**Spring semester**

ENGL 120	Expository Writing II	3
PRRM 440	Use of Natural Resources for Leisure	3
SOCIO 211	Introduction to Sociology	3
FOR 385	Computer Applications in Natural Resource Management	3
	<b>or</b>	
CIS 110	Introduction to Personal Computing	3
KIN 101	Principles of Physical Fitness	1
		<u>13</u>

**Sophomore**

**Fall semester**

ECON 120	Principles of Microeconomics	3
FOR 330	Dendrology I	2
GEOL 100	Introduction to Geology	3
PSYCH 110	General Psychology	3
FOR 375	Introduction to Natural Resource Management	3
	<b>or</b>	
FOR 285	Introduction to Forestry	3
	Electives	3
		<u>17</u>

**Spring semester**

AGRON 305	Soils	4
BIOL 210	General Botany	4
	<b>or</b>	
BIOL 201	Organismic Biology	5
FOR 340	Dendrology II	2
PHYS 115	Descriptive Physics	4
	Western civilization or U.S. history course	3
		<u>17-18</u>

**Summer**

PRRM 350	Parks and Recreation Practicum	2
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**Junior**

**Fall semester**

PRRM 490	Parks and Recreation Administration I	3
STAT 330	Elementary Statistics for Social Sciences	3
	<b>or</b>	
STAT 340	Biometrics	3
PRRM 320	Recreation Dynamics	3
	Arts/humanities course	3
	Electives	3
		<u>15</u>

**Spring semester**

BIOL 433	Wildlife Conservation	3
PRRM 635	Environmental Interpretation	3
PRRM 520	Research Methods for Parks and Recreation	3
PRRM 385	Recreation Programming	3
JMC 325	Fundamentals of Public Relations	3
		<u>15</u>

**Senior**

**Fall semester**

PRRM 590	Park Operations and Facilities Management	4
BIOL 529	Fundamentals of Ecology	3
	Professional/free electives	8-9
		<u>15-16</u>

**Spring semester**

POLSC 520	State and Local Government	3
PRRM 675	Dimensions of Recreational Behavior	3
	Cultural diversity course	3
	Professional/free electives	6
		<u>15</u>

**Internship**

PRRM 492	Internship	3
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The "internship" work experience is required after the junior year.

**Park manager/ranger emphasis**

Select three of the following:

HORT 508	Landscape Maintenance	3
LAR 756	Design of Parks and Recreation Areas	3
PRRM 575	Management of Water Resources for Leisure	3
HORT 585	Arboriculture	3
GEOG 705	Remote Sensing of the Environment	3
AGEC 525	Natural Resource Economics	3
PLTH 500	Plant Pathology	3
ENTOM 312	General Entomology	3
HORT 612	Turf Management	3
FOR 210	Forestry Graphics	2
FOR 311	Forestry Instruments	2
HORT 374	Woody Plants I	3
HORT 375	Woody Plants II	3

**Park interpreter emphasis**

Select three of the following:

JMC 235	Mass Communication in Society	3
PRRM 640	Advanced Interpretation	3
BIOL 470	Introductory Limnology	4
BIOL 542	Ichthyology	3
BIOL 543	Ornithology	3
BIOL 547	Herpetology	2
ENTOM 312	General Entomology	3
GEOG 705	Remote Sensing of the Environment	3
FOR 210	Forestry Graphics	2
BIOL 551	Taxonomy of Flowering Plants	4
BIOL 544	Mammalogy	3

**Parks and recreation administration**

Bachelor of science in agriculture  
130 semester hours

**Freshman**

**Fall semester**

GENAG 101	Ag Orientation	1
ENGL 100	Expository Writing I	3
MATH 100	College Algebra	3
PRRM 210	Introduction to Parks and Recreation Professions	2
	General Chemistry	5
CHEM 110	General Chemistry	5
SPCH 106	Public Speaking I	3
		<u>17</u>

<b>Spring semester</b>		
ENGL 120	Expository Writing II	3
KIN 101	Principles of Physical Fitness	1
FOR 385	Computer Applications in Natural Resource Management	3
<b>or</b>		
CIS 110	Introduction to Personal Computing	3
PRRM 440	Use of Natural Resources for Leisure	3
ECON 120	Principles of Microeconomics	3
		<b>13</b>

<b>Sophomore</b>		
<b>Fall semester</b>		
MKTG 400	Marketing	3
PSYCH 110	General Psychology	3
GEOL 100	Introduction to Geology	3
SOCIO 211	Introduction to Sociology	3
PRRM 320	Recreation Dynamics	3
		<b>15</b>

<b>Spring semester</b>		
BIOL 210	General Botany	4
<b>or</b>		
BIOL 201	Organismic Biology	5
GENBA 391	Administrative Communications	3
Cultural diversity course		
Western civilization/U.S. history course		
Arts/humanities course		
		<b>16-17</b>

<b>Summer</b>		
PRRM 350	Parks and Recreation Practicum	2

<b>Junior</b>		
<b>Fall semester</b>		
PHYS 115	Descriptive Physics	4
MANGT 420	Management Concepts	3
PRRM 490	Parks and Recreation Administration I	3
STAT 330	Elementary Statistics for Social Sciences	3
<b>or</b>		
STAT 340	Biometrics	3
Electives		3
		<b>15</b>

<b>Spring semester</b>		
PRRM 385	Recreation Programming	3
PRRM 520	Research Methods for Parks and Recreation	3
PRRM 635	Environmental Interpretation	3
PRRM 699	Parks and Recreation Administration II	3
Electives		3
		<b>15</b>

<b>Senior</b>		
<b>Fall semester</b>		
MANGT 520	Organizational Behavior	3
PRRM 590	Park Operations and Facilities Management	4
POLSC 737	Public Budgeting Techniques	3
LAR 756	Design of Recreation and Park Areas	3
Electives		3
		<b>16</b>

<b>Spring semester</b>		
POLSC 520	State and Local Government	3
JMC 325	Fundamentals of Public Relations	3
PRRM 675	Dimensions of Recreational Behavior	3
Free electives*		7-8
		<b>16-17</b>

<b>Internship</b>		
PRRM 492	Internship	3
The "internship" work experience is required after the junior year.		

*Select two of the following:		
PLAN 315	Introduction to Planning	3
FOR 510	Urban Forestry	3
FOR 520	Urban Forestry Administration	3
AGEC 525	Natural Resource Economics	3

**Horticulture courses Undergraduate credit**

**HORT 110. Introduction to Horticulture.** (1) I. A survey of commodities and specialties in horticulture and the career opportunities they offer. One hour lec. a week, to be taught by specialists in each area. Required of freshman and sophomore majors and open to all nonmajors.

**HORT 153. Home Horticulture.** (2) II. An introduction to the basic concepts and practices of horticulture. Culture, use, and relationships of horticultural plants in the garden, yard, and home are stressed. Two hours of lec. a week. For nonmajor students only.

**HORT 155. Home Horticulture Laboratory.** (1) II. The application of horticultural practices with emphasis on the establishment, maintenance, and use of horticultural plants in and around the home. Three hours lab a week. Pr.: HORT 153 or conc. enrollment.

**HORT 180. Basic Floral Design Concepts.** (3) I. An introduction to the use of flowers and related products with emphasis on fundamentals of design. Two hours rec. and three hours studio a week. For majors or nonmajors.

**HORT 200. Plant Science.** (4) II. Study of the production principles of economic plants, including morphology, taxonomy, physiology, ecology, propagation, preservation, storage, and utilization. Three hours lec. and one two-hour lab a week.

**HORT 255. Introduction to Horticultural Therapy.** (1) I, II. Introduction to horticultural therapy programs, activities, and resources. Orientation to the profession, roles, and functions of horticultural therapists, and to the broad range of skills required to work with psychiatric, developmentally disabled, geriatric, corrections, and noninstitutional clients. One hour rec. a week.

**HORT 290. Florist Shop Internship.** (1) I, II, S. Principles of commercial florist shop operations including exposure to the multiple phases of work in a retail flower shop. Retail florist shops with wire services will be selected for the internship.

**HORT 299. Flower Judging.** (1) I. Principles of judging cut flowers, flowering potted plants, and foliage plants for flower shows and judging contests. Pr.: Consent of instructor.

**HORT 325. Indoor Plants and Flowers.** (2) I, II. The selection, culture, and use of plants in homes, schools, offices, and public buildings. Two hours lec. a week. No prerequisites.

**HORT 333. Gardening for Food.** (2) II. An introductory course on how to plant, culture, harvest, and store fruits and vegetables at home. Two hours rec. a week. Nonmajor. No prerequisites.

**HORT 350. Plant Propagation.** (3) I. Designed to develop proficiency in the various skills and techniques necessary for propagation of horticultural plants. Basic fundamentals of seed structure and vegetative makeup of plants are emphasized. Two hours rec. and two hours lab a week. Pr.: HORT 200.

**HORT 374. Woody Plant Materials I.** (3) I. Identification, ornamental characters, site requirements, and use of woody ornamental deciduous trees and shrubs with special emphasis on the cultivated varieties. Weekly labs consist of lengthy walking campus tours to identify plant specimens. Three hours lec. and two hours lab a week. Pr.: BIOL 210; HORT 200; or BIOL 198.

**HORT 375. Woody Plant Materials II.** (3) II. Identification, ornamental characters, site requirements, and use of woody ornamental conifers, broadleaf evergreens, vines, ground covers, deciduous flowering shrubs, and small- to medium-size flowering trees. Weekly labs consist of lengthy walking campus tours to identify plant specimens. Three hours lec. and two hours lab a week. Pr.: HORT 374.

**HORT 380. Advanced Floral Design Concepts.** (3) II. Stylized floral design and related management for the commercial florist shop, including corsages, wedding decorations, funeral pieces, and party/banquet decorations. Two hours rec. and three hours studio a week. Pr.: HORT 180.

**HORT 390. Horticulture Topics.** (Var.) I, II, S. Lectures and discussion of topics of importance to undergraduate majors. Pr.: Consent of instructor.

**HORT 450. Landscape Development.** (3) I. The location and arrangement of plants and other permanent features of the landscape around homes and other similar areas. Two hours lec. and two hours lab a week. Pr.: HORT 374 and 375.

**HORT 460. Bedding and Foliage Plants.** (4) I. Identification of herbaceous annuals, biennials, and perennials found in the bedding plant industry and of tropical foliage plants used in the consumer and commercial interiorscape market. Discussion of production techniques, consumer care, and commercial maintenance. One hour rec., two hours lec., and one three-hour lab weekly. Pr.: BIOL 210, HORT 200.

**Undergraduate and graduate credit in minor field**

**HORT 508. Landscape Maintenance.** (3) II. Fundamental principles of maintaining ornamental plantings of trees, shrubs, perennials, and turf in the nursery, home grounds, parks, and similar areas. Three hours rec. a week. Pr.: HORT 374 and/or 375.

**HORT 520. Fruit Production.** (3) I. Principles and practices of cultivating fruit and nut crops commercially and in the home grounds. Laboratory offers experiences in pomological practices. Two hours rec. and two hours lab a week. Pr.: HORT 200 or equiv. and 350.

**HORT 525. Horticulture for Special Populations.** (3) I. An intensive study of the concepts and methods of using plants and gardening as therapeutic activities with developmentally disabled, geriatric, economically and socially disadvantaged, emotionally disturbed, or educationally deprived clients. Two hours rec. and two hours lab a week. Pr.: BIOL 210 or HORT 200.

**HORT 530. Horticultural Therapy Seminar.** (1) II. Guest lecturer and student presentations of topics relating to professionalism, current issues, or goals of horticultural therapy. The course is intended to help students focus expectations and assumptions about a professional career in horticultural therapy and to give them practice in articulating their understanding of the field. Pr.: HORT 255 and 525.

**HORT 535. Horticultural Therapy Field Techniques.** (3) I, II. Students under supervision will plan, conduct, and evaluate horticultural therapy activities at Manhattan institutional sites selected according to student's interest. A weekly discussion session addresses evaluation and issues of professionalism. Two hours rec. and two hours lab a week. Pr.: HORT 525.

**HORT 540. Horticultural Therapy Field Experiences.** (12) I, II. Supervised training at institutions with horticultural therapy programs to gain experience in the application and use of horticultural activities for special populations. Six months intensive training provided within student's specialization. Pr.: HORT 535.

**HORT 551. Landscape Contracting.** (3) II, in odd years. The use, interpretation, and development of planting plans (including contracting, construction, and specifications) as applied to landscape horticulture. Two hours rec. and two hours lab a week. Pr.: HORT 374 and/or 375.

**HORT 560. Vegetable Crop Production.** (3) II. Study of production principles and cultural practices involved in the growing of vegetable crops. Two hours lec. and two hours lab or field trips a week. Pr.: HORT 200.

**HORT 570. Greenhouse Management.** (3) I. Greenhouse construction, environmental control, crop scheduling, and management. Two hours rec. and three hours lab a week. Pr.: HORT 200.

**HORT 575. Nursery Management.** (3) II. A study of the various practices and methods of operating a commercial nursery for the production of ornamental woody plants used for landscaping purposes. Two hours rec. and three hours lab a week. Pr.: BIOL 210, HORT 200, HORT 350, and AGRON 305.

**HORT 582. Pesticide Application Technology.** (3) II. The equipment, procedures, and techniques used in applying pesticides. Emphasis is placed on types, theory, operation, calibration, and maintenance of application equipment. Two hours rec. and three hours lab a week. Pr.: HORT 200 or BIOL 210 and an entomology or weed science course.

**HORT 585. Arboriculture.** (3) I. Principles and practices of maintaining shade and ornamental trees under urban environments. Two hours rec. and three hours lab a week. Pr.: HORT 200 and 374.

**HORT 590. Horticulture Field Study.** (1-4) I, II, S. Principles of commercial horticulture activity including exposure to multiple phases of the working horticulture enterprise. Students will be placed according to specific interest. For juniors and seniors in horticulture only. Pr.: HORT 200, plus one other core curriculum horticulture course.

### Undergraduate and graduate credit

**HORT 612. Turf Management.** (3) I. Establishment and maintenance concepts for lawn and recreational turf. Three hours rec. a week. Pr.: HORT 200, AGRON 305.

**HORT 617. Turfgrass Management Laboratory.** (2) I. Practical aspects of turf management, including: turfgrass species and weed identification, site analysis and problem solving, equipment, and turf site construction methods. Two two-hour labs weekly. Pr.: HORT 612 or conc. enrollment.

**HORT 625. Floriculture.** (4) II, in odd years. The principles and commercial practices for producing greenhouse florist crops. The relationship is stressed between a plant's physiological response and its greenhouse environment. Aspects of postharvest physiology are also covered. Three hours lec. and two hours lab a week. Pr.: HORT 350 and 570.

**HORT 640. Horticultural Problems.** (Var.) I, II, S. Problems and reports in floriculture, olericulture, ornamental horticulture, pomology, turfgrass, and horticultural therapy. Pr.: Consent of instructor.

**HORT 700. Vegetable Crop Physiology.** (3) I, in even years. Study of basic principles of applied physiology using specific vegetable crops as examples. Three hours lec. a week. Pr.: HORT 560, BIOL 500.

**HORT 706. Turfgrass Science.** (3) II. A study of environmental stresses on turfgrass growth and management. Microclimate effects on turf are studied. Temperature, moisture, aeration, light, traffic aspects are discussed. Three hours rec. a week. Pr.: HORT 612.

**HORT 730. Fruit Science.** (3) II. Detailed discussion of selected topics in fruit physiology. Three hours rec. a week. Pr.: HORT 520, BIOL 500.

**HORT 740. Horticultural Plant Breeding.** (3) I, in even years. Breeding methods and their application to the economic improvement of flowers, fruits, shrubs, trees, turfgrasses, and vegetables. Pr.: ASI 500 or equiv.

**HORT 751. Advances in Horticultural Therapy.** (3) I. New developments and applications of gardening or horticultural activities for special populations will be emphasized. Procedures for management of horticultural therapy programs, designing therapeutic or rehabilitation activities, and evaluation methods will be discussed. Reading of selected research publications relating to horticultural therapy will be assigned. Pr.: HORT 535.

**HORT 780. Topics in Horticulture.** (Var.) I, II, S. Discussion and lectures of important papers and contributions in this field. Pr.: Consent of instructor.

**HORT 792. Handling and Processing Fruits and Vegetables.** (3) I, in odd years. Field trips required. Principles of harvesting, grading, handling, nutritive value, and processing of fruits and vegetable crops. Pr.: BIOL 198 or equiv., and a course in organic chemistry or biochemistry.

### Forestry courses

#### Undergraduate credit

**FOR 210. Forestry Graphics.** (2) II. Construction and interpretation of maps, charts, and graphs employed in forestry and related resources. One hour rec. and three hours lab per week.

**FOR 285. Introduction to Forestry.** (3) I. An introduction to American forestry including: forestry heritage in the U.S., importance of forests, multiple-use concepts, management practices, utilization, protection, policy, and the profession of forestry.

**FOR 311. Forestry Instruments.** (2) I. Introduction to the use of instruments and applied measurements used in forestry and related resources. One hour lec. and three hours lab a week.

**FOR 321. Forestry Resource Topics.** (1) I. Student presentation of ideas, practices, and concepts in forestry or related areas. One hour rec. a week.

**FOR 330. Dendrology I.** (2) I. Identification, classification, silvical characteristics, distribution, and economic significance of North American angiosperm trees. One hour rec. and three hours lab a week. Pr.: BIOL 210 or equiv.

**FOR 340. Dendrology II.** (2) II. Identification, classification, silvical characteristics, distribution, and economic significance of North American gymnosperm trees. One hour rec. and three hours lab a week. Pr.: BIOL 210 or equiv.

**FOR 375. Introduction to Natural Resource Management.** (3) I. A survey of historic and present-day uses, problems, and basic management approaches associated with our renewable and nonrenewable natural resources. The impact of society, economics, law, politics, and philosophy on the management and use of our natural resources will also be examined.

**FOR 385. Microcomputer Applications in Natural Resource Management.** (3) II. A microcomputer course designed to develop basic skills needed by natural resource management professionals. The course will emphasize use of the microcomputer for communication of written and graphic information, record keeping, decision making, budgeting, and investment analysis. Two hours lec. and two hours lab a week. Pr.: FOR 285 or 375.

### Undergraduate and graduate credit in minor field

**FOR 510. Urban Forestry.** (3) I. A study of the urban forest ecosystem, with an emphasis on its management aspects. The course provides an indepth study of the theory and practical application of integrated management of the urban forest resource. The following areas will be emphasized: the role environment plays in management, watershed protection, water conservation, and research. Three hours lec. a week. Pr.: BIOL 210 or HORT 200 and either FOR 330 and FOR 340 or HORT 374 and HORT 375.

**FOR 520. Urban Forest Administration.** (3) II. This course is a study of urban and community forest administration. It considers the urban forest ecosystem involving an in-depth look at ownerships, composition, distribution, benefits, values, and administrative operation. The policies and politics of successful administration will be emphasized. Three hours lec. a week. Pr.: FOR 510.

### Undergraduate and graduate credit

**FOR 641. Forestry Problems.** (Var.) I, II, S. Work is offered in various fields of forestry. Pr.: Consent of instructor.

**FOR 643. Agroforestry Systems.** (2) II. Study of the woody and non-woody components of the land use management systems used in much of the world. Topics will include international agriculture and forestry covering the interaction of crops, livestock, and woody plants. The agroforestry concept, classification of systems, practices used worldwide, and the contribution of agroforestry to local economies of lesser developed countries will be examined. Two hours lec. a week. Field trip required. Pr.: BIOL 201 or BIOL 210 or HORT 200.

### Parks, recreation, and resource management courses

#### Undergraduate credit

**PRRM 210. Introduction to the Parks and Recreation Profession.** (2) I. Coverage of the parks and recreation profession to include, federal, state, county, and local agencies and positions. Private sector careers will also be examined. Two hours lec. a week.

**PRRM 320. Recreation Group Dynamics.** (3) II. Principles and methods of organizing and directing individual and group leisure activities and experiences. A mixture of lecture and experiential education. Field trips required. Two hours lec. and one and one-half hours lab a week.

**PRRM 350. Parks and Recreation Practicum.** (2) I, II, S. Required professional employment: a survey and application of the principles of park and recreation areas management and operations. Studies of selected aspects of natural resource management for recreation. Preparation and presentation of a comprehensive analysis of a specific assigned problem. Pr.: Sophomore in park resource management.

**PRRM 440. Use of Natural Resources for Leisure.** (3) II. A survey of the concepts, history, present status, and goals of outdoor recreation for leisure. Three hours lec. a week.

**PRRM 489. Recreation Programming.** (3) II. A study of the design, supply, and management of recreation programs by a variety of public, private, and commercial recreation and park agencies. Three hours lec. a week.

**PRRM 490. Parks and Recreation Administration I.** (3) II. A focus on basic skills specific to the management of public recreation and park agencies. Includes special emphasis on finance and budgeting, organizational structure, risk management, and an introduction to policy formulation. Three hours lec. a week.

**PRRM 492. Internship in Parks and Recreation.** (3) I, II, S. An intensive, paid practical experience with an approved agency, extending over a 15-week, 600-hour span. For seniors only.

## Undergraduate and graduate credit in minor field

**PRRM 520. Research Methods in Parks and Recreation.** (3) I. A study of basic research techniques and the application of specific methodologies in the analyses of recreation and park problems. Three hours lec. per week. Pr.: STAT 330 or 340.

**PRRM 575. Management of Water Resources for Leisure.** (3) II. A study of the management of water resources for leisure time uses. The course investigates the use of rivers, lakes, reservoirs, and marine resources. Management considerations, including agency policy formation, legal rights, use conflicts, and use valuation are covered.

**PRRM 590. Park Operations and Facilities Management.** (4) I. Planning, execution, and supervision of field maintenance, operations, and facilities management to include: job planning, budgeting, equipment selection and maintenance, and personnel practices. Three hours lec. and two hours lab a week. Pr.: Junior standing. PRRM 440 and 489.

## Undergraduate and graduate credit

**PRRM 635. Methods of Environmental Interpretation.** (3) II. This course focuses on principles and techniques necessary to communicate environmental and cultural values to visitors in park areas. The philosophy, theory, design, and application of interpretive media to communicate information about the environment is studied. Two hours rec. and three hours lab a week. Field trips required. Pr.: FOR 375 and PRRM 440.

**PRRM 640. Advanced Environmental Interpretation.** (3) II. This course builds on the principles and interpretive techniques which are introduced in PRRM 635. Specifically, labs emphasize development of personal interpretive skills and students are introduced to interpretive media not covered in PRRM 635 (e.g., video equipment, computers, etc.) The lecture and readings focus on the philosophy of interpretation and the theoretical framework for designing and evaluating interpretive strategies. One hour lec. and four hours lab a week. Field trips required. Pr.: PRRM 635.

**PRRM 675. Dimensions of Recreational Behavior.** (3) II. A case study of the motivational factors and trends affecting recreational visitation patterns, including: attitudes, preferences, and satisfaction measurements. Three hours lec. a week. Pr.: PRRM 490.

**PRRM 699. Parks and Recreation Administration II.** (3) II. A focus on personnel management, liability issues and funding options for parks and recreation agencies. Three hours rec. a week. Field trips required. Pr.: PRRM 490.

**PRRM 705. Parks and Recreation Theory and Policy.** (3) I, II. On sufficient demand. An analysis of the values, principles, theories, and processes of public policy development as it applies to the park and recreation profession. Three hours lec. a week. Pr.: PRRM 489.

**PRRM 799. Problems in Parks and Recreation.** (Var. 1-3) I, II, S. A special investigation of a problem in parks and recreation normally requiring a combination of experiential work, research, and writing. Pr.: PRRM 520 or 590.

# Pest Science and Management

Advisors: Barry A. Dover,\* Coordinator; Agronomy: Moshier; Entomology: Blocker and Broce; Grain Science: Pedersen; Horticulture, Forestry, and Recreation Resources: Geyer and Hellman; Plant Pathology: Bockus, Hctrick, Pfender, and Schwenk.

## Pest science and management Bachelor of science in agriculture 127 semester hours

Pest science and management is an interdisciplinary degree involving the Departments of Agronomy; Entomology; Horticulture, Forestry, and Recreation Resources; and Plant Pathology. The goal of pest science and management is the effective management of pests that affect humans, homes, livestock, food, and fiber while avoiding adverse effects on humans, wildlife, and the environment. Pest science and management also addresses fundamental questions about the biology of insects and plant diseases.

The pest science and management curriculum is administered by a committee of faculty from participating departments. Persons interested in the curriculum should contact the director of academic programs, College of Agriculture, for additional information and assignment of an advisor. It offers options as discussed below.

The pest management option prepares students to recognize and analyze factors that cause pest problems; prescribe an economical control that does not violate state or federal regulations and that has minimal adverse effects on the environment; advise on control programs, including ecologically sound preventive measures; and use new biological, cultural, and chemical controls as they evolve.

The business and industries option permits students to take more business and economics courses and fewer biological science courses, while still providing basic core courses in entomology, plant pathology, weed science, and nematology. It is for students interested in private business, retail sales, and management.

The entomology and plant pathology science options are designed for students who wish to specialize and/or do graduate study in the various areas of those sciences.

Students majoring in pest science and management are required to complete the following basic courses:

### General requirements

ENGL 100	Expository Writing I	3
ENGL 120	Expository Writing II	3
SPCH 105	Public Speaking IA	2
GENAG 101	Ag Orientation	1
MATH 100	College Algebra	3
CHM 210	Chemistry I	4
	<b>and</b>	
CHM 230	Chemistry II	4
	<b>or</b>	
CHM 110	General Chemistry	5
	Communications course	2-3
ECON 110	Principles of Macroeconomics	3
KIN 101	Principles of Physical Fitness	1
	Humanities and social sciences	9

Other requirements depend upon the option selected.

### Pest management option

#### Curriculum requirements:

AGRON 330	Weed Management	3
ENTOM 300	Economic Entomology	3
ENTOM 312	General Entomology	2
ENTOM 314	Insect and Arachnid Identification	3
	ENTOM 420 Insecticides: Properties and Laws	2
ENTOM 612	Insect Pest Diagnosis	2
HORT 582	Pesticide Application Technology	3
PLPTH 500	Principles of Plant Pathology	3
PLPTH 607	Plant Disease Diagnosis	2
PLPTH 613	Plant Disease Control	3
ENTOM 651	Internship in Crop Protection	1-2
ENTOM 652	Seminar in Crop Protection	1

#### Supporting courses—agriculture and biological sciences:

HORT 200	Plant Science	4
	<b>or</b>	
AGRON 200	Crop Science	4
AGRON 305	Soils	4
AGRON 375	Soil Fertility	3
BIOL 198	Principles of Biology	4
BIOL 201	Organismic Biology	5
	<b>or</b>	
BIOL 210	General Botany	4
BIOL 529	Fundamentals of Ecology	3
ATM 653	Irrigation Practices	3

Four or more of the following suggested:

AGRON 350	Crop and Seed Quality	2
AGRON 360	Crop Growth and Development	3
AGRON 501	Range Management	3
AGRON 515	Soil Genesis and Classification	3
AGRON 520	Grain Production	3
AGRON 525	Crop and Soil Management	3
AGRON 550	Forage Management and Utilization	3
ENTOM 625	Biological Control of Insects	3
HORT 400	Plant Propagation	3
HORT 520	Fruit Production	3
HORT 560	Vegetable Crop Ecology	3
HORT 575	Nursery Management	3
HORT 612	Turf Management	3

#### Supporting courses—physical sciences and mathematics:

PHYS 115	Descriptive Physics	4
BIOCH 265	Introductory Organic and Biological Chemistry	5
CIS 110	Introduction to Personal Computing	3
	<b>or</b>	
CIS 200	Fundamentals of Computer Programming	2
	<b>and</b>	
	Computer Language Lab (200 level)	2
STAT 340	Biometrics I	3

**Business and industries option****Curriculum requirements:**

Curriculum requirements for the business and industries option are the same as the curriculum requirements under the pest management option.

**Supporting courses—agriculture and biological sciences:**

HORT 200	Plant Science .....	4
	<b>or</b>	
AGRON 220	Crop Science .....	4
AGRON 305	Soils .....	4
AGRON 375	Soil Fertility .....	4
BIOL 198	Principles of Biology .....	4

Two or more from list of supporting courses of pest management option.

**Supporting courses—physical sciences and mathematics:**

STAT 340	Biometrics I .....	3
PHYS 115	Descriptive Physics .....	4
BIOCH 265	Introduction to Organic and Biological Chemistry .....	5
CIS 110	Introduction to Personal Computing .....	3
	<b>or</b>	
CIS 200	Fundamentals of Computer Programming .....	2
	<b>and</b>	
	Computer language lab (200 level) .....	2

**Supporting courses—business administration and economics:**

ACCTG 231	Accounting for Business Operations .....	3
Four or more of the following suggested:		
MANGT 202	Small Business Operations .....	3
MANGT 390	Business Law I .....	3
MANGT 420	Management Concepts .....	3
MKTG 400	Marketing .....	3
MKTG 542	Sales Management .....	3
ACCTG 241	Accounting for Investment and Finance .....	3
ECON 530	Money and Banking .....	3
ECON 620	Labor Economics .....	3
ECON 631	Principles of Transportation .....	3
AGEC 318	Agribusiness Management .....	3

All other courses in AGECE with a 300 or higher course number.

## Plant Pathology

Fred W. Schwenk,\* Head

Professors Bockus,\* Claflin,\* Gill,\* Johnson,\* Schwenk,\* and Stuteville;\* Associate Professors Hetrick,\* Jardine,\* Leach,\* Leslie,\* Pfender,\* Tisserat,\* and White;\* Assistant Professors Bowden,\* Heaton,\* and Hulbert;\* Instructors O'Mara and Todd;\* Adjunct Assistant Professors Appel, Eversmeyer,\* Sauer,\* and Sim; Emeriti: Professors King and Willis;\* Adjunct Associate Professor Browder.\*

Plant pathology is the study of plant diseases, their causes, effects, nature, and control. Opportunities for graduates in plant pathology include basic and applied research, development, and teaching.

**Plant pathology**

Bachelor of science in agriculture under the pest science and management curriculum, which includes a plant pathology science option.

Students interested in the broad aspects of plant disease and insect and weed control should consider the pest management or business and industries option of the curriculum. Students who wish to specialize in the study of plant diseases should consider the plant pathology science option discussed below.

Students majoring in the plant pathology science option take the following courses in addition to the general requirements for the curriculum. See also information earlier in this college section.

**Major courses**

BIOL 210	General Botany .....	4
AGRON 305	Soils .....	4
ENTOM 300	Economic Entomology .....	3
	<b>or</b>	
ENTOM 312	General Entomology .....	2
	<b>and</b>	
ENTOM 313	General Entomology Lab .....	1
ASI 500	Genetics .....	3
PLPTH 500	Principles of Plant Pathology .....	3
BIOL 455	Microbiology .....	5
BIOL 605	Biology of the Fungi .....	3
	Crop production elective .....	3
	Botanical science electives .....	6

**Math and science courses**

MATH 150	Plane Trigonometry .....	3
MATH 220	Analytic Geometry and Calculus I ..	4
CIS 110	Introduction to Personal Computing .....	3
	<b>or</b>	
CIS 200	Fundamentals of Computer Programming .....	2
	Computer language lab (200 level) .....	2
STAT 340	Biometrics I .....	3
PHYS 113	General Physics I .....	4
PHYS 114	General Physics II .....	4
CHM 350	General Organic Chemistry .....	3
CHM 351	General Organic Chemistry Laboratory .....	2
BIOL 500	Plant Physiology .....	4

Select one of the following:

BIOCH 521	General Biochemistry .....	3
	<b>and</b>	
BIOCH 522	General Biochemistry Laboratory ..	2
BIOCH 755	Biochemistry I .....	3
	<b>and</b>	
BIOCH 756	Biochemistry Laboratory .....	2
	Free electives .....	23-24

**Plant pathology courses****Undergraduate and graduate credit in minor field**

**PLPTH 500. Principles of Plant Pathology.** (3) II. An introductory class in the nature of plant pathogens and the cause, effect, and control of plant diseases. Diseases of field and horticultural crops will be addressed. Two hours lec., one two-hour lab a week. Not open to students with credit for PLPTH 510 or 520. Pr.: BIOL 198, 210 or equiv., and junior standing.

**Undergraduate and graduate credit**

**PLPTH 607. Plant Disease Diagnosis.** (2) I. Theory and principles, with laboratory and practical experience in diagnosing diseases of field crops and horticultural plants. Two hours lec. and four hours lab a week. To meet first 10 weeks of semester. Pr.: PLPTH 500.

**PLPTH 613. Plant Disease Control.** (3) I. Disease control strategies are developed in a practical manner. Control economics and practices are considered in relation to principles and current research. Biological, cultural, physical, chemical, and regulatory methods are discussed. Two hours lec., one two-hour lab a week. Pr.: PLPTH 500.

**PLPTH 650. Plant Nematology.** (3) II. An introduction to the morphology, taxonomy, and ecology of phytoparasitic and free-living nematodes found in plants, soil, and fresh water. Emphasis is on the identification and control of plant parasitic nematodes and on lab techniques used in their study. Two hours lec., one two-hour lab a week. Pr.: An introductory course in plant pathology.

**PLPTH 735. Plant Virology.** (3) I, in odd years. A study of the classification, etiology, epidemiology, molecular biology, genetics, and evolution of plant-infecting viruses, with emphasis on viruses and viral diseases of importance to Kansas. The laboratory will emphasize general research techniques and equipment usage, particularly transmission, symptomatology, serology, centrifugation, nucleic acid extraction, and electrophoresis of plant viruses. Two hours lec., one four-hour lab a week. Pr.: Genetics, General Biochemistry and lab, and an introductory course in plant pathology; or consent of instructor.

**PLPTH 740. Plant Pathogenic Bacteria.** (3) II, in odd years. The etiology, epidemiology, dissemination and survival, taxonomy, mechanisms of pathogenicity, serology, host-parasite relations, control measures, and principles and methods of identifying plant pathogenic bacteria. Lab sessions will be devoted to use of general lab equipment and research techniques. Six hours combined lec./lab a week. Pr.: General Biochemistry, introductory course in plant pathology. Enrollment limited to 12 students.

**PLPTH 745. Plant Pathogenic Fungi.** (3) I, in even years. The isolation, handling, storage, inoculation, terminology, and taxonomy of fungal pathogens of plants. Particular attention will be given to techniques used to study fungi and to the genus and species concepts for important plant pathogenic fungal genera. Two hours lec., one three-hour lab a week. Pr.: PLPTH 500 and BIOL 640.

**PLPTH 750. Problems in Plant Pathology.** (1-3) I, II, S. Work is offered in general plant pathology, plant virology, plant nematology, disease physiology, epidemiology, and disease diagnosis. Pr.: Background of courses needed for the problem undertaken.

**PLPTH 760. Plant Pathology Methods.** (3) I, in even years. Practical lab methods in manipulating plant pathogens with emphasis on the isolation, culture, identification, inoculation, and preservation of plant pathogenic bacteria and fungi. One hour lec. and five hours lab a week. Pr.: PLPTH 500 or equiv. Enrollment limited to 12 students.

# Architecture and Design

Lane L. Marshall,\* Dean  
 Paul G. Windley,\* Associate Dean  
 William R. Jahnke,\* Assistant Dean  
 Lynn Ewanow, Assistant Dean

212 Seaton Hall  
 532-5950

The College of Architecture and Design offers opportunities for professional study in architecture, interior architecture, landscape architecture, and regional and community planning.

The college consists of four academic departments: architecture, interior architecture, landscape architecture, and regional and community planning.

The curriculum in architecture is accredited by the National Architectural Accrediting Board (NAAB). The interior architecture curriculum is accredited by the Foundation for Interior Design Education and Research (FIDER). The landscape architecture curricula are accredited by the Landscape Architectural Accreditation Board (LAAB). The planning curriculum is accredited by the American Planning Association (APA) in cooperation with the Association of Collegiate Schools of Planning (ACSP).

Bachelor's degrees are offered in architecture, interior architecture, and landscape architecture. Graduate degrees are offered in architecture, landscape architecture, and regional and community planning.

## General Requirements

### Electives

Curricula in the college indicate two types of electives: those listed as free electives may be chosen from any course offered in the university that is open to the student; those electives listed with a specific designation must be chosen from those courses in the indicated field that are open to the student. Four hours of electives may be taken in basic military science. Additional information concerning acceptable electives is available at the dean's office or departmental offices.

### Student projects

All programs involve extensive project work. Students are advised to budget sufficient funds to cover the cost of materials and supplies. Material costs will be higher than those published for non-studio curricula.

Student projects, assignments, presentations, and models may be retained by the various departments. Students are advised to assemble photographic files of their work for their portfolios.

### Transfer students

In addition to credit for general studies courses, transfer credit for professional courses equivalent to those offered by the College of Architecture and Design will be accepted if earned in environmental design programs accredited by NAAB, FIDER, or LAAB. Students who have questions concerning the transfer of specific courses should contact the dean's office.

## Options

### Design Discovery Program

The Design Discovery Program is an intensive design experience for students who are curious about the environmental design fields of architecture, interior architecture, landscape architecture, or regional and community planning. The program is offered in early summer for high school, community college, and other students not currently enrolled in the College of Architecture and Design.

Participants are offered an opportunity to learn about the challenges and rewards of a career in environmental design through direct interaction with professional designers.

Students explore their interests and abilities through a series of design exercises. Students who find the challenge of environmental design satisfying are given assistance in planning future courses of study.

### Honors program

Honors courses are open to students who wish to be challenged beyond the requirements of regular classes. Students in these seminars study selected topics in environmental design.

### Concurrent degree programs

The nature of the environmental design professions makes concurrent study toward a degree in a variety of other fields an attractive and logical decision for some students. Early development of such academic plans will allow the student sufficient time to coordinate courses and to plan enrollments. Interested students should contact the dean's office.

### Secondary majors

Certain departmental courses have been approved for credit toward the secondary major in gerontology, international studies, and women's studies. A listing of the approved courses may be found in the Secondary Majors section of this catalog.

### Admission to the college

Enrollment in the College of Architecture and Design is limited. Students are admitted once a year into the fall-semester studio classes of Environmental Design Studies (ENV D).

High school applicants and college transfer students who seek admission to the College of Architecture and Design, must file both (a) an application for university admission and (b) a freshman or transfer student self-report form for review by the Office of Admissions. These two forms can be mailed to the Office of Admissions at any time.

Admission decisions are made on a rolling basis. Students who are in the top 25 percent of their class are encouraged to apply in the fall semester of their senior year. Other students should complete their applications immediately after the 7th-semester high school transcripts are available.

Admission application forms and self-report forms may be obtained by contacting the dean's office or the Office of Admissions.

## Center for Planning and Design Innovation

Richard Forsyth, Director

The Center for Planning and Design Innovation coordinates the applied research and service activities of the college's four departments. CPDI has three objectives: to assist faculty in their efforts to develop new knowledge and methods to solve problems related to the planning, design, and management of the built and natural environment; to provide advisory support to planning and design practitioners, business/industry personnel, public agency staff, and special user groups in solving complex planning and design problems; and to assemble and disseminate new knowledge in these areas.

# Environmental Design Studies

All students are enrolled in environmental design studies for their freshman and sophomore years of study. In the first two years, student are introduced to the knowledge, concerns, attitudes, methods, and skills common to the environmental design professions of architecture, interior architecture, landscape architecture, and regional and community planning. After successful completion of these course requirements, students undertake the professional curricula in the degree-granting departments.

The professional curricula in architecture, interior architecture, and landscape architecture extends from the third through the fifth years. Admission to the degree-granting programs is determined by faculty in each department. The admissions process is administered by the Departments of Architecture, Interior Architecture, and Landscape Architecture. In all departments, admission may be affected by availability of teaching faculty, space, and equipment.

Participation in environmental design studies courses, together with a close working relationship with faculty advisors, helps students make informed career choices within, and sometimes outside, fields of study represented in the College of Architecture and Design.

Eligible transfer students may apply for admission to the accelerated studios in environmental design studies, which may enable them to complete the basic program requirements in one year.

## Environmental design studies 100 ENVD

The curriculum for the first two years forms the foundation of the five-year accredited professional programs in architecture, interior architecture, and landscape architecture.

Total hours required for ENVD curriculum ..... 66 minimum

### First year

First semester	
ENVD 205	Graphics I ..... 2
ENVD 230	Drawing and Visual Perception .... 2
ENVD 220	Theory of Environmental Design I .. 2
ENGL 100	Expository Writing I ..... 3
ART 195	Survey of Art History I ..... 3
or	
HIST 101	Western Civilization: Rise of Europe ..... 3
MATH 201	Elementary Applied Mathematics .. 3
	<b>15</b>

Second semester	
ENVD 206	Graphics II ..... 2
ENVD 231	Environmental Design Studio I .... 2
ENVD 222	Theory of Environmental Design II ..... 2
ENGL 120	Expository Writing II ..... 3
ART 196	Survey of Art History II ..... 3
or	
HIST 102	Western Civilization: Modern Era .. 3
PHYS 115	Descriptive Physics ..... 4
SPCH 105	Public Speaking IA ..... 2
	<b>18</b>

### Second year

Third semester	
ENVD 232	Environmental Design Studio II ... 4
ENVD 224	Theory of Environmental Design III ..... 2
ENVD 290	Technology of Designed Environment ..... 3
ENVD 291	Technology of Designed Environment Lab ..... 1
ENVD 250	History of the Designed Environment I ..... 3
KIN 101	Principles of Physical Fitness ..... 1
Limited elective	..... 3
	<b>17</b>

### Fourth semester

ENVD 233	Environmental Design Studio III ... 4
ENVD 226	Theory of Environmental Design IV ..... 2
ENVD 292	Concept of Structure ..... 3
ENVD 293	Concept of Structure Lab ..... 1
ENVD 251	History of the Designed Environment II ..... 3
Limited elective	..... 3
	<b>16</b>

High school mathematics prerequisites: Entering freshman or transfer students should have fulfilled the minimum prerequisites of: algebra I (one unit); plane geometry (one unit); algebra II (one unit); and trigonometry (one-half unit) before entering the College of Architecture and Design. The prerequisites may be fulfilled at K-State, or elsewhere, with the exception of geometry, which is not taught at K-State.

After satisfactory completion of the environmental design studies, students are eligible to apply for admission to the Department of Architecture, the Department of Interior Architecture, or the Department of Landscape Architecture.

## Environmental design studies courses Undergraduate credit

**ENVD 205. Graphics I.** (2) I, II, S. Instruction in instrument-aided drawing as a basic tool for communicating information about environmental subjects. Four hours of studio a week. Pr.: Permission of the College of Architecture and Design.

**ENVD 206. Graphics II.** (2) I, II, S. Instruction in the principles and methods of perspective drawing. Perspective drawing is used as a basic tool for communicating information about design components and properties. Four hours of studio a week. Pr.: ENVD 205. END-206-1-0201

**ENVD 207, 208. Form, Space, and Order I, II.** (3) I, II. A design course devoted to the study of the essential elements of form and space and the principles that control their organization in the designed environment. Three-dimensional design problems are used to develop an awareness of human behavior, perception, and response associated with the designed environment. A general course for nonmajors. Six hours studio a week.

**ENVD 207. Form, Space, and Order I.** (3) I. Pr.: ENVD 205, 206.

**ENVD 208. Form, Space, and Order II.** (3) II. Pr.: ENVD 205, 206, 207.

**ENVD 212. Studio for Environmental Design and Graphics.** (3) I, II, S. Introduction to graphic communication skills and problem-solving processes used by environmental designers. For students not enrolled in the College of Architecture and Design. Six hours studio a week.

**ENVD 220. Theory of Environmental Design I.** (2) An introduction to the social, cultural, and behavioral factors in environmental design. Two hours lec. a week.

**ENVD 221. Theory of Environmental Design Honors I.** (1) I. Same as ENVD 220, but includes additional seminar sessions requiring reading, writing, and discussion. For honors students.

**ENVD 222. Theory of Environmental Design II.** (2) II. An introduction to the relationship of the natural environment to the life within it and as a factor in environmental design. Two hours lec. a week. Pr.: ENVD 220.

**ENVD 223. Theory of Environmental Design Honors II.** (1) II. Same as ENVD 222, but includes additional seminar sessions requiring reading, writing, and discussion. For honors students. Pr.: ENVD 220.

**ENVD 224. Theory of Environmental Design III.** (2) I. An introduction to elements of design; visual and aesthetic factors relating the designed environment to human needs. Two hours lec. a week. Pr.: ENVD 222.

**ENVD 225. Theory of Environmental Design Honors III.** (1) I. Same as ENVD 224, but includes additional seminar sessions requiring reading, writing, and discussion. For honors students. Pr.: ENVD 222.

**ENVD 226. Theory of Environmental Design IV.** (2) II. An introduction to the relationship of science and technology to the designed environment. Two hours lec. a week. Pr.: ENVD 224.

**ENVD 227. Theory of Environmental Design Honors IV.** (1) II. Same as ENVD 226, but includes additional seminar sessions requiring reading, writing, and discussion. For honors students. Pr.: ENVD 224.

**ENVD 230. Drawing and Visual Perception.** (2) I, II, S. Instruction in the visual perception, drawing, and verbal description of design components and properties of environmental subjects at different scales of observation. Four hours of studio a week. Pr.: Admission to the College of Architecture and Design.

**ENVD 231. Environmental Design Studio I.** (2) I, II, S. Instruction in the relationships between design components and properties at different scales of observation. Introduction to design process. Continued instruction in design communication skills. Four hours of studio a week. Pr.: ENVD 230.

**ENVD 232, 233. Environmental Design Studio II, III.** Studies in a wide range of environmental design problems using varied means of communications as they pertain to architecture, interior architecture, and landscape architecture. Eight hours of studio a week.

**ENVD 232. Environmental Design Studio II.** (4) I. Pr.: ENVD 231.

**ENVD 233. Environmental Design Studio III.** (4) II. Pr.: ENVD 232.

**ENVD 240. Honors Seminar in Environmental Design Studio.** (1) I, II. Discussion and additional reading concerning issues arising out of an environmental design studio. For honors students, repeatable for credit. To be taken conc. with an EDS studio.

**ENVD 250 and ENVD 251. History of the Designed Environment I and II.** A study of the history of the built environment and its relationship to the societies that produced it; classic times to present. Three hours lec. a week.

**ENVD 250. History of the Designed Environment I.** (3) I. Pr.: HIST 102 or ART 196.

**ENVD 251. History of the Designed Environment II.** (3) Pr.: ENVD 250.

**ENVD 290. Technology of the Designed Environment.** (3) I. Criteria for evaluation and selection of materials; the art of joining; introduction to communicating construction information; interrelation of material properties, fabrication-erection, methods, and design considerations. Introduction to systems of environmental control. Taken conc. with ENVD 291. Pr.: MATH 201 and PHYS 115.

**ENVD 291. Technology of the Designed Environment Laboratory.** (1) I. Laboratory/recitation to supplement and reinforce the material covered in lecture course. Taken conc. with ENVD 290.

**ENVD 292. The Concept of Structure.** (3) II. A descriptive course in structures in the natural and built environment covering concepts and vocabulary. Topics include force, equilibrium, active and reactive forces, stability, and strength of materials. Emphasis is on design decisions. Three hours lec. a week. Taken conc. with ENVD 293. Pr.: MATH 201 and PHYS 115.

**ENVD 293. The Concept of Structure Laboratory.** (1) II. Laboratory/recitation to supplement and reinforce the material covered in lecture course. Taken conc. with ENVD 292.

**ENVD 299. Problems in Basic Design.** (Var.) I, II, S. A study of specified problems in elementary environmental design under the guidance of a member of the staff. Pr.: Approval of department head.

**ENVD 341, 342. Accelerated Environmental Design Studio I, II.** Foundation in environmental design with emphasis on design fundamentals and graphic communication skills. Pr.: For transfer students with 8 or more credit hours in environmental design, graphics, and/or art studio courses, and admission to the College of Architecture and Design. Twelve hours of studio a week.

**ENVD 341. Accelerated Environmental Design Studio I.** (6).

**ENVD 342. Accelerated Environmental Design Studio II.** (6) Pr.: ENVD 341.

**ENVD 351. Developments in the Built Environment: 1890-1945.** (3) I. Examination of developments in design in Europe and the United States. Attention given to diversity of movements throughout the period. Emphasis given to attitudes toward design and to the socio-cultural context in which they occurred. Pr.: ENVD 251 or equiv.

**ENVD 352. Developments in the Built Environment Since 1945.** (3) II. Examination of recent developments in the design of buildings and urban schemes in Europe and the United States. Course will focus on diversity of contemporary directions and influential design attitudes. Three hours lec. a week. Pr.: ENVD 251 or equiv.

**ENVD 370. Perspective Methodology for Designers.** (2) Intercession. Mechanical and freehand perspective drawing methodology as a systematic approach to three-dimensional design. Projects will be directed toward the individual student's area of interest and need. Pr.: ENVD 208 and 2 hours drawing credit.

**ENVD 375. The Designed Environment and Human Behavior.** (3) I. An introduction to those aspects of human behavior which influence the process of environmental design, including the ways in which people perceive, think about, respond to, and interact in physical settings. Techniques for environmental analysis and design from a behavioral perspective will be applied to architectural, urban, and natural settings. Three hours lecture/seminar a week.

**ENVD 380. Visual Thinking.** (2) Intercession. An analysis of human recognition, visualization, and recording of environmental experiences. Experimental exercises in sensory stimulation and response recording.

## Undergraduate and graduate credit in minor field

**ENVD 505. Architectural Materials Testing.** (2) I, II. Testing of materials commonly used in architecture, interior architecture, and landscape architecture, including steel, wood, concrete, aluminum, and plastics. Experimental evaluation of connections used with each material. Data analysis and report writing. One hour lec. and two hours lab a week. Pr.: ENVD 292 and junior standing.

**ENVD 510. Surroundings for People.** (3) II, S. Functional and visual analysis of the designed environment; human response; relation to nature; introduction to design approaches; case studies; strategies for problem solving. Three hours illustrated lec.-discussion a week. Not for students in architecture, interior architecture, or landscape architecture.

**ENVD 520. Design Graphics Workshop.** (1-4) I, II, S. Exposure to principles, techniques, and discipline of the communication modes of design drawing; exercises to illustrate the basic methodologies of perspective, orthographic, and oblique graphic systems for displaying three-dimensional messages of physical design issues and ideas. Pr.: Junior standing; open to nonmajors; architecture and design majors by permission of the department head only.

**ENVD 560. Accelerated Environmental Design and Graphics.** (3) I, II, S. An accelerated study of design principles, elements, and methods facilitating the ability of students to translate ideas and concepts from their academic areas into two- and three-dimensional representation. Primarily for students from non-design baccalaureate programs entering graduate studies in architecture, landscape architecture, or regional and community planning. Nine hours studio a week.

## Undergraduate and graduate credit

**ENVD 650. Preservation Documentation.** (3) I, II. Investigation of existing buildings and their settings; documenting design qualities, history, materials, systems, construction techniques, landscape, and physical and functional changes over time, using Historic American Building Survey Standards. Pr.: Senior standing and proficiency in drafting.

**ENVD 651. Preservation Principles and Methods.** (3) I. Examination of theoretical and practical aspects of the preservation process of the built environment in the United States. Topics covered include: historical background, legislation, roles of preservation organizations, funding techniques, ramifications of historic districts and zoning, approaches to restoration and rehabilitation, scope of objectives. Three hours seminar a week. Pr.: Senior standing.

**ENVD 655. History of the Built Environment in the Midwest.** (3) II. Examination of physical growth and development in the midwest-plains region, concentrating on second half of the nineteenth and early twentieth centuries. Investigation of both settlement patterns and basic building forms and types within a broad socio-cultural context. Seminar offered alternate years. Pr.: Senior standing. (For graduate and undergraduate credit.)

**ENVD 670. History of American Architecture and Allied Design I.** (3) I. The history of American architecture including aspects of interior architecture, landscape architecture, urban planning, and preservation. This course investigates how the built forms of various colonial settlers in America responded to a new environment and, consequently, how a distinctive American culture eventually took shape by the end of the 1800s. Pr.: ENVD 250 and 251 or approval of the instructor.

**ENVD 671. History of American Architecture and Allied Design II.** (3) II. The history of American architecture including some aspects of interior architecture, urban planning, landscape architecture, and preservation. This course will survey those distinctively American styles of design which originated in the late 1800s and will trace their impact on world

architecture and how outside influences shaped American design during that same time period up to the present. Particular emphasis will be placed upon the interplay of formal and functional concerns in architectural design. Pr.: ENVD 250 and 251 or approval of the instructor.

**ENVD 699. Problems in Environmental Design.** (Var.) I, II, S. A study of specific environmental design problems under the direction of a member(s) of the departmental staff. Pr.: Junior standing.

# Architecture

William Miller,\* Head

Professors Coates,\* DeVilbiss, Ernst,\* Foerster,\* Garvin, Hoag,\* Jahnke,\* Kremer,\* Miller,\* Stotesbury,\* and Windley;\* Associate Professors Charney,\* Condia,\* Jones, McNamara,\* Norris-Baker,\* Owens-Wilson,\* Sachs,\* Seamon,\* Selfridge,\* Siepl Coates,\* C. Watts,\* D. Watts,\* and Wendt; Assistant Professors Clarke, Closet, Knox, Kristic,\* J. Lowe, L. Lowe, Ornelas, and Streeter; Instructors: Anderson and Pecar; Adjunct Instructors: Barucchier and Seligson; Emeriti: Professors Chang, Christensen, Fischer, Heintzelman, Krider, Sanner, and Slack.

One of the few certainties the future holds is change. For this reason, the professional program in architecture emphasizes principles, analytical processes, and communication in addition to technical skills and knowledge. The program consists of four interrelated groups of professional courses in design, planning and programming, environmental analysis and technology, and professional practices, as well as an elective group. The design studio sequence is employed to apply much of the information introduced in other courses and to explore design issues and processes.

Optional study experiences are available through foreign study in Italy or a 30-week internship program. The internship, which involves work experience in professional offices, industry, or governmental agencies, gives students the opportunity to consolidate their academic experience in a professional context.

To become an architect, many states require an accredited professional degree. Two types of degrees are accredited by the national Architectural Accrediting Board: (1) the master of architecture, which requires a minimum of three years following an unrelated bachelor's degree or two years following a related preprofessional bachelor's degree, and (2) the bachelor of architecture, which requires a minimum of five years of study. These professional degrees are structured to educate the architect, and those who aspire to registration and licensure should consider a

program of this type. Where offered, the four-year preprofessional degree is not accredited by NAAB. This degree provides students with a less extensive study of architecture than would a professional degree. The preprofessional degree is useful for those who wish a strong foundation in the field of architecture. It will prepare those who wish to continue their architectural education in a professional program to become an architect, or to seek employment options in other architecturally related areas.

The bachelor of architecture degree offered by K-State is the NAAB-accredited professional degree.

## Architecture program

### 115 AR

Total hours required for graduation—167

For the curriculum requirements for the first four semesters, see environmental design studies earlier in this section.

#### Fifth semester

ARCH 401	Architectural Design Studio I	5
ARCH 413	Environmental Systems in Architecture I	4
ARCH 450	Structural Systems in Architecture I	3
LAR 500	Site Planning and Design	3
Electives*		3
		<b>18</b>

#### Sixth semester

ARCH 402	Architectural Design Studio II	5
ARCH 514	Environmental Systems in Architecture II	3
ARCH 451	Structural Systems in Architecture II	3
ARCH 433	Building Construction Systems in Architecture I	3
Electives*		3
		<b>17</b>

#### Seventh semester

ARCH 603	Architectural Design Studio III	5
ARCH 515	Environmental Systems in Architecture III	3
ARCH 434	Building Construction Systems in Architecture II	3
PLAN 315	Introduction to Planning	3
ARCH 650	Architectural Programming	3
		<b>17</b>

#### Eighth semester

ARCH 604	Architectural Design Studio IV	5
Electives*		10
		<b>15</b>

or

ARCH 504	Architectural Internship	15
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#### Ninth semester

ARCH 680	Development Analysis	3
ARCH 701	Architectural Design Studio V	5
ARCH 705	Project Programming	1
ARCH 720	Environment and Behavior	3
ARCH 756	Topics in Professional Practice I	2
Electives*		3
		<b>17</b>

#### Tenth semester

ARCH 702	Architectural Design Studio VI	5
ARCH 757	Topics in Professional Practice II	2
Electives*		10
		<b>17</b>

\*Students must successfully complete at least 13 professional support elective credits and as many as 19 free elective credits.

Six hours of professional electives must be taken in history and/or theory courses.

## Architecture courses

### Undergraduate credit

**ARCH 301. Appreciation of Architecture.** (3) I, II, S. An analysis of the evolution of architectural styles to determine the relation of architectural expression to the needs of society. Three hours rec. a week. May not be taken for credit by students enrolled in the architecture, landscape architecture, and interior architecture curricula.

**ARCH 401 and ARCH 402. Architectural Design Studio I and II.** Relation of structures to their environment; client and community restraints; development of building programs; synthesis of functional, technical, and aesthetic considerations in the design of structures for human use. Twelve hours studio a week.

**ARCH 401. Architectural Design Studio I.** (5) I. Pr.: Admission to the professional program and ENVD 233 or 342.

**ARCH 402. Architectural Design Studio II.** (5) II, S. Pr.: ARCH 401.

**ARCH 413. Environmental Systems in Architecture I.** (4) I, II. Discussion of the influences of environmental technology upon design concepts. Three hours lec. and one hour rec. a week. Pr.: Admission to a professional program in the college.

**ARCH 433 and ARCH 434. Building Construction Systems in Architecture I and II.** (3 each) These courses deal with development of decision-making skills related to building construction systems in architecture, and with preparation of written and graphic communications which illustrate and direct the construction process. Methodologies for evaluating, selecting, manipulating, and interfacing building systems and materials are introduced with reference to changing technological, regulatory, and economic environments and their impact on building design. Materials properties, sequence of assembly, and studies of the construction process are reviewed. Two hours lec. and five and one-half hours of studio a week.

**ARCH 433. Building Construction Systems in Architecture I.** (3) II. Pr.: ENVD 290, 291, and admission to a professional program in the college.

**ARCH 434. Building Construction Systems in Architecture II.** (3) I. Pr.: ARCH 433.

**ARCH 450. Structural Systems in Architecture I.** (3) I. Broad approach to the design of building structures as whole systems. Basic issues and principles are identified by analysis of overall structural behavior in building forms. Simplified strategies and techniques are applied for analyzing and manipulating basic quantitative properties of major subsystems in response to anticipated loadings. Two hours lec. and three hours lab a week. Pr.: Admission to a professional program in the college and ENVD 290, 291.

**ARCH 451. Structural Systems in Architecture II.** (3) II. Continuation of the study of major subsystems begun in ARCH 450, and introduction of techniques for the design of key sub-system components. Issues associated with analysis and design of special building structures are studied. Treatment of basic constructive and economic aspects of design and selection of structural systems. Two hours lec. and three hours lab a week. Pr.: ARCH 450.

**ARCH 475. Problems in Architectural Presentation.** (Var.) I, II, S. Study of various methods of graphically representing architectural problems to develop professional office techniques. Pr.: Third-year standing and approval of instructor.

**ARCH 504. Architectural Internship.** (15) I, II. Thirty weeks off-campus work-study in the office of an architect, environmental designer, or allied organization; field experience and office production. This course is not for graduate credit. Pr.: ARCH 434, 603, not more than one grade of D in an architectural design course, and approval of the internship coordinator.

### Undergraduate and graduate credit in minor field

**ARCH 514 and ARCH 515. Environmental Systems in Architecture II and III.** (3 each) Criteria for selection and application of natural and mechanical environmental control systems in architecture. Focus on the integration of thermal, illumination, sanitary, movement, and acoustical systems with the building fabric and the natural environment. Contemporary and developing approaches are explored. Three hours lec. a week.

**ARCH 514. Environmental Systems in Architecture II.** (3) II. Pr.: ARCH 413.

**ARCH 515. Environmental Systems in Architecture III.** (3) I. Pr.: ARCH 413.

**ARCH 566. Problems in Architectural Design.** (Var.) S. Study of specific design problems under the direct supervision of a member of the architectural faculty. Pr.: Approval of instructor.

**ARCH 601. Topics in History of the Designed Environment.** (3) I, II. For the concentrated study of a particular period or subject in the history of the built environment. Seminars, readings, discussions, and projects. May be taken by majors in the College of Architecture and Design for a total of 12 hours credit. Three hours rec. a week. Pr.: ENVD 251 or approval of instructor.

**ARCH 603. Architectural Design Studio III.** (5) I, II. Problem analysis and program development, generation of alternate solutions, selection and refinement of the building design. Twelve hours studio a week. Pr.: ARCH 402 and not more than one grade of D in a prior architectural design course, and LAR 500 or concurrent enrollment in LAR 500.

**ARCH 604. Architectural Design Studio IV.** (5) I, II. Continuation of ARCH 603. Increased complexity of function and space definition systems. Relating environmental technology to total design. Twelve hours studio a week. Pr.: ARCH 603 and not more than one grade of D in an architectural design course.

**ARCH 655. Foreign Seminar.** (Var.) I, II, S. Group observation of design examples (ancient or modern) of a selected region, conducted in situ, to study significant aspects of environment, culture, and technology as relating to design solutions.

### Undergraduate and graduate credit

**ARCH 650. Architectural Programming.** (3) I, II. An introductory course surveying the basic philosophies and methodologies for architectural programming; emphasis on the comparative evaluation of different strategies and their integration within the process of design. Pr.: Senior standing or permission of the instructor.

**ARCH 680. Development Analysis.** (3) I, II. An examination of various development characteristics and components and their crucial interactive nature which leads toward success or failure of building and land developments. Development factors investigated include: market analysis, location uses and users, cost/benefits, nonmonetary benefits, financial returns expected and needed, financial incentives for investors, and feedback into the design process. Pr.: Admission to the professional program.

**ARCH 701. Architectural Design Studio V.** (5) I, II. Integration of the physiological, psychological, and sociological parameters in the design of people's environmental needs. Analysis, programming, and design of urban problems and/or large-scale site planning problems, increased complexity of function

and space definition systems. Relating environmental technology to total design. Twelve hours studio a week. Pr.: At least 2.0 GPA in required third-, fourth-, and fifth-year courses which have been taken; not more than one D in an architectural design course; at least a 1.75 GPA in required third-, fourth-, and fifth-year courses other than design which have been taken; either ARCH 604 or 504; ARCH 434, or ARCH 433 and conc. enrollment in ARCH 434; ARCH 515, or ARCH 514 and conc. enrollment in ARCH 515; or ARCH 450.

**ARCH 702. Architectural Design Studio VI.** (5) I, II. Development of the student's project programmed in ARCH 702, under the direction of a faculty committee. Project must demonstrate a high level of achievement in systematic and comprehensive thinking, application of resources, and communication of the total process. Twelve hours studio a week. Pr.: At least 2.0 GPA in required third-, fourth-, and fifth-year courses which have been taken; not more than one D in an architectural design course; at least a 1.75 GPA in required third-, fourth-, and fifth-year courses other than design which have been taken; either ARCH 700; ARCH 701; ARCH 434; ARCH 515; or ARCH 451, or ARCH 450 and conc. enrollment in ARCH 451.

**ARCH 703. Environmental Aesthetics.** (3) I, II. Problems involving aesthetics in areas related to student's major field. Three hours a week. Pr.: Senior standing in architecture, landscape architecture, interior architecture, architectural structures, urban design.

**ARCH 704. Environmental Seminar.** (Var.) I, II. Environmental systems related to human perception, reactions, and behavior. Pr.: Senior standing.

**ARCH 705. Project Programming.** (1) I, II. Independent development of a program for ARCH 702, Architectural Design VI, under the direction of a faculty committee. Pr.: ARCH 603 and approval of the faculty committee.

**ARCH 710. Topics in Architectural Design Methods.** (3) I, II. Intensive review of selected design methodologies, including systematic and computer-based approaches to problem definition and project design; emphasis upon the comparative evaluation of problem-solving strategies within the architectural design process. Pr.: Advanced undergraduate or graduate standing.

**ARCH 715. Theory of Design.** (3) I, II. Analysis of theories and philosophies in the design professions, including those in related societal and technological fields. Pr.: ARCH 603 or IAR 603 or IAR 641.

**ARCH 716. Environmental Systems in Architecture.** (3) I, II. Study of site-specific microenvironmental systems and the designed microenvironment about buildings. Exploration of their interaction and manipulation to meet human comfort requirements and achieve resource-efficient site and building design. Pr.: ARCH 413 and 402; or graduate standing.

**ARCH 720. Environment and Behavior.** (3) I, II. An introductory course investigating the relationship between human behavior and the design of the physical environment, identifying those basic psychological and social concepts which influence and are influenced by the built environment. Three hours lec.-rec. a week. Pr.: Senior standing or permission of instructor.

**ARCH 725. Architectural Research Methods.** (3) I, II. An introductory course surveying the basic philosophies and methodologies of science and research as they apply to the field of architecture. Special emphasis will be placed on those methods appropriate for investigating human response to the built environment. Three hours lecture/seminar a week. Pr.: Senior standing.

**ARCH 730. Environment and Aging.** (3) I, II. An exploration of the aging process related to those factors in the architecturally designed environment that hinder and facilitate successful adaptation by the aging individual. Three hours lecture/seminar a week. Pr.: Senior or graduate standing.

**ARCH 735. Topics in Building Construction Systems in Architecture.** (1-4) I, II. Advanced study of the relationship of conceptual and/or technological factors of building construction to architecture. Pr.: ARCH 434; or graduate standing and consent of instructor.

**ARCH 752. Structural Systems in Architecture III.** (Var.) I, II. Study of the relationship of conceptual and/or technological factors of structure to architectural design in more depth, or in a broader context of form-determining interactions than that presented in ARCH 450 and ARCH 451. Pr.: ARCH 450, ARCH 451.

**ARCH 756 and ARCH 757. Topics in Professional Practice I and II.** Studies of conventional and newly developing modes of professional architectural practice. The relationship of the architect and the profession to the user, client, building industry, and society. Two hours lec. a week.

**ARCH 756. Topics I.** (2) I, II. Pr.: Fourth-year standing.

**ARCH 757. Topics II.** (2) I, II. Pr.: Fourth-year standing.

**ARCH 765. Problems in Architecture.** (Var.) I, II, S. A study of specific architectural problems under the direction of a member of the department staff. Pr.: Approval of instructor.

## Interior Architecture

Stephen M. Murphy, Head

Professors Haycock, McDonald, and McGraw;\* Associate Professors Dubois, Husseini, and Murphy; Assistant Professors Brown, Bullock, Hastings, Thompson, and Troyer; Emeritus Professor Durgan.

The bachelor of interior architecture professional program consists of a three-year course of study following the two-year environmental design studies program.

The curriculum in interior architecture is structured for students who plan a professional career in space planning in commercial, institutional, and industrial interior design. After an introduction to basic interior space planning, students undertake studio exercises that include programming and designing of spaces. Special emphasis is placed on spatial organization, behavior analysis, space component design and construction, the integration of environmental systems, building rehabilitation, and the preparation of working drawings and contract documents.

An elective 30-week internship program, which may include work-study experience in professional offices or industry, gives advanced students the opportunity to work in a professional context and to apply the problem-solving approaches they have developed.

### Foreign study program

During their fourth year, interior architecture students may participate in the 30-week exchange program between K-State and a selected foreign institute, as

an alternative to the internship program. Students may earn 15 hours of credit while overseas.

### Interior architecture program 150 IAR

Total hours required for graduation—167

For the curriculum requirements for the first four semesters, see Environmental Design Studies, earlier in this section.

#### Fifth semester

IAR 401	Interior Architectural Design Studio I .....	5
ARCH 413	Environmental Systems in Architecture I .....	4
IAR 409	Materials and Finishes .....	2
IAR 413	Materials and Finishes Lab .....	1
IAR 415	History of Interior Architecture .....	2
	Free electives .....	3
		<b>17</b>

#### Sixth semester

IAR 402	Interior Architectural Design Studio II .....	5
ARCH 514	Environmental Systems in Architecture II .....	3
ARCH 433	Building Construction Systems in Architecture I .....	3
IAR 420	Theory of Furniture Design .....	2
IAR 407	Design Workshop I .....	3
		<b>16</b>

#### Seventh semester

IAR 603	Interior Architectural Design Studio III .....	5
ARCH 515	Environmental Systems in Architecture III .....	3
IAR 408	Design Workshop II .....	3
Free elective	.....	3
ARCH 434	Building Construction Systems in Architecture II .....	3
		<b>17</b>

#### Eighth semester

IAR 604	Interior Architectural Design Studio III .....	5
	Free electives .....	10
		<b>15</b>
	<b>or</b>	
IAR 644	Interior Architecture Internship .....	13
IAR 645	Interior Architecture Internship Reports .....	2
		<b>15</b>

#### **or**

IAR 646	Interior Architecture Foreign Studies .....	13
IAR 647	Interior Architecture Foreign Studies Reports .....	2
		<b>15</b>

### Option A

#### Ninth semester—A

IAR 701	Interior Architectural Design Studio V .....	5
IAR 601	Interior Architecture Seminar .....	3
ARCH 720	Environment and Behavior .....	3
IAR professional elective	.....	4
Marketing elective	.....	3
		<b>18</b>

#### Tenth semester—A

IAR 702	Interior Architectural Design Studio VI .....	5
IAR 754	Contract Design Practice .....	2
CT 260	Textiles .....	3
Management elective	.....	4
Free elective	.....	4
		<b>18</b>

**Option B****Ninth semester—B**

IAR 703	Product Design Studio/ Workshop I .....	5
IAR 755	Product Design Illustration .....	2
IAR 756	Theory of Product Design .....	2
IAR 601	Interior Architecture Seminar .....	3
Free elective .....		6
		<b>18</b>

**Tenth semester—B**

IAR 704	Product Design Studio/ Workshop II .....	5
IAR 754	Contract Design Practice .....	2
CT 260	Textiles .....	3
Free electives .....		8
		<b>18</b>

**Interior architecture courses****Undergraduate credit**

**IAR 406. Problems in Interior Architecture.** (Var.) I, II. Study of specific interior architectural problems under direct supervision of a member of the department. Pr.: Approval of instructor.

**IAR 409. Materials and Finishes.** (2) I. Introduction to materials and finishes specific to interior applications. Criteria for evaluation, selection, and application of interior materials and finishes with the building fabric and their impact on building design. Preparation of written and graphic communications to illustrate and direct the construction process. Two hours lec. a week. Pr.: Admission to the professional program in interior architecture.

**IAR 413. Materials and Finishes Laboratory.** (1) I. Identification and application of specific interior finishes. Two hours lab a week. Pr.: To be taken concurrently with IAR 409.

**IAR 414. Furniture Design Workshop.** (3) I, II, S. Design, construction, and finishing of contemporary furniture and accessories. Pr.: Open to all students in the professional programs in architecture and landscape architecture.

**IAR 415. History of Interior Architecture.** (2) I. History of the design of architectural interiors and their related components. Special emphasis upon the developments of the twentieth century. Pr.: Admission to professional program in architecture, interior architecture, or landscape architecture. Two hours lec. a week.

**IAR 420. Theory of Furniture Design.** (2) II. Design theory related to analysis, materials, and construction techniques of contemporary furniture. Pr.: Admission to professional program in architecture, interior architecture, or landscape architecture. Two hours lec. a week.

**Undergraduate and graduate credit**

**IAR 401, 402, 603, 604, 701, and 702. Interior Architectural Design Studio I through VI.** Analysis, synthesis, and design execution of various types of interior spaces, integrating such space design determinants as human factors, environmental-technological systems, activity structure, and symbiotic relationships. Not more than one grade of D in an interior architecture design studio course. *Interior Architectural Design Studios I and II are not for graduate credit.*

**IAR 401. Interior Architectural Design Studio I.** (5) I. Pr.: Admission to professional program and ENVD 233 or 342.

**IAR 402. Interior Architectural Design Studio II.** (5) II. Pr.: IAR 401.

**IAR 603. Interior Architectural Design Studio III.** (5) I. Pr.: IAR 402.

**IAR 604. Interior Architectural Design Studio IV.** (5) II. Pr.: IAR 603.

**IAR 701. Interior Architectural Design Studio V.** (5) I. Pr.: IAR 604.

**IAR 702. Interior Architectural Design Studio VI.** (5) II. Pr.: IAR 701.

**IAR 407 and 408. Design Workshop I and II.** Instruction in the sequence of courses consists of the design, development of shop drawings, construction, and finishing of interior space components. *Design Workshop I and II are not for graduate credit.*

**IAR 407. Design Workshop I.** (3) I. Pr.: Admission to a professional program and consent of instructor.

**IAR 408. Design Workshop II.** (3) II. Pr.: IAR 407.

**IAR 410. Interior Architecture Microcomputer Applications.** (2) I, II. Instruction in microcomputer operating procedure, general terminology, programming concepts for microcomputer, and use of appropriate word-processing specification writing and computer-aided design software as it relates to the interior architecture profession. Four hours lab a week. Pr.: Enrollment in the interior architecture program.

**IAR 601. Interior Architecture Seminar.** (3) I. Readings and discussion of contemporary thought and movements within the field of interior architecture with special emphasis on the societal factors which produce and affect change. Pr.: IAR 402 or graduate standing.

**IAR 644. Interior Architecture Internship.** (13) II, S. Thirty weeks off-campus work study in professional offices specializing in interior architecture: field and office experience. Pr.: IAR 603, ARCH 433, not more than one grade of D in an interior architecture design studio, and approval by the internship coordinator.

**IAR 645. Interior Architecture Internship Report.** (2) II, S. Taken in conjunction with IAR 644. The purpose is to develop the student's communication skills and awareness of the importance of written communication and record keeping in interior architectural office practice. The required report will provide a detailed documentation of the student's experiences encountered during internship. Pr.: Conc. enrollment in IAR 644.

**IAR 646. Interior Architecture Foreign Studies.** (13) II, S. This course allows the student to study outside of the United States for one semester. The semester will expand their global perspective of design professions, cultural, political, and economic views. One semester studying interior architecture in a foreign university. Pr.: IAR 603, ARCH 433, not more than one grade of D in an interior architecture design studio and approval by the foreign studies coordinator.

**IAR 647. Interior Architecture Foreign Studies Reports.** (2) II, S. Taken in conjunction with IAR 646. The purpose is to develop the student's written communication skills as well as increase awareness of written communication and record keeping in interior architecture office practice. The report will provide detailed documentation of the student's experiences during the Foreign Studies Program. Pr.: Conc. enrollment in IAR 646.

**IAR 703. Product Design Studio/Workshop I.** (5) I. Analysis, synthesis, and design of various types of products associated with the interior environment, integrating such human factor determinants as anthropometrics and ergonomics. Construction of prototype products associated with the human environment developed concurrently within the design studio. Fifteen hours studio/workshop a week. Pr.: IAR 604 or 644 or 646 and not more than one D in an interior architecture design studio course.

**IAR 704. Product Design Studio/Workshop II.** (5) II. Advanced design projects involving products related to the interior environment. Synthesis of the design, materials, construction, and finishing of prototype products relevant to human use. Fifteen hours studio/workshop a week. Pr.: IAR 703; not more than one D in an interior architecture design studio course.

**IAR 720. Advanced Seminar In Interior Architecture.** (1-3) I, II. Advanced readings and discussions of environmental issues related to the practice of interior architecture. Readings, discussions, reports. Pr.: IAR 702 or equiv.

**IAR 740. Advanced Design Workshop.** (1-4) I, II. Advanced instruction in the design, construction, and finishing of contemporary furniture and accessories. Pr.: IAR 414 or equiv.

**IAR 754. Contract Design Practice.** (2) II. Evaluation, selection, and specification of interior architectural materials, surfaces, and finishes. Pr.: IAR 604.

**IAR 755. Product Design Illustration.** (2) I. Exercises in various rendering techniques and involvement in different media presentations associated with product design. Pr.: IAR 604.

**IAR 756. Theory of Product Design.** (2) II. History and design theory related to analysis materials and construction in product design. Pr.: IAR 420.

## Landscape Architecture

Dennis L. Law,\* Head

Professors Barnes,\* Brooks,\* Day,\* Forsyth,\* Law,\* Marshall,\* and Page;\* Associate Professors Chelz, Clement,\* Ewanow, Keane,\* Rassman, and Winslow;\* Assistant Professors Alington, Hansen,\* Rolley,\* Schrader, and Wigfall;\* Emeriti: Professor Ealy.

The bachelor of landscape architecture professional program consists of a three-year course of study following the two-year environmental design studies program.

The curriculum is designed to prepare students for professional landscape architecture. Special emphasis is placed on outdoor space organization, land planning, topographical manipulation, landscape planning and construction, and the role of adapted plant materials in the landscape. The study of the human impact upon the environment, both natural and built, is emphasized. The bachelor of landscape architecture degree is accredited by the Landscape Architectural Accreditation Board of the American Society of Landscape Architects.

All required courses taught in the Department of Landscape Architecture that are counted toward the degree must be passed with a grade of C or better.

### Landscape architecture program 180 LAR

Total hours required for graduation—167

For the curriculum requirements for the first four semesters, see Environmental Design Studies earlier in this section.

**Fifth semester**

LAR 431	Landscape Architectural Design Studio I .....	4
LAR 436	Landscape Construction I .....	3
CE 212	Elementary Surveying Engineering* .....	3
HORT 374	Woody Plant Materials I** .....	3
Art elective .....		2
		<b>15</b>

**Sixth semester**

LAR 432	Landscape Architectural Design Studio II	4
LAR 437	Landscape Construction II	3
LAR 510	Landscape Architectural Delineation Techniques	2
HORT 375	Woody Plant Materials II	3
LAR 460	Microcomputer Applications in Landscape Architecture	3
		<b>15</b>

**Seventh semester**

LAR 641	Landscape Architectural Design Studio III	4
LAR 647	Landscape Construction III	3
LAR 541	Planting Design I	4
LAR 315	Introduction to Planning	3
LAR 433	History and Theory of Landscape Architecture	3
		<b>17</b>

**Eighth semester**

LAR 642	Landscape Architectural Design Studio IV	4
LAR 542	Planting Design II	4
GEOG 705	Remote Sensing of Environment	3
HORT 508	Landscape Maintenance	3
LAR 501	Landscape Architecture Seminar	2
LAR 744	Community Site Planning	3
		<b>19</b>

**Ninth semester**

LAR 701	Landscape Architectural Design Studio V	5
LAR 756	Designing Parks and Recreation Areas	3
LAR 501	Landscape Architecture Seminar	2
LAR 645	Professional Internship***	2
Business elective		3
General elective		3
		<b>18</b>

**Tenth semester**

LAR 702	Landscape Architectural Design Studio VI	5
LAR 753	Professional Practice	2
Business elective		3
Science elective		4
General elective		3
		<b>17</b>

\*Surveying is taught in civil engineering; MATH 150, Plane Trigonometry, or equivalent, is a prerequisite.

\*\*Woody Plant Materials is taught in horticulture and the prerequisite is one of these three courses: horticulture/agronomy or HORT 200 Plant Science; BIOL 210 General Botany; or BIOL 198 Principles of Biology.

\*\*\*Internship in a professional office is arranged by the student for the summer and credited in the next fall semester.

**Landscape architecture courses Undergraduate credit**

**LAR 431 and LAR 432. Landscape Architectural Design Studio I and II.** Design of the outdoor environment for human needs and activities; ecological considerations; project program, site selection, analysis, concept, design, communications, specification, construction, planting, and maintenance.

**LAR 431. Landscape Architectural Design Studio I.** (4) I. Two hours lec. and six hours design studio a week. Pr.: Admission to the professional program and ENVD 222, 233.

**LAR 432. Landscape Architectural Design Studio II.** (4) II. Two hours lec. and six hours design studio a week. Pr.: LAR 431.

**LAR 433. History and Theory of Landscape Architecture.** (3) I. The influences of social, political, economic, and climatic factors on historic landscape

styles; theory of landscape design. Three hours rec. a week. Pr.: First-year classification in professional LAR program.

**LAR 436. Landscape Construction I.** (3) I. Problems in the basic aspects of land construction to include topography, site grading, earthwork estimating, and vehicular requirements. Two hours lec. and six hours studio a week. Pr.: ENVD 222, 290, 292. Conc. with CE 212.

**LAR 437. Landscape Construction II.** (3) II. Continuation of LAR 436. To include site layout, road alignment, construction detailing, and cost estimating. Two hours lec. and six hours studio a week. Pr.: LAR 436.

**LAR 440. Problems in Landscape Design.** (Var.) I, II, S. Assigned problems and reports in landscape architecture. Pr.: Junior standing.

**LAR 450. General Landscape Design.** (3) I, II. Basic graphic communication skills, design principles, and design vocabulary covering residential and small scale landscape development plans. Two hours lec. and two hours studio a week. A general service course for non-architecture and design majors.

**LAR 460. Microcomputer Applications in Landscape Architecture I.** (3) I, II. Introduction of uses of microcomputers in typical landscape architectural practice; function, operation characteristics, and applications of computer software and hardware. Two hours lec. and two hours lab a week. Pr.: Sophomore standing.

**LAR 500. Site Planning and Design.** (3) I, II. Theory, principles, and elements of site planning and design. Lectures, readings, short problems, and site visits dealing with site analysis, ecological consideration, grading, drainage, circulation and parking, lighting, planting design, materials and details, management and maintenance, and cost factors. Pr.: ARCH 401 or conc. with ARCH 401.

**Undergraduate and graduate credit in minor field**

**LAR 501. Landscape Architecture Seminar.** (2) I, II. Required of all fourth- and fifth-year landscape architecture majors. Discussion of current trends in landscape architecture and related fields by students, faculty, and invited speakers. (Two 2-credit-hour seminars are required for a total of four hours.)

**LAR 510. Landscape Architectural Delineation Techniques.** (2) I, II. A study of delineation media and techniques that are related to the practice of landscape architecture in professional offices. Four hours studio a week. Pr.: ENVD 232 or 341.

**LAR 541. Planting Design I.** (4) I, II. Relationship between plants and the built environment; preparation of planting plans and their use as working drawings; elements and principles of planting design; specification writing; contractor relationships and design implementation. Two hours lec. a week and six hours of studio a week. Pr.: HORT 375; and BIOL 210 or HORT 200.

**LAR 542. Planting Design II.** (4) I, II. Specialized planting applications with emphasis on ecological issues in design; comprehensive in scale and complexity. Two hours lec. a week and six hours studio a week. Pr.: LAR 541.

**LAR 641 and LAR 642. Landscape Architectural Design Studio III and IV.** Design of the outdoor environment for human needs and activities; ecological considerations; project program, site selection, analysis, concept, design, communication, specification, construction, planting, and maintenance.

**LAR 641. Landscape Architectural Design Studio III.** (4) I. Twelve hours design studio a week. Pr.: LAR 432 and 436.

**LAR 642. Landscape Architectural Design Studio IV.** (4) II. Twelve hours design studio a week. Pr.: LAR 641 and 437.

**LAR 645. Professional Internship.** (2) I, II, S. Confirmed employment in a professional physical planning office, subject to the approval of the departmental faculty, for a period of eight weeks, documented by the employer and a written report by the student. Pr.: LAR 432, 437.

**LAR 647. Landscape Construction III.** (3) I. Continuation of LAR 437 to include utilities routing, area lighting, irrigation systems, and construction specification writing. Two hours lec. and six hours studio a week. Pr.: LAR 437.

**LAR 652. The Small Community in the Plains States.** (3) I, II, S. An overview of the diverse nature of small communities in the Plains states, with an emphasis on the forms and patterns in the existing physical environment. Instruction in various methods of survey and analysis at the regional and community-specific scales, and application of these techniques to a different community each semester. Pr.: Fourth-year standing.

**LAR 660. Landscape Rehabilitation of Disturbed Lands.** (3) I. Planning rehabilitation of lands disturbed by mining and construction. Review of mining procedures, ecological systems, slope rehabilitation, and revegetation techniques. Three hours lec. a week. Pr.: Junior standing.

**Advanced undergraduate and graduate credit**

**LAR 701 and LAR 702. Landscape Architectural Design Studio V and VI.** Design of the outdoor environment for human needs and activities; ecological considerations; project program, site selection, analysis, concept, design, communication, specification, construction, planting, and maintenance.

**LAR 701. Landscape Architectural Design Studio V.** (5) I. Fifteen hours design studio a week. Pr.: LAR 642 and 647.

**LAR 702. Landscape Architectural Design Studio VI.** (5) II. Terminal project. Individual studies approved by departmental faculty. Fifteen hours design studio a week. Pr.: LAR 701 and 647.

**LAR 710. Microcomputer Applications in Landscape Architecture II.** (3) I, II. Examination of the application of microcomputer technology in the decision-making processes in the advanced practice and research of landscape architecture. Two hours lec. and two hours lab a week. Pr.: LAR 460.

**LAR 731. Landscape Plant Field Studies I.** (1) I. The study of introduced and indigenous deciduous woody trees, shrubs, vines, and herbaceous plants adapted to the northeastern Kansas region with emphasis on the identification and selection of plant materials for use in landscape design. One hour lec. and two hours outdoor lab a week. Pr.: Graduate standing.

**LAR 732. Landscape Plant Field Studies II.** (1) II. A continuation of LAR 731; including the study of introduced and indigenous woody conifers and broadleaf evergreens, deciduous flowering trees and shrubs, and native grasses and forbs adapted to the northeastern Kansas region with emphasis on the identification and selection of plant material for use in landscape design. One hour lec. and two hours outdoor lab a week. Pr.: LAR 731.

**LAR 741. Problems in Landscape Architecture.** (Var.) I, II, S. Specific problems and/or reports in the area of landscape architecture. Pr.: Advanced undergraduate or graduate standing.

**LAR 744. Community Site Planning.** (3) II. Growth and development of cities and towns; land subdivision. Eight hours lab a week. Pr.: PLAN 315 or consent of instructor.

**LAR 746. Urban Design Studio I.** (4) I. An interdisciplinary design studio involving large-scale design; projects with extensive time implementation sequence; responses to socioeconomic, cultural, environmental,

and technical needs; and implementation strategies. Design methods are applied to selected urban areas of the Midwest. Pr.: PLAN 315 or equiv.; and conc. enrollment in PLAN 745.

**LAR 747. Urban Design Studio II.** (4) II. Continuation of LAR 746. Pr.: LAR 746 and conc. enrollment in PLAN 845.

**LAR 748. Composite Planting Design I.** (1-4) I. Plant characteristics and their application in landscape architectural design; ecological considerations of site adaptation; natural systems; comprehensive site analysis; variety in scale and scope of projects. Two hours lec. and seven hours studio a week. Pr.: Graduate standing.

**LAR 749. Composite Planting Design II.** (1-4) I, II. Preparation of planting plans and supplementary materials designed to fit a variety of sites; emphasis on planting design elements and principles. Two hours lec. and seven hours studio a week. Pr.: LAR 748.

**LAR 750. Graduate Seminar in Landscape Architecture I.** (2) I. Discussion of the scope of the profession and the nature of graduate study in landscape architecture. Pr.: Graduate standing in the department.

**LAR 751. Graduate Seminar in Landscape Architecture II.** (2) II. Readings and discussion of current issues in practice and research in landscape architecture. Pr.: LAR 750.

**LAR 753. Professional Practice.** (2) II. Ethics, office practice and procedure, contracts, and specifications. A professional resume is required. Two hours rec. a week. Fifth-year classification.

**LAR 756. Design of Parks and Recreation Areas.** (3) I. Site planning of national, state, municipal, and private parks, and specialized recreation areas. Three hours lec. a week. Pr.: Junior standing.

**LAR 757. Design for Special Populations.** (3) II. Design of exterior environments to accommodate the handicapped and disadvantaged individual. Pr.: Advanced undergraduate or graduate standing.

**LAR 758. Land Resource Information Systems.** (3) I. The understanding, collection, and application of land resource data to land planning and design. Current methods of resource inventory, ecologically oriented site analysis, and environmental impact assessment. Review of common sources for necessary information in each resource category. Two hours lec. and two hours studio a week. Pr.: Advanced undergraduate or graduate standing.

**LAR 759. Landscape Resource Evaluation.** (3) II. The determination of the impact of physical landscape project design upon the natural and man-made environment. Studies of existing site conditions and projections of the effect of such projects upon the site and vicinity. Pr.: Senior or graduate standing.

**LAR 760. Composite Landscape Architecture Design Studio I.** (1-4) I. Landscape design including delineation, design process, design elements, small-scale design, urban design. Pr.: Graduate standing.

**LAR 761. Composite Landscape Architecture Design Studio II.** (1-4) Continuation of LAR 760: including topics such as community design, resource analysis, park and recreation design, historic preservation with consideration of aesthetic and sensory issues. Pr.: LAR 760.

**LAR 762. Composite Landscape Architecture Design Studio III.** (1-4) I. Continuation of LAR 761: including topics such as community design, resource analysis, park and recreation design, historic preservation with consideration of aesthetic, technical, and economic issues. Pr.: LAR 761.

**LAR 763. Composite Landscape Architecture Construction I.** (1-5) II. Landscape construction including topography, site planning, site layout, grading, earthwork estimating, lighting, irrigation, construction detailing, cost estimating. Pr.: LAR 762.

**LAR 764. Composite Landscape Architecture Construction II.** (1-5) I. A continuation of LAR 763: large area grading, road alignment, storm drainage, utilities layout and specifications, contracts. Pr.: LAR 763.

## Regional and Community Planning

C. A. Keithley,\* Head

Professors Deines,\* Keithley,\* Keller,\* and Weisenburger;\* Associate Professors Burns and Jutla; Adjunct Professors Barnes,\* Forester,\* McGraw,\* Rolley,\* Seamon,\* Watts,\* and Wigfall.\*

### Planning certificate

The Department of Regional and Community Planning offers course work in support of other university programs dealing with the professional practice of planning and in preparation for entry into a graduate program in planning either at K-State or other universities.

Planning encompasses a body of knowledge that has been partially derived from social science theory and embodies awareness or understanding of the physical planning elements of the community and region, as well as the environmental, ecological, socio-economic, and political systems at work in society.

In preparation for possible graduate study in planning, and to provide a different perspective of the community in which individuals and groups work, live, and play, the department offers an undergraduate Certificate in planning, which requires students seeking the equivalent to a minor in planning to integrate a minimum of 15 credit hours of planning courses in their undergraduate degree program. The requirements include the following:

**Required**  
PLAN 315 Introduction to Planning ..... 3

**Elective**  
12 credit hours of planning course work below the PLAN 800 level offered from the department, in which the student meets the prerequisites. Suggested courses depend on student interest and degree orientation. Advising is available from the departmental faculty or the department head.

**Options**  
Several other departments offer courses directed to elements of planning concerns. Upon petition by the undergraduate student enrolled in the certificate program and evaluation by departmental faculty, substitution of up to one 3-credit-hour course as an accepted elective may be possible. Courses that have been approved for substitution include, but are not limited to, the following:  
LAR 744 Community Site Planning  
CE 570 Transportation Planning

Enrollment in the planning certificate program is accomplished by contacting the departmental staff in Seaton 302. Upon

graduation, students completing the program receive a departmental certificate denoting completion of the requirements.

Students interested in pursuing graduate study in planning are encouraged to complete an undergraduate-level statistics course in their program of study leading to a bachelor's degree. This requirement is a prerequisite for entry into all graduate planning programs in the United States. Knowledge in the use of microcomputers and basic software programs for word processing, spreadsheet, and database applications is becoming indispensable.

While there are many routes to graduate study in planning, students are encouraged to consider following a pre-planning program, such as that offered in the Department of Geography. Students may also seek advising or counsel from faculty in the Department of Regional and Community Planning as to which electives in the various departments will provide better planning-oriented information for later use. Courses which satisfy that orientation at the undergraduate level include the following:

### College of Architecture and Design

Environmental design studies:  
ENVD 212 Environmental Design and Graphics ..... 3  
ENVD 375 The Designed Environment and Human Behavior ..... 3

Architecture:  
ARCH 601 Topics: History of Designed Environment ..... 3

Regional and community planning:  
PLAN 315 Introduction to Planning ..... 3  
PLAN 590 Problems: Shaping the American City ..... 3

### College of Arts and Sciences

Computing and information science:  
CIS 110 Introduction to Personal Computing ..... 3

Economics:  
ECON 532 Fiscal Operation of State and Local Government ..... 3  
ECON 633 Public Finance ..... 3  
ECON 555 Urban and Regional Economics .... 3

Geography:  
GEOG 200 Human Geography ..... 3  
GEOG 220 Environmental Geography ..... 3  
GEOG 440 Geography of Natural Resources ... 3  
GEOG 450 Geography of Economic Behavior .. 3  
GEOG 460 Geography of Future Worlds ..... 3

Political science:  
POLSC 377 Introduction to Public Policy ..... 3  
POLSC 507 Introduction to Public Administration ..... 3  
POLSC 618 Urban Politics ..... 3

Sociology:  
SOCIO 530 Population and Human Ecology ... 3  
SOCIO 531 Urban Sociology ..... 3  
SOCIO 532 Community Organization and Leadership ..... 3  
SOCIO 533 Rural Society ..... 3

Statistics:  
STAT 330 Elementary Statistics for Social Sciences ..... 3

<b>College of Business Administration</b>	
Finance:	
FINAN 552	
Real Estate	3
<b>College of Human Ecology</b>	
Clothing, textiles and interior design:	
FEC 420	
Housing	3
FEC 625	
Consumer and Energy Issues in Housing	3

Courses listed above the 500 level (with the exception of those listed in the Department of Regional and Community Planning) must be taken for graduate credit and applied towards a graduate degree in planning, per university guidelines, if not needed in the undergraduate degree program of study. Several additional courses could be listed at the 700 level from across the campus. For more information, see the graduate catalog or visit the departmental office.

## Regional and community planning courses

### Undergraduate credit

**PLAN 315. Introduction to Planning.** (3) I, II. The origins and evolution of planning in response to economic, social, political, and physical problems. The planning process and its relationship to the design professions and the social and behavioral sciences. Three hours rec. a week. Pr.: Sophomore standing.

### Undergraduate and graduate credit

**PLAN 590. Problems in Planning.** (1-3) I, II, S. Specific planning problems, including process, theory, method and implementation, under direction of department staff. Pr.: Introduction to Planning.

**PLAN 630. Computer Applications in Planning and Design.** (1-3) I, II, S. The application of computer concepts to problem solving and data analysis in the planning and design professions, including the development of user skills in the application of various software packages for data analysis, mapping, and computer-assisted design. Pr.: CIS 110 and junior standing.

**PLAN 700. Planning Analysis.** (3) I, II. Introduction to quantitative methods in planning to measure change in the socio-economic-political-physical environment and to analyze the interrelations that guide formulation of comprehensive planning. Pr.: PLAN 315 and ECON 555.

**PLAN 705. Planning Communications.** (1-4) I. Study and application of communication concepts and media utilized in regional and community planning, topics to be selected from: (a) graphics, (b) physical models, (c) professional reports, and (d) public hearings. Pr.: Senior status and PLAN 315.

**PLAN 710. Urban Visual Analysis.** (3) II. Survey and analysis of urban form and space in relation to aesthetic theories and values. Methods of visual perception and analysis are reviewed and applied to contemporary urban form and space. Pr.: PLAN 745.

**PLAN 715. Planning Principles.** (3) I, S. Examination of principles and elements of regional and community planning, including growth forms, physical patterns, planning stages, standards, control measures, and procedures. Pr.: Senior standing and approval of instructor.

**PLAN 721. Institutional Planning and Development.** (3) II. Examination of infrastructure systems, standards, and costs; consideration of policy options and strategies; review of infrastructure finance methods; and implementation of community development with infrastructure planning and finance process. Pr.: PLAN 715 and 9 additional credit hours in planning and/or administration courses.

**PLAN 725. Planning Theory.** (3) I. Review of basic theories of regional and community growth and change; analysis of the process of urbanization in relation to societal determinants and environmental constraints; and the synthesis of a process of planning. Pr.: Senior standing and approval of instructor.

**PLAN 735. Community Plan Preparation.** (3) II. Review of the principles and elements of city growth and change. Criteria and methodology for city analysis and planning are examined and applied to the elements of cities. Pr. or conc.: PLAN 715 or 725.

**PLAN 736. Community Plan Implementation.** (Var.) I. Introduction to legislation and interpretation of codes related to planning, design, and construction. Pr.: PLAN 715.

**PLAN 740. Small Community and Rural Area Planning.** (3) II. Synthesis of small community and rural area change, including socio-economic-political determinants as bases for community design and planning. Pr.: PLAN 315 plus 9 credit hours in economics, political science, and sociology.

**PLAN 745. Urban Design.** (3) I, II. Review of recent historical developments of urban form and space. Criteria and methodology for urban design and planning are examined and applied to the elements of cities. Pr. or conc.: PLAN 315 or graduate status.

**PLAN 746. Urban Design Studio I.** (4) I. An interdisciplinary design studio involving large-scale design; projects with extensive time implementation sequence; responses to socio-economic, cultural, environmental, and technical needs; and implementation strategies. Design methods are applied to selected urban areas of the Midwest. Pr.: PLAN 315 and conc. enrollment in PLAN 745.

**PLAN 750. Housing Policies and Programs.** (3) II. Review and evaluation of historical and current housing issues, production, and financial systems. Examination of federal, state, and local policies and programs for community development. Pr.: PLAN 315.

**PLAN 755. State and Regional Planning.** (3) I. Review of the principles and elements of regional growth and change. Criteria and methodology for regional analysis and planning are examined and applied to the elements of regions. Pr.: PLAN 715 or conc. enrollment.

**PLAN 760. Community Development Planning.** (3) II. Examination of past and present approaches to community development planning in the United States. Review and assessment of community development planning policies, programs, and practices. Pr.: PLAN 715 or conc. enrollment, and 9 semester hours in the social sciences.

**PLAN 761. Community Development Workshop.** (Var.) I, II, S. The organization, planning, design, development, and evaluation of community development projects with real clients and actual locations. Pr.: PLAN 715 and PLAN 760; or conc. enrollment.

**PLAN 770. Planning Law.** (3) I. Examination of evolution and current state of land use regulation within constitutional limits. Introduction to zoning, subdivision, and other police power controls within a comprehensive planning process. Pr.: PLAN 715.

**PLAN 780. Planning in Developing Areas.** (3) I, II. Examination of comparative regional and community systems of development, consideration of alternative approaches to planning, with emphasis on developing countries and underdeveloped areas in the rural United States. Pr.: PLAN 715 plus 9 credit hours from the social sciences.

# Arts and Sciences

Peter J. Nicholls, Dean  
William R. Feyerharm, Assistant Dean  
Marvin A. Kaiser, Associate Dean  
Judith K. Zivanovic, Associate Dean

117 Eisenhower Hall  
532-6900

The College of Arts and Sciences is the home of the liberal arts and is the largest college at K-State. The liberal arts, which include the physical and biological sciences, the fine arts, the social sciences, the humanities, and the quantitative disciplines, embody the core studies of a university education.

The liberal arts seek to develop intellectual skills, such as critical analysis, self-expression, and creativity. Majors in the College of Arts and Sciences range from those related to specific jobs and professions to those related to vocation in a more general and perhaps more fundamental way.

## Advising

Students with undeclared, interdisciplinary, and pre-professional majors are advised in the office of the dean. Students with other majors are assigned an advisor by the department head who supervises the majors. In all cases, advisors try to ensure that students design their curricula to meet such goals as: the ability to think, speak, and write with clarity and precision; knowledge of another culture or another language; knowledge and appreciation of science and technology; familiarity with major artistic and literary forms; and exposure to moral and ethical issues.

For students who are uncertain about their majors, or who would prefer to explore a number of academic areas before making a choice, the College of Arts and Sciences provides a general (or undeclared) curriculum. Undeclared majors work with dean's office advisors to devise programs that satisfy basic degree requirements while exploring personal interests and aptitudes before choosing majors.

It is expected that students will declare a major by the end of the sophomore year, or upon completion of 60 credit hours.

## Majors and degrees

The undergraduate degrees offered in the College of Arts and Sciences are: bachelor of arts, bachelor of fine arts, bachelor of music, bachelor of music education, and bachelor of science. In addition, the associate of arts and the associate of science degrees with unspecified majors are offered at Fort Riley.

Below in the left column are majors, options, advising programs, and degrees offered. In the right column are names of the departments under which the major programs are offered. The specific requirements for a degree in the various curricula may be found in the department listings later in the College of Arts and Sciences catalog section.

Anthropology, B.A. or B.S. Applied anthropology	Sociology, anthropology, and social work	Pre-law (advising program)	Dean's office
Art, B.A. or B.F.A.	Art	Pre-medical records (advising program)	Dean's office
Biochemistry, B.A. or B.S.	Biochemistry	Pre-medicine, B.A. or B.S.	Dean's office
Biology, B.A. or B.S.	Biology	Pre-nursing (advising program)	Dean's office
Chemical science, B.A. or B.S.	Chemistry	Pre-occupational therapy (advising program)	Dean's office
Chemistry, B.A. or B.S. General textile	Chemistry	Pre-optometry (advising program)	Dean's office
Computer science, B.A. or B.S.	Computing and information sciences	Pre-pharmacy (advising program)	Dean's office
Economics, B.A. or B.S.	Economics	Pre-physical therapy (advising program)	Dean's office
English, B.A. Creative writing Literature Teaching certification	English	Pre-respiratory therapy (advising program)	Dean's office
Fisheries and wildlife biology, B.A. or B.S.	Biology	Pre-veterinary medicine* (advising program)	Dean's office
Fisheries biology Wildlife biology Natural history		Psychology, B.A. or B.S.	Psychology
General (advising program)	Dean's office	Radio-television, B.A. or B.S.	Journalism and mass communications
Geography, B.A. or B.S. General Pre-planning	Geography	Social work, B.A. or B.S.	Sociology, anthropology, and social work
Geology, B.A. or B.S.	Geology	Sociology, B.A. or B.S. General Society and criminal justice	Sociology, anthropology, and social work
Geophysics, B.A. or B.S.	Geology	Speech, B.A. or B.S. General Linguistics	Speech
History, B.A. or B.S.	History	Speech Pathology, B.A. or B.S.	Speech
Information systems, B.A. or B.S.	Computing and information sciences Dean's office	Statistics, B.A. or B.S.	Statistics
Interdisciplinary Humanities, B.A. Life science, B.A. or B.S. Physical science, B.A. or B.S. Social science, B.A. or B.S.	Dean's office	Theatre, B.A. or B.S. Dance	Speech
Journalism and mass communications, B.A. or B.S. Advertising Electronic journalism Print Public relations	Journalism and mass communications		
Kinesiology, B.A. or B.S. Exercise science Human movement	Kinesiology		
Mathematics, B.A. or B.S.	Mathematics		
Medical technology, B.A. or B.S.	Dean's office		
Microbiology, B.A. or B.S.	Biology		
Modern languages, B.A.	Modern languages		
Music, B.A. or B.M.	Music		
Music education, B.M.E.	Music		
Philosophy Interdisciplinary, B.A. or B.S. Pre-business, B.A. or B.S. Pre-law, B.A. or B.S. Pre-ministry, B.A. Traditional, B.A.	Philosophy		
Physics, B.A. or B.S.	Physics		
Political science, B.A. or B.S.	Political science		
Pre-dentistry, B.A. or B.S.	Dean's office		

## Secondary majors

Secondary majors are majors that can be taken only in addition to the primary majors listed above. The secondary majors in the college are: American ethnic studies, gerontological studies, industrial labor relations, international studies, Latin American studies, South Asian studies, and women's studies.

\* Students who complete pre-veterinary medicine requirements in the College of Arts and Sciences will be eligible for the bachelor of science degree from the College of Arts and Sciences upon completion of the second professional year in the College of Veterinary Medicine.

# General Requirements

## General education requirements

Requirements in general education are to be fulfilled by courses chosen by students in consultation with their advisors. The aim of these requirements is to provide breadth in the major areas of knowledge outside the field of specialization. Introductory and intermediate-level courses are available for this purpose in departments in natural sciences, social sciences, and humanities. *Courses numbered below 100 may not be applied toward a degree.*

# Bachelor of Arts and Bachelor of Sciences

120 credit hours required for graduation

## Physical education

Purpose: to give a foundation in the principles of physical exercise and fitness.

KIN 101 Principles of Physical Fitness . . . . . 1

## Basic rhetoric

(Three courses, 8 credit hours minimum)

Purpose: to give students practice in writing and analyzing expository and argumentative prose and in oral presentation.

ENGL 100 Expository Writing I . . . . . 3  
 ENGL 120 Expository Writing II . . . . . 3  
 SPCH 105 Public Speaking IA . . . . . 2  
 or  
 SPCH 106 Public Speaking I . . . . . 3

(Argumentation and Debate or Public Speaking II will fulfill requirement upon approval of the Department of Speech)

## A major

Purpose: to ensure some depth and detail in at least one field of knowledge.

Satisfaction of requirements for any of the majors in the College of Arts and Sciences (see list earlier in this section). With careful scheduling, it is possible to complete an additional major, a secondary major, or pre-professional requirements, as well.

## Basic disciplines

Purpose: The aim of the requirement in the humanities is to encourage and to enable students to recover "a heritage so important that to lose it would be to lose the very qualities that make men and women greater than the systems they devise and mark the difference between a society of robots and a community of civilized human beings." The aim of the requirement in the sciences is to ensure that students gain an immediate acquaintance with the general principles of scientific method and with the different shapes the scientific enterprise takes in the physical sciences, the life sciences, and the social sciences.

Up to two courses from one department may be used to fulfill the distribution requirements for humanities and the social sciences. They may be used at the same time to count towards the student's major. No course may be used to satisfy more than one specific requirement for humanities and social sciences. Only courses taken for 2 or more credit hours satisfy these requirements; courses in excess of 5 credit hours count as two courses.

## Humanities

Four courses, one course each section, 11 credit hours minimum

**Fine arts** (one course, or at least two credits)

Purpose: to ensure some interpretive or expressive competence in a traditional nonliterary mode of artistic expression.

Choose from the following:

Anthropology—ANTH 515, 516, or 517  
 Art—ART 301, 305, 400, or 560  
 Art history—any course  
 Art technique—ART 200 to 799  
 Dance—DANCE 205, 323, 324, 325, 326, or 371  
 History—HIST 459  
 Music—MUSIC 200, 201, 245, 250, 255, 280, 310, 385, 420, 424, 455, 480, 570, 601, or 650.  
 Theatre—THRE 260 to 799

**Philosophy** (one course)

Purpose: to ensure some interpretive or expressive competence in the fundamental conceptual issues of human thought and activity.

Choose any philosophy course except PHILO 110, 220, or 510.

**Western heritage** (one course)

Purpose: to ensure some interpretive or expressive competence regarding the institutions, traditions, and values that have shaped Western civilization.

Choose from the following:

History—courses dealing with the Greco-Roman, Western European, or North American experience; HIST 515 History of Sport  
 Constitutional law—POLSC 613, 614, 615, 616, or 799  
 Women's studies—Women's Studies xxx 105, 405, 500, or 506  
 American ethnic studies—xxx 160, 560  
 Political thought—POLSC 301, 661, 663, 667, 671, 675, or (SOCIO) 709  
 Western humanities—ENGL 230, 231, 233, or 234  
 Foreign civilizations—FREN 514,  
 GRMN 530, SPAN 565, or SPAN 566  
 Music—MUSIC 245  
 Speech—SPCH 460

**Literary or rhetorical arts** (one course)

Purpose: to ensure some interpretive or expressive competence in a traditional literary or rhetorical mode of artistic expression.

Choose from the following:

English—literature or creative writing—ENGL 250 to 799 *except* 300, 400, 415, 420, 430, 476, 490, 492, 499, 516, 600, 601, 602, 603, 604, 759, 790, or 796  
 Modern languages—literature courses including literature in translation  
 Theatre—THRE 562 or 764  
 History of rhetoric—SPCH 330, 335, 430, 432, 434, 460, 725, 730, 732, or 733

Exception: Students in B.S. programs who take two courses in one foreign language may use these to satisfy the requirements for Western heritage and for literary and rhetorical arts.

**Social sciences**

Four courses, 12 credit hours minimum, from three disciplines

Purpose: to acquaint students with the adaptation of scientific method to the analysis of human social systems.

One course must be at 500 level or above, or carry a prerequisite in the same department.

Three of the four courses must be from these areas:

Psychology—any course  
 Sociology—any course  
 Cultural anthropology—including archaeology  
 Geography—except GEOG 220 or 221  
 Economics—any course  
 Political science—any course  
 History—any course

The fourth course must be from the above areas or from:

Women's studies—Women's Studies xxx 105, 405, 500, or 506  
 Gerontology—DAS 315 or 415  
 Linguistics—except LG 601  
 Speech—SPCH 323, 435, 520, 720, or 726  
 Journalism and mass communications—JMC 235, 530, 565, 570, 575, 612, or RTV 300, 660, or 675  
 Kinesiology—KIN 320, 340, or 435  
 Anthropology—ANTH 432, 520, 532, or 640

## Natural sciences

Three courses, 11 credit hours minimum

**Life sciences** (one course with laboratory)

Purpose: to introduce students to the systematic study of organisms and their interrelationships.

Choose from the following:

Biology—any course  
 Biochemistry—any course  
 Paleobiology—GEOL 581 or 704  
 Physical anthropology—ANTH 280, 281, 688, 691, 694, or 695

**Physical sciences** (one course with laboratory)

Purpose: to introduce students to the appropriate attitudes and methods that characterize the systematic study of matter and energy.

Choose from the following:

Physics—any course  
 Chemistry—any course  
 Environmental geography—GEOG 220 or 221  
 Geology—any course except GEOL 581 or 704

Additional natural science course selected from life sciences or physical sciences lists above.

## International studies overlay

One course

Purpose: to equip students better to become citizens of a world where the most important problems are unavoidably defined in international terms and to understand cultures of the world outside the Western tradition.

A student must take one course of which at least half is devoted to: economic, political, and social relations or interactions between or among different countries, in which the major focus is upon the interdependency of nations of the modern world; or contemporary features or historical traditions of non-Western cultures (excluding those dealing primarily with Greek, Roman, Western European, or North American experience).

Students may satisfy the international studies requirement at the same time they satisfy requirements in the major, in the humanities, or the social sciences. These courses qualify:

Agricultural economics—AGEC 615  
 Anthropology—ANTH 200, 220, 260, 505, 506, 507, 508, 511, 512, 515, 516, 517, 532, 536, 545, 550, 604, 618, 630, 634, 640, 673, or 676  
 Economics—ECON 505, 506, 636, 681, or 682  
 Geography—GEOG 100, 200, 201, 505, 506, 620, 640, 650, 710, or 715  
 History—HIST 250, 350, 504, 505, 506, 514, 543, 544, 545, 561, 562, 564, 576, 577, 591, 592, or 598  
 Journalism and mass communications—JMC 670  
 Management—MANGT 690  
 Marketing—MKTG 544  
 Modern languages—RUSSN 250, 504, 508, or 552  
 Political science—POLSC 333, 505, 506, 511, 541, 543, 545, 622, 623, 624, 625, 626, 627, 628, 629, 642, 645, 647, 649, 651, 652, or 653  
 Sociology—SOCIO 505, 506, 535, 618, or 742

Students may use the fourth course in a single foreign language sequence (other than Latin) to satisfy the international studies overlay requirement.

### Additional requirements for the B.A. Foreign language

(The four basic courses, 15 credit hours, in one of the foreign language sequences in the Department of Modern Languages, or equivalent competency)

Purpose: to bring students to a point at which they are able to proceed on their own to a command of a second language—a key for access both to a foreign culture and to much primary and secondary material in many special fields.

### Mathematics

(One 3-credit-hour course, 100 level or above, or any other course for which there is a mathematics prerequisite)

Purpose: to give students a college-level competence in mathematical reasoning and analysis.

Any course used to satisfy this requirement cannot be used to satisfy any other general education requirement.

### Additional requirements for the B.S. Natural sciences

(One course, 3 credit hours minimum, with a prerequisite in the same department; for this requirement, biochemistry courses with a chemistry prerequisite qualify as upper-level courses.)

Purpose: to give students who elect the bachelor of science degree an especially solid foundation in the natural sciences.

Courses that qualify are those listed earlier under natural sciences, and:

Kinesiology—KIN 330 or 335  
 Psychology—PSYCH 470 or 480

### Quantitative and abstract formal reasoning

Purpose: to give students training in a

clear, nonambiguous, simplified language for the efficient transfer and logical analysis of information—a language in which a good deal of discussion is conducted in the sciences.

A course that satisfies this requirement may at the same time be used to satisfy any major requirement for which it qualifies. Fulfill this requirement one of three ways:

1. Three courses, 9 credit hours minimum, selected from:  
 Computer science—100 level or above (CIS 200 requires lab 203 and is equivalent to *one* required course.)  
 Mathematics—100 level or above  
 Philosophy—PHILO 110, 220, or 510  
 Statistics—any course
2. One course and its Level II prerequisite, selected from:  
 Geography—GEOG 700  
 Kinesiology—KIN 710  
 Physics—PHYS 113  
 Sociology—SOCIO 520 or 725  
 Social work—SOCWK 519
3. Equivalent competency:  
 Competency may be demonstrated by taking two Level II courses or a Level III course from:

Level II courses (two courses):

Computer science—CIS 200 and lab 203 to count as one course  
 Mathematics—MATH 150, 201, or 205  
 Philosophy—PHILO 510  
 Statistics—STAT 320, 330, 340, 350, 702, or 703

Level III courses (one course):

Computer science—CIS 300 or 350  
 Mathematics—MATH 210 or 220  
 Philosophy—PHILO 701  
 Statistics—STAT 341, 351, 704, or 705

## Bachelor of Fine Arts

120 hours required for graduation

The bachelor of fine arts degree is a professionally oriented undergraduate degree in art. Emphasis is on actual practice in the creative art disciplines. The degree is considered the appropriate preparation for the master of fine arts degree, which is recognized as the terminal degree in studio arts, and for the master of arts in art therapy, which is required for certification as an art therapist. The B.F.A. in art is a four-year, 120-credit-hour program with emphases possible in painting, sculpture, ceramics, graphic design, printmaking, metalsmithing and jewelry, drawing, and pre-art therapy. The degree requirements are as follows:

### General education (45 hours)

Communications—English composition, two courses; and oral communication, one course  
 Social sciences—two courses  
 Humanities—three courses

Philosophy or mathematics—one course  
 Natural sciences—two courses, one with a lab  
 General electives—11–19 hours  
 Kinesiology—KIN 101 Principles of Physical Fitness

### Art courses (75 credit hours)

Core—39 hours  
 Major—20 hours  
 Art electives and related courses—16 hours

## Bachelor of Music

129–134 credit hours required for graduation

Areas of concentration offered in this curriculum are: all instruments, voice, and composition. A secondary performance area also is required.

### General requirements (42 hours)

ENGL 100	Expository Writing I	3
ENGL 120	Expository Writing II	3
SPCH 106	Public Speaking I	3
KIN 101	Principles of Physical Fitness	1
PHYS 101	The Physical World I	3
PSYCH 110	General Psychology	3
Nonmusic electives		minimum of 9
Modern language		two courses minimum

The remaining hours are to be taken in the area of concentration. For specific music requirements, see the Music section of this catalog.

## Bachelor of Music Education

136–139 credit hours required for graduation, depending on emphasis

The program of study leading to this degree is a nine-semester curriculum designed to prepare music teachers for grades K–12. With careful planning and enrollment during summer session(s) all requirements may be completed in four years. Within this curriculum there are two optional emphases—one in vocal/choral music, the other in instrumental music.

### General education requirements:

ENGL 100	Expository Writing I	3
and		
ENGL 120	Expository Writing II	3
or		
ENGL 110	English Honors Composition I	3
and		
ENGL 125	English Honors Composition II	3
SPCH 106	Public Speaking I	3
Literature elective (ENGL 261, 262, 271, 272, 361, 362, 381, 382)		3
Modern language (two courses in the same language)		
or		
One course in computer science		3–8
PSYCH 110	General Psychology	3
One course in American or world history (HIST 101, 102, 251, or 252)		3
ANTH 200	Introduction to Cultural Anthropology	3

MATH 100	College Algebra (or other math course having College Algebra as a prerequisite) . . . . .	3
Biological science . . . . .		3-4
Physical science (one of these two courses must include a lab) . . . . .		3-4
KIN 101	Principles of Physical Fitness . . . . .	1

Humanities electives to complete a total of 50 hours required general education

The remaining hours are to be taken in the area of concentration. For specific music requirements, see the Music section of this catalog.

## Associate of Arts at Fort Riley

60 hours, taken only at Fort Riley, including the following general requirements:

English—ENGL 100 and 120
Speech—SPCH 105 (or one course), courses subject to approval by Department of Speech
Modern languages—two years in one language or equivalent competence
Mathematics—one course
Humanities—three courses from: art, dance, English, history, modern languages, music, philosophy, speech, and Introduction to Women's Studies. No more than three courses in history may be used to fulfill humanities and social sciences requirements.
Social sciences—three courses from: anthropology, economics, geography (excluding GEOG 220 and 221), history, political science, psychology, sociology, social work, journalism and mass communications, and Introduction to Women's Studies. No more than three courses in history may be used to fulfill humanities and social sciences requirements.
Natural sciences—four courses, including one laboratory course and one course that has a prerequisite in the same department: biochemistry, biology, chemistry, computer science, geography, (GEOG 220 and 221 only), geology, mathematics, physics, or statistics
Kinesiology—KIN 101 Principles of Physical Fitness

## Associate of Science at Fort Riley

60 hours including the following general requirements:

English—ENGL 100 and 120
Speech—SPCH 105 (or one course), courses subject to approval by Department of Speech
Humanities and social sciences—seven courses, taken from at least two departments, including one course in philosophy, from: anthropology, art, dance, economics, English, geography (excluding GEOG 220 and 221), history, modern languages, music, philosophy, political science, psychology, sociology, social work, speech, journalism and mass communications, and Introduction to Women's Studies
Natural sciences—four courses, including one laboratory course and one course that has a prerequisite in the same department: biology, biochemistry, chemistry, computer science, geography (GEOG 220 and 221 only), geology, mathematics, physics, or statistics
Kinesiology—KIN 101 Principles of Physical Fitness

## Program Options

### Honors program

The honors program offers intellectually able and motivated students experiences in the humanities and in the social-behavioral and natural sciences that are challenging and unusual in breadth and focus. By stressing liberal studies in the freshman and sophomore year, interdisciplinary study in the junior year, and independent study in the senior year, the honors program enables students to develop broad intellectual interests.

The honors program further enriches the experiences of its members by creating opportunities for them to develop a sense of community and to meet faculty and distinguished guests of the university in informal settings.

Students with high ACT scores are invited to participate in the honors program during the freshman year. Formal admission to the program is granted at the end of the freshman year to students who have achieved a 3.3 GPA.

Students in the honors program are expected to enroll in DAS 010 Introduction to the Honors Program in arts and sciences and an honors section of ENGL 125 Expository Writing II or receive consent of the director. Students must complete: two seminars, one in social sciences or humanities and one in the natural sciences or mathematics; an interdisciplinary colloquium, and an independent study, under the supervision of a faculty member of the student's choice, during the senior year. Honors sections of regular Arts and Sciences classes are also available each semester.

The senior study culminates in an honors thesis or other documentation of performance, which is filed with the director. This project is invaluable as evidence of a student's ability to organize and complete a study independently. It provides evidence of capability to do well in graduate studies and may enable the student to strengthen significantly an application to graduate school. It may also help make the case for a scholarship application or serve as the impetus for more detailed investigation later in the student's career. Honors students are encouraged to complete a four-course sequence in a modern language other than English.

All phases of the honors program emphasize oral and written communication, both as a method of demonstrating one's understanding of a subject, and as a strategy for developing one's thinking skills.

In addition to the curricular options described, students in the honors program have many opportunities to individualize their courses of study. Student-designed curricular plans may be approved with the consent of department heads involved, the director of the honors program, and the dean of the college. Students are also encouraged to propose other plans in their course work, including off-campus learning experiences that may be supplemented by reading, discussion, and reporting for course credit with the approval of the proper supervising faculty.

A transfer student or other upperclassman who has a grade point average of 3.3 and who receives a positive evaluation by the director may be admitted to the honors program as late as the beginning of the junior year. Students who wish to be considered for late admission should contact the director.

For more information, contact the director of the honors program, College of Arts and Sciences, Office of the Dean.

**DAS 010. Introduction to the Honors Program in Arts and Sciences.** (0) I, II. Direction and goals for the honors program in the College of Arts and Sciences. Meets four to six times during the semester.

**DAS 388. Honors Internship.** (1-3) I, II, S. A scholarly investigation related to activities in a place of employment or in a volunteer situation. Written and oral presentations are required. Pr.: Concurrence of a faculty advisor and approval of the arts and sciences honor program advisory council.

**DAS 399. Junior Honors Colloquium.** (3) I, II. An interdisciplinary colloquium whose topics change each semester. Consistently incorporates perspectives of sciences and humanities. Pr.: Non-credit seminar, Introduction to Honors Program in Arts and Sciences, and two honors program sophomore seminars.

### Freshman Seminar

Freshman Seminar introduces students to what a university is, the purpose of a university education, and what it means to be an educated person. This is done, not through a lecture approach, but through sharing the varied cultural and intellectual activities that occur at K-State, demonstrating by example the characteristics of educated persons and the importance of higher education.

**DAS 100. Freshman Seminar.** (2) I. An introduction to the intellectual and cultural life of Kansas State University.

### Natural resources/environmental sciences

Increasing national and international concerns have generated opportunities for individuals to contribute to the resolution of environmental and resource problems. These issues are so complex that they lie beyond the scope of any one discipline.

The natural resources and environmental science option broadens students' perspectives through course offerings and interaction with students and faculty from many disciplines. The option prepares students to apply broadly-based knowledge to the use, management, sustainability, and quality of soil, air, water, mineral, biological, and energy resources.

The NRS option includes entry requirements; at least five block courses selected from natural science, applied science, and social science/humanities offerings; and an interdisciplinary capstone course. Interested students should contact Steve J. Thien, acting director, 317B Throckmorton Hall, 532-7207.

**DAS 582. Natural Resources/Environmental Sciences Project (NRES).** (3) I, II. A comprehensive project in NRES. Requires integration of information and understanding acquired in NRES secondary major courses. Students must prepare and present written and oral reports. Three hours recitation per week. Pr.: All writing and oral communications courses required for the major. Pr. or conc.: 15 hours of approved courses in NRES secondary major. Crosslisted with GENAG 582 and DEN 582.

### Study Abroad

Walter F. Kolonosky, Director  
304 Fairchild Hall  
532-5990

The Office of Study Abroad should be the first stop for students who wish to study in another country for a year, a semester, a summer, or an intersession.

In addition to a number of good language programs, there are opportunities to study almost every subject from art to zoology in Africa, Asia, Canada, Latin America, and Europe. Every attempt is made to ensure the best match between the interests of a student and the ingredients of a program sponsored by K-State or by another institution.

Students may apply for scholarships, such as the Fulbright or the Pearson, or scholarship-exchanges, such as the K-State/Justus Liebig year abroad. Through the International Student Exchange Program it is possible to study for a semester or a year at one of 100 colleges and universities outside the U.S. for the same cost as tuition, room, and board at K-State. Financial aid from almost every agency is applicable to all credit-earning programs.

### Linguistics

The Departments of English, Modern Languages, Speech, and Sociology, Anthropology, and Social Work offer cross-listed linguistics courses available for either graduate or undergraduate credit.

The courses provide students in education, anthropology, foreign languages, psychology, philosophy, literature, and other areas an opportunity to appreciate both the rich structure of language itself and the relationships between their disciplines and linguistic studies.

For further information about linguistics courses, contact either the participating departments or the linguistics advisor in 110 Leasure Hall.

### Secondary teacher certification

An arts and sciences major may apply some elective hours toward the requirements for secondary teacher certification. In most arts and sciences departments, students can complete an academic major and earn certification within the 120 hours of course work required for a degree. Because the teacher training courses are offered through the College of Education, students who choose to combine these two programs are entitled to two advisors, one in the major field of study, the other in secondary education.

By combining a traditional academic major with teaching certification, students can be assured of varied choices after graduation. By pursuing an arts and sciences major, students also have the option of working toward a bachelor of arts degree and studying a foreign language. In addition, the teaching certification will qualify graduates to teach in a public secondary school. For specific certification requirements in secondary education, see the College of Education section of this catalog.

## Interdisciplinary Majors

Interdisciplinary majors provide an opportunity for students to organize their interests within a broad area of study rather than within the narrower focus required by a major in a single discipline. Students who want to create their own fields of emphasis and students who are eager to pursue multidisciplinary solutions to complex problems often choose an interdisciplinary major. Other students choose interdisciplinary study as a second major, adding it to a departmental major in order to gain expertise in complementary areas.

The College of Arts and Sciences offers four interdisciplinary majors:

Major	Degree(s)	Credit hrs.
Humanities	B.A. only	30
Life science	B.S. or B.A.	36
Physical science	B.S. or B.A.	36
Social science	B.S. or B.A.	36

The requirements for each of the interdisciplinary majors are sufficiently flexible to allow individual students, in consultation with their advisors, to devise degree programs designed to meet their particular needs, interests, and career goals.

Interdisciplinary majors are advised in the College of Arts and Sciences dean's office.

### Humanities

The humanities disciplines require the study of cultural artifacts, traditions, and activities. The purpose of cultural study is to learn what culture means and how individuals operate within it. This study should enable students to understand their own places in existing traditions, and help them to contribute positively to the development of new ones. Creativity, imagination, and interpretation are central to humanistic study. The humanities disciplines include art, dance, speech, theater, history, languages, literature, music, and philosophy. A humanities major leads to the traditional liberal degree, the bachelor of arts.

A student seeking admission to the program must submit a plan of study to an interdisciplinary humanities advisor in the College of Arts and Sciences dean's office for approval. This proposal must include a rationale or thematic design for the interdisciplinary degree and a tentative listing of courses. The student *must confer* with other humanities faculty members who have special expertise in the areas of the student's interest. This procedure should be accomplished before or during the semester in which the student completes 60 credit hours toward the degree. *The student's proposal must be approved by the Humanities Advisory Committee.*

The humanities major consists of 36 credit hours.

Fifteen credits must be completed in each of two humanities disciplines; these should be selected from among courses normally counted toward a major in the field.

At least 15 credit hours must be completed in humanities disciplines at the 500-699 level, including at least two courses in each of the two humanities concentration areas. (Students interested in music are encouraged to seek special advising in the music department.)

No more than 9 credit hours may be counted toward both the general requirements and the major.

A student with a well-defined theme that exceeds the scope of these requirements may petition the Humanities Advisory Committee for an appropriate waiver.

A 2.0 GPA in the major is required for graduation.

## Life sciences

Life science is a multidisciplinary major that deals with studies of living organisms and life processes.

BIOL 198	Principles of Biology	4
BIOL 201	Organismic Biology	5
BIOCH 120	Introductory Organic and Biological Chemistry	5
<b>or</b>		
BIOCH 201/202	Elementary Biochemistry and Lab	5
<b>or</b>		
CHM 350/351	General Organic Chemistry and Lab	5
BIOL 455	Microbiology	4
ANTH 280/281	Introduction to Physical Anthropology and Lab	4
	Psychology course with prerequisite	3
	Electives	11*
		<b>36</b>

The 11 remaining elective hours must be selected from two or more of the following fields: biochemistry, biology, microbiology, organic chemistry, physical anthropology, and psychology. At least two of these courses must have a prerequisite. A 2.0 GPA is required in the major for graduation.

## Physical science

Physical science is a multidisciplinary major that deals primarily with nonliving matter. It concerns itself with the theoretical and observable natural phenomena of our world and universe.

	Analytic Geometry and Calculus I	4
	Statistics 320, 340, or 510	3
	Chemistry I	4
<b>or</b>		
	Chemical Principles I	5
<b>and</b>		
	Chemistry II	4
<b>or</b>		
	Chemical Principles II	5
	General Physics I	4
<b>or</b>		
	Engineering Physics I	5
<b>and</b>		
	General Physics II	4
<b>or</b>		
	Engineering Physics II	5
	Introduction to Geology and Lab	4
<b>or</b>		
	Environmental Geography I	4
	Electives	5-9*

\*Students must complete a total of 36 hours in the major. Electives must be selected from the following:

Computing and information sciences—200 or above  
 Chemistry—271, 350, 351, 500 or above  
 Geology—100, 105, 130, 300, 500 or above, except 512  
 Geography—221  
 Mathematics—221, 222, 240, 510, or 551  
 Physics—100, 191, 300, or above, except 515  
 Statistics—341, 511, or above

Problems, seminar, or topics courses are not acceptable unless listed above. At least five elective hours must have a prerequisite.

## Social science

Social science is a branch of learning that

examines society's institutions—their structures, theoretical foundations, evolution, and interrelationships—and how they affect and are affected by human behavior. The social science disciplines include anthropology, economics, geography, history, political science, psychology, and sociology.

A student seeking admission to the program must submit a plan of study to an interdisciplinary social science advisor in the College of Arts and Sciences for approval. This proposal must include a rationale or thematic design for the interdisciplinary degree and a tentative listing of courses. The theme or rationale should run through a minimum of 12 hours of courses in the major. One course outside the stipulated social science disciplines may be used to count toward the major if the course fits the student's theme. No more than one course may be used unless more seem to be necessary to fulfill a student's theme.

The student's social sciences advisor may encourage him or her to confer with other social science faculty members who have special expertise in the area of the student's interest. This procedure should be accomplished before or during the semester in which the student completes 60 hours of university credit.

A total of 36 credit hours must be completed with at least 3 credits being completed in each of four different social science disciplines.

At least 9 credit hours must be completed in one social science discipline, including at least one course at the 500-699 level.

At least 15 credit hours must be completed in social science disciplines at the 500-699 level.

No more than 9 credit hours may be counted toward both the general requirements and the major.

A 2.0 GPA in the major is required for graduation.

Students must complete at least one course in social science research methods or data analysis. This course may be any statistics course that a student is qualified to take or may be selected from: GEOG 700 Quantitative Analysis in Geography; HIST 586 Junior Seminar in History; POLSC 400 Political Inquiry and Analysis; POLSC 700 Research Methods in Political Science; PSYCH 350 Experimental Methods in Psychology; SOC 520 Methods of Social Research; STAT 330 Elementary Statistics for the Social Sciences.

The research/data course cannot be used to fulfill any other requirement in the major.

It can, however, be used to fulfill a general requirement.

## Pre-Professional Programs

Pre-professional programs are advised in the College of Arts and Sciences dean's office.

**DAS 015. Orientation to Health Professions Careers.** (0) I, II. Acquaints students whose career goals are in the health professions fields with the varieties of options available and with the corresponding academic requirements. Discussion covers an introduction to the personal responsibilities that health-care workers assume and the impact of social and economic problems on our health-care delivery system.

### Medical technology

The medical technology curriculum requires 90 semester hours of preclinical courses and 12 to 18 months of work at one of the affiliated clinical programs in Kansas City, Topeka, or Wichita. Admission into that portion of the training is by application; students are expected to have a minimum GPA of 2.0 to 2.5 for both overall work and for the required science courses. All the requirements for a bachelor's degree must be completed before a student is allowed to sit for the certification examination.

In addition to the general requirements for a bachelor's degree in the College of Arts and Sciences, the following courses are required:

### Preclinical courses

	One course in statistics	3
MA TH 100	College Algebra	3
CHM 210	Chemistry I	4
CHM 230	Chemistry II	4
CHM 350	General Organic Chemistry	3
CHM 351	General Organic Chemistry Laboratory	2
BIOCH 521	General Biochemistry	3
BIOCH 522	General Biochemistry Laboratory	2
<b>or</b>		
CHM 271	Chemical Analysis	4
BIOL 198	Principles of Biology	4
BIOL 455	Microbiology	4
BIOL 670	Immunology	4

Select two of the following courses:

BIOL 240	Human Body	6
BIOL 530	Pathogenic Microbiology	3
BIOL 545/546	Parasitology and Lab	5

Internship in affiliated school of medical technology 30

Highly recommended courses:

BIOL 400	Human Genetics	3
BIOL 671	Immunology Laboratory	2
CIS 110	Introduction to Personal Computers	3
PHYS 114	Descriptive Physics	4
MANGT 420	Management Concepts	3

Either CHM 271 or BIOCH 522—whichever was not taken above

**Clinical courses** (taken during internship)

**DAS 401. Clinical Microbiology.** (6-8) II. The theory and laboratory study of pathogenic bacteria, viruses, rickettsiae, fungi, and parasites. Includes morphology, physiology, taxonomy, and medical significance.

**DAS 402. Clinical Chemistry.** (6-8) I. Theory and laboratory study of analytical biochemistry, incorporating both routine and special chemical procedures.

**DAS 403. Clinical Hematology.** (4-6) S. Study of blood cell derivation, maturation, and function, principles of hemastasis, and blood coagulation. Methodology used in routine and special hematology studies.

**DAS 404. Clinical Immunology.** (2-6) I. Immunohematology, the study of fundamentals of antigen-antibody reactions, blood groups and types, crossmatches, blood components, and the laboratory methods used in immunohematology studies; and serology, the theory of immunologic responses and procedures used in determination of serological studies.

**DAS 405. Topics in Medical Technology.** (3-6) II. Basic principles and practices of the medical laboratory, techniques and special projects.

Contact the College of Arts and Sciences dean's office for more information.

**Pre-dentistry**

U.S. dental schools require applicants to have satisfactorily completed a specified set of courses and to present acceptable scores on the Dental Admission Test. The majority of entrants earn bachelor's degrees prior to matriculating.\* The courses listed in the pre-dental major satisfy the admission requirements for most dental schools.

PHYS 113	General Physics I	4
PHYS 114	General Physics II	4
CHM 210	Chemistry I	4
CHM 230	Chemistry II	4
CHM 350	General Organic Chemistry	3
CHM 351	General Organic Chemistry Laboratory	2
CHM 531	Organic Chemistry I	3
CHM 532	Organic Chemistry Laboratory	2
CHM 550	Organic Chemistry II	3
BIOL 198	Principles of Biology	4
BIOL 201	Organismic Biology	5
	Biology electives (400 level or above)	8
MATH 100	College Algebra	3
MATH 150	Plane Trigonometry	3

\*Students who enter dental school after completing only 90 credit hours, which include the courses listed in the pre-dental major and the general education requirements for the B.A. or B.S. degree, may complete degree requirements by transferring 30 credit hours from an accredited dental school.

**DAS 240. Practicum in Pre-Dentistry.** (1) I, II, S. Forty hours are spent observing the practice of dentistry at Fort Riley Dental Clinic. Students are under the supervision and direction of individual dentists. Pr.: Sophomore standing, permission of the pre-dentistry advisor.

Contact the College of Arts and Sciences dean's office for more information.

**Pre-medicine**

Medical schools in the United States require applicants to have satisfactorily completed a bachelor's degree before

matriculating, to include a series of required courses in their studies, and to present acceptable scores on the Medical College Admission Test. Kansas residents are given preference at the University of Kansas Medical School. The courses listed below constitute the pre-medical major and fulfill the course requirements at most U.S. medical schools and at the University of Kansas Medical School.

CHM 210	Chemistry I	4
CHM 230	Chemistry II	4
CHM 271	Chemical Analysis	4
CHM 531	Organic Chemistry I	3
CHM 532	Organic Chemistry Laboratory	2
CHM 550	Organic Chemistry II	3
CHM 551	Organic Chemistry II Laboratory	2
MATH 220	Analytic Geometry and Calculus I	4
	or	
MATH 205	General Calculus and Linear Algebra	3
PHYS 113	General Physics I	4
PHYS 114	General Physics II	4
BIOL 198	Principles of Biology	4
BIOL 400	Human Genetics	3
	or	
ASI 500	Genetics	3
BIOL 510	Embryology	3
BIOL 511	Embryology Laboratory	1

Contact the College of Arts and Sciences dean's office for more information.

**Pre-optometry**

In order to apply for admission to a school of optometry, students are expected to have successfully completed at least three years of college work including a set of specified science and math courses and to have taken the Optometry Admission Test. Students must receive a bachelor's degree before the optometry degree will be granted. Pre-optometry is not a major toward an undergraduate degree.

The following courses satisfy the admission requirements at most optometry schools:

MATH 100	College Algebra	3
MATH 150	Plane Trigonometry	3
MATH 220	Analytic Geometry and Calculus I	4
PHYS 113	General Physics I	4
PHYS 114	General Physics II	4
BIOL 198	Principles of Biology	4
BIOL 201	Organismic Biology	5
BIOL 455	Microbiology	4
BIOL 240	Structure and Function of the Human Body	6
CHM 210	Chemistry I	4
CHM 230	Chemistry II	4
CHM 350	General Organic Chemistry	3
CHM 351	General Organic Chemistry Laboratory	2
BIOCH 521	General Biochemistry	3
PSYCH 110	General Psychology	3
STAT 320	Elements of Statistics	3

Requirements for some optometry schools vary, so consultation with the pre-optometry advisor is recommended.

Contact the College of Arts and Sciences dean's office for more information.

**Pre-veterinary**

Seventy semester hours are required for students applying for admission to the freshman class entering the College of Veterinary Medicine.

ENGL 100	Expository Writing I	3
ENGL 120	Expository Writing II	3
SPCH 105	Public Speaking IA	2
CHM 210	Chemistry I	4
CHM 230	Chemistry II	4
CHM 350	General Organic Chemistry	3
CHM 351	General Organic Chemistry Laboratory	2
BIOCH 521	General Biochemistry	3
BIOCH 522	General Biochemistry Laboratory	2
PHYS 113	General Physics I	4
PHYS 114	General Physics II	4
BIOL 198	Principles of Biology	4
BIOL 510	Embryology	3
BIOL 511	Embryology Laboratory	1
BIOL 455	General Microbiology (with lab)	4
ASI 500	Animal Genetics	3
	Social sciences and/or humanities	12
	Electives	9
		<b>70</b>

Because the pre-veterinary curriculum is not a degree-granting program, students in arts and sciences are encouraged to combine the pre-veterinary requirements with a degree-granting major of their choice. Students should consult the pre-veterinary advisor in the College of Arts and Sciences dean's office.

The pre-veterinary requirements may be completed in the College of Agriculture if a student's major is in that college.

**Pre-pharmacy**

The admission committee of the Pharmacy School of the University of Kansas gives a preference to applicants who are Kansas residents. The following courses constitute their requirements and fulfill most of the requirements of the other U.S. pharmacy schools.

ENGL 100	Expository Writing I	3
ENGL 120	Expository Writing II	3
CHM 210	Chemistry I	4
CHM 230	Chemistry II	4
CHM 531	Organic Chemistry I	3
CHM 532	Organic Chemistry Laboratory	2
CHM 550	Organic Chemistry II	3
CHM 551	Advanced Organic Chemistry Laboratory	2
MATH 220	Analytic Geometry and Calculus I	4
BIOL 198	Principles of Biology	4
BIOL 240	Structure and Function of the Human Body	6
BIOL 455	General Microbiology	4
PHYS 115	Descriptive Physics*	4
SPCH 106	Public Speaking I	3
	Humanities and social sciences electives	9

\*Students who have completed high school physics with a grade of B or better may be exempt.

Contact the College of Arts and Sciences dean's office for more information.

**Pre-law**

While the Association of American Law Schools does not specify a particular pre-law curriculum, it does emphasize the selection of rigorous courses that will enable students to achieve comprehension and expression in words; critical understanding of the human institutions and values with which the law deals; and creative power in thinking. The development of these capacities is a highly individualized process vigorously pursued in a variety of disciplines and degrees. Students in all majors who are considering law study should consult with the K-State pre-law advisor in the College of Arts and Sciences dean's office as early as possible in their undergraduate careers.

**Pre-nursing**

Students entering the pre-nursing curriculum take the necessary courses and electives for transferring to a school of nursing. The number of credits earned and the courses taken will vary depending on the school of nursing the student desires to attend. For students entering a baccalaureate degree program in nursing, generally two years of course work (60–65 credit hours), as prescribed by the university granting the degree, are required.

ENGL 100	Expository Writing I	3
ENGL 120	Expository Writing II	3
SPCH 106	Public Speaking I	3
SOCIO 211	Introduction to Sociology	3
PSYCH 110	General Psychology	3
CHM 110	General Chemistry and Lab	5
BIOL 198	Principles of Biology and Lab	4
MATH 100	College Algebra	3
BIOL 455	General Microbiology	4
BIOL 240	Structure and Function of the Human Body	6
PSYCH 520	Life Span Personality Development	3
FN 132	Basic Nutrition	3
STAT 330	Elementary Statistics for the Social Sciences	3
Humanities electives (Var.)		

The number of elective hours varies with the BSN program of your choice. Individual advising is strongly recommended.

Contact the College of Arts and Sciences dean's office for more information.

**Pre-physical therapy**

To be eligible for the state's two physical therapy degree programs, which are located at the University of Kansas and Wichita State University, students should complete an undergraduate degree in the field of their choice. Both programs grant the master's degree in physical therapy. The following are core requirements needed for most physical therapy programs. Additional humanities and social science electives are required and vary with each program. *Individual advising is strongly recommended.*

ENGL 100	Expository Writing I	3
ENGL 120	Expository Writing II	3
SPCH 106	Public Speaking I	3
PSYCH 110	General Psychology	3
PSYCH 505	Abnormal Psychology	3
PSYCH 520	Life Span Personality Development	3
SOCIO 211	Introduction to Sociology	3
MATH 100	College Algebra	3
MATH 150	Plane Trigonometry	3
STAT 330	Elementary Statistics for the Social Sciences	3
BIOL 198	Principles of Biology	4
BIOL 240	Structure and Function of the Human Body	6
BIOL 455	General Microbiology	4
CHM 210	Chemistry I	4
CHM 230	Chemistry II	4
PHYS 113	General Physics I	4
PHYS 114	General Physics II	4

Contact the College of Arts and Sciences dean's office for more information.

**Pre-occupational therapy**

To be eligible for admission to the occupational therapy program at the University of Kansas Medical Center the following course work needs to be completed:

ENGL 100	Expository Writing I	3
ENGL 120	Expository Writing II	3
Literature		3
SPCH 106	Public Speaking I	3
SOCIO 211	Introduction to Sociology	3
PSYCH 110	General Psychology	3
Psychology course (consult advisor)		3
BIOL 198	Principles of Biology	4
BIOL 240	Structure and Function of the Human Body	6
MATH 100	College Algebra	3
Basic art course*		3
Restricted liberal arts elective		3
General electives		11
		<u>51</u>

\*Tangible art/craft classes (metal and jewelry, drawing I, sculpture, weaving, ceramics, painting, etc.)

Contact the College of Arts and Sciences dean's office for more information.

**Pre-respiratory therapy**

Advising is available for two years of preparatory work for application to respiratory therapy programs. The following classes should be taken:

ENGL 100	Expository Writing I	3
ENGL 120	Expository Writing II	3
SPCH 106	Public Speaking	3
MATH 100	College Algebra	3
STAT 330	Elementary Statistics for Social Sciences	3
CHM 110	General Chemistry	5
BIOL 198	Principles of Biology	4
BIOL 240	Human Body	6
BIOL 455	General Microbiology	4
PHYS 115	Descriptive Physics	4
LATIN 105	Latin and Greek for Scientists	1
Social science electives		3
Humanities electives		3
Math and science electives		6–10
Electives		<u>12</u>

63–66

Contact the College of Arts and Sciences dean's office for more information.

**Pre-medical records administration**

The pre-medical records administration curriculum is a three-year program. Qualified applicants then apply to the Medical Records Administration program at the University of Kansas. The following course work needs to be completed:

ENGL 100	Expository Writing I	3
ENGL 120	Expository Writing II	3
ENGL 516	Written Communication for Sciences	3
SPCH 106	Public Speaking	3
MATH 100	College Algebra	3
STAT 320	Elements of Statistics	3
or		
STAT 330	Elementary Statistics for the Social Sciences	3
or		
STAT 350	Business and Economic Statistics I	3
PSYCH 110	General Psychology	3
PSYCH 535	Social Psychology	3
SOCIO 111	Introduction to Sociology	3
BIOL 198	Principles of Biology	4
BIOL 240	Structures and Function of the Human Body	6
BIOL 455	Microbiology	4
FN 132	Basic Nutrition	3
MANGT 420	Management Concepts	3
MANGT 531	Personnel and Human Resource Management	3
MANGT 390	Business Law	3
ACCTG 211	Financial Accounting	3
CIS 110	Introduction to Personal Computing	3
Humanities electives		6
Electives		<u>18</u>
		<u>86</u>

# Institute for Social and Behavioral Research

M. Duane Nellis, Director

The Institute for Social and Behavioral Research promotes, encourages, and facilitates research and graduate studies in the social, behavioral, and statistical sciences. This interdisciplinary institute conducts its own research, enhances research by faculty, assists faculty in securing research funding, assists graduate students and undergraduates through fellowship programs, and provides outreach services to public agencies and institutions in Kansas. Research colloquia and faculty research fellowships are also sponsored by the ISBR. Programs coordinated by the ISBR include the Population Research Laboratory, the Geographic Information Systems Spatial Analysis Laboratory, the Labor Studies Program, the Statistical Design and Analysis Unit, the Survey Research Laboratory, the Center for Exercise Research, and the Advanced Research Development Program.

# Aerospace Studies

Dennis L. Ritter, Head

Assistant Professors Barham and Royer.

108 Military Science Hall  
532-6600

The Air Force Reserve Officer Training Corps provides the best means for undergraduate and graduate students to become officers in the United States Air Force. Upon completion of the university program, students are commissioned second lieutenants, and then enter active duty as a pilot, missileer, or navigator, or enter a technical or nontechnical career field; are deferred for graduate study, to enter active service after degree completion; or enter into Air Force-sponsored graduate study at full pay while serving as Air Force officers.

Any student—graduate or undergraduate—who is a U.S. citizen may become a cadet by enrolling in AERO 110. The duration of the program varies from two to four years, depending upon an applicant's previous experience and the availability of different options.

## Scholarships

Full-time students who qualify to become Air Force officers, with two or more years left for degree completion (including graduate study), are eligible to apply for scholarships. If selected, students will have their tuition, fees, and book expenses paid for by the U.S. Air Force; they will also receive a \$100 monthly stipend while in school. All payments are tax free.

Students who apply for and receive the Air Force Pre-Health Professions Scholarship, and are subsequently accepted to medical school, are guaranteed scholarship through medical school. The Pre-Health Professions Scholarship pays for tuition, fees, and books, plus \$100 monthly. The medical school scholarship pays med-school tuition, fees, books, and more than \$700 per month.

High school students considering the four-year Air Force College Scholarship Program must be highly motivated toward becoming Air Force officers. To qualify, students should be above-average scholars, be physically capable, possess leadership potential, and apply before December of the senior year. Financial benefits are the same as the undergraduate scholarships mentioned earlier. Applicants should contact their high school counselor or an AFROTC officer for applications and further information.

## Four-year program

### Basic course

Students electing the four-year program normally will begin with the General Military Course during the freshman or sophomore year. This program consists of four semesters of 1 credit hour each, counts toward all bachelor's degrees awarded by K-State, and in no way obligates students to a military commitment. Aerospace studies GMC courses are open to all students at the university without obligation to military service. Students in the GMC are provided uniforms, texts, and other equipment needed for their AFROTC courses. Students may begin enrollment in GMC courses at any time until two years prior to graduation (graduate or undergraduate).

### Advanced course

The Professional Officer Course is the upperclass program and consists of four courses of 3 credit hours each, over a period of four semesters. All cadets in the POC become members of the Air Force Reserve and receive \$100 a month and all necessary AFROTC texts and equipment. Upon completion of the POC and their degree requirements, students are commissioned as second lieutenants in the United States Air Force.

## Two-year program

The two-year program consists of the POC phase only and may be taken during a student's final four semesters, undergraduate or graduate, at the university.

Prerequisites for selection include Air Force aptitude testing, an Air Force physical, and completion of six weeks of summer field training. Applicants should contact AFROTC before February 15.

## Field training

Cadets practice their leadership and management skills in a cadet group. Cadets who are in the four-year program attend four weeks of field training at an Air Force base during the summer prior to entering the POC. Two-year program cadets attend six weeks of field training. During training, cadets are paid approximately \$140 per week, and receive travel pay to and from the training base.

## Extracurricular activities

Students enrolled in Air Force ROTC may participate in many activities including detachment-sponsored events and social functions. Cadets pursuing officers' commissions are eligible for membership in the Arnold Air Society, a national honorary professional and service organization established to foster good relations among Air Force ROTC, the Air Force, the campus, and the local community. Participation in the Arnold Air Society is voluntary.

## AFROTC Supplemental Courses Program

The Supplemental Courses Program provides both required and recommended courses to enhance the career and officer performance of students commissioned through AFROTC.

GMC scholarship cadets must successfully complete a course in English composition by the end of the sophomore year. They are also encouraged to take a course in speech.

POC cadets must successfully complete a course in mathematical reasoning prior to commissioning.

In all cases, successful completion of a K-State required course in a supplemental subject area will also satisfy the AFROTC requirement. Details on the SCP are available through the Department of Aerospace Studies.

## Foreign language requirement

AFROTC cadets who accept scholarships are required to successfully complete at least two semesters of college instruction in a major Indo-European or Asian language prior to commissioning. AFROTC policy is to allow cadets to meet the requirement by completing a course or by demonstrating proficiency as certified by the Department of Modern Languages.

## General military courses

### Undergraduate credit

**AERO 099. Aerospace Studies Lab.** (0) I, II. The leadership laboratory for aerospace studies. Students will receive leadership training and experience as well as training in Air Force customs and courtesies. Pr.: Instructor permission.

**AERO 110. Aerospace Studies 1A.** (1) I. A study of the mission and organization of the United States Air Force; U.S. general purpose and aerospace support forces. One hour of class plus one hour of leadership training a week.

**AERO 111. Aerospace Studies 1B.** (1) II. U.S. strategic offensive and defensive forces; their mission, function, and employment. One hour of class plus one hour of leadership training a week.

**AERO 210. Aerospace Studies 2A.** (1) I. The development of air power from its beginnings to the end of World War II. It traces the development of various concepts of employment of air power. One hour of class plus one hour of leadership training a week.

**AERO 211. Aerospace Studies 2B.** (1) II. The development of air power from the close of World War II to the present. It focuses upon factors which have prompted research and technological change and stresses significant examples of the impact of air power on strategic thought. One hour of class plus one hour of leadership training a week.

**AERO 215. AFROTC Summer Program.** (4) S. Mission and organization of United States Air Force, including function and employment; development of air power from its beginning to the present. Emphasis on factors prompting research and technological change and impact of air power on strategic issues. Taught off campus at selected Air Force bases. Pr.: Open only to students entering AFROTC program at the junior level.

## Professional officers courses

### Undergraduate credit

**AERO 310. The Professional Officer 3A.** (3) I. A study of USAF professionalism, leadership, and management. Includes the meaning of professionalism, professional responsibilities, the military justice system, leadership theory, functions and practices, management principles and functions, problem solving, and management tools, practices, and controls. Three hours of class plus one hour of leadership training a week.

**AERO 311. The Professional Officer 3B.** (3) II. Continuation of AERO 310. Three hours of class plus one hour of leadership training a week.

**AERO 399. Problem in Aerospace Studies.** (Var.) I, II. Work offered in any of the AFROTC general or professional courses for students out of phase for graduation; material covered in a basic or advanced course. Pr.: Consent of department head.

**AERO 410. Aerospace Studies 4A.** (3) I. This course will examine the role of the professional officer in a democratic society; socialization processes within the armed services; the requisites for maintaining adequate national security forces; political, economic, and social constraints upon the overall defense policy-making process. Three hours a week.

**AERO 411. Aerospace Studies 4B.** (3) II. Focusing on the armed forces as an integral element of society, this course provides an examination of the broad range of American civil-military relations and the environmental context in which defense policy is formulated. Communicative skills are stressed. The role of contemporary aerospace power, and current and future employment of aerospace forces will also be examined. Three hours of class plus one hour of leadership training a week.

**AERO 491. Introduction to Flight Training.** (1) II. Basic aerodynamics, aviation weather, navigation, flight/mission planning, and introduction to undergraduate pilot/navigator training. Normally taken by senior professional officer course students. Pr.: Consent of instructor.

# Anthropology

Martin Ottenheimer,\* Head

Professors Finnegan,\* O'Brien,\* H. Ottenheimer,\* and M. Ottenheimer,\* Associate Professor Benson,\* Assistant Professors W. R. Adams\* and H. Prins,\* Adjunct Professor Michie; Emeritus Professor Taylor.\*

Anthropology is a major within the Department of Sociology, Anthropology, and Social Work, listed alphabetically in the College of Arts and Sciences.

There are four major subfields of anthropology. Physical anthropology explores the origins of human life and the biological bases of culture. Archaeology examines the development of human cultures from prehistory and ancient civilizations to historic and modern times. Linguistic anthropology focuses on the languages and dialects of the world and the relationships of language to thought and culture. Cultural anthropology studies human behavior by surveying the range and variety of cultural traditions throughout the world. Some anthropology majors generalize, while others specialize in one or more of the subfields.

## Requirements

In addition to the general B.A. or B.S. requirements, anthropology majors take a minimum of 27 hours in anthropology as follows:

Introductions to the four subfields:		
ANTH 200	Introduction to Cultural Anthropology .....	3
ANTH 220	Introduction to Linguistic Anthropology .....	3
ANTH 260	Introduction to Archaeology .....	3
ANTH 280	Introduction to Physical Anthropology .....	3
Capstone course:		
ANTH 602	Anthropological Theory .....	3

Four advanced electives distributed among at least two of the subfields: 12 hours at or above the 500 level.

Many anthropology students prepare for the variety of occupations concerned with human relations by combining anthropological study with other training, frequently by majoring in two fields. Each program of study is worked out individually by a student and his or her advisor. Interested students may obtain additional information from the *Handbook on Majoring in Anthropology*, which is available in the department office.

## Applied anthropology option

The applied anthropology option provides preparation and experience in the application of anthropology to professional settings outside the academic environment. The option is interdisciplinary, combining anthropology with other areas of training and expertise. While the option is flexible and accommodates a wide range of individual student interests, emphasis is on three major areas: developmental/action anthropology (domestic, international, community, and rural development); cultural resource management (historic preservation, parks and museums, and public archaeology); and complex organizations (agencies, foundations, business, administration, planning, and policy analysis).

The option builds on existing requirements for a bachelor's degree in anthropology. It adds 6 hours in anthropology and 18 hours in an area specialization outside the anthropology major. Double major, dual degree, pre-professional, and secondary major programs are particularly well suited for the option. Application to participate is normally made to the anthropology faculty during or before the junior year.

In addition to the existing 27 hours of major requirements for the bachelor's degree in anthropology, the following courses are required:

ANTH 640	Pro-Seminar in Applied Anthropology .....	3
ANTH 641	Internship in Applied Anthropology .....	3
	or	
ANTH 626	Internship in Museology .....	3

An area specialization consisting of 18 hours of course work outside anthropology with the following distribution:

Quantitative or technical skill development .....	6
Subject matter courses .....	12

The area specialization is a set of related courses focused on a particular interest, problem domain, or area of expertise taken from any other discipline or combination of disciplines. The quantitative and technical skill courses must be consistent with and supportive of the subject matter work. Students must demonstrate the coherence of their chosen area specialization and its fit with anthropology. The area specialization must be approved by the anthropology faculty.

## Anthropology courses

### Undergraduate credit

**ANTH 200. Introduction to Cultural Anthropology.** (3) I, II S. Introduction to ethnology and ethnography; analysis and comparison of technological, social, and religious characteristics of cultural systems.

**ANTH 201. Introduction to Cultural Anthropology, Honors.** (4) On sufficient demand. Introduction to basic ethnology and ethnography; technological, social, and religious characteristics of cultural systems; discussion and independent study.

**ANTH 202. Anthropology Seminar for Education Majors.** (1) I, II. To aid elementary and secondary education majors in relating anthropological perspectives and findings to their teaching areas. Pr.: ANTH 200 or conc. enrollment.

**ANTH 220. Introduction to Linguistic Anthropology.** (3) II. Language as a part of human behavior: its origins, uses and abuses, and ways of defining reality. Basic descriptive and ethnosemantic skills used by anthropologists to learn languages in the field.

**ANTH 260. Introduction to Archaeology.** (3) I, II. A brief survey of theories of culture change as they apply to the development of Stone Age cultures through the rise of worldwide agricultural societies, cities, and other complex societies; brief outlines of the major Old and New World cultural sequences.

**ANTH 280. Introduction to Physical Anthropology.** (3) I, II, S. History of research; principles of evolution and human genetics; primate relations of hominids; fossil evidence of the evolution of hominids; the study of modern race; culture and evolution.

**ANTH 281. Introduction to Physical Anthropology Laboratory.** (1) I, II, S. Laboratory investigation of human skeletal anatomy, human genetics, primate comparative anatomy, fossil hominid morphology, and comparative evolution of hominid types. Two hours lab a week. Pr.: ANTH 280 or conc. enrollment.

**ANTH 399. Honors Seminar in Anthropology.** (1-3) On sufficient demand. Readings and discussion of selected topics. Open to nonmajors in the honors program.

**ANTH 420. Ethnography of Language.** (3) I or II. Study of language and dialect as aspects of social and ethnic group identities. Participant observation is emphasized. Research project includes kinship terminology, life histories, folklore, and lexicography. Pr.: ANTH 200 or consent of instructor.

**ANTH 432. Indians of Mexico, Central America, and the Caribbean.** (3) I, in even years. Description and comparison of the cultural ecology of many of the indigenous peoples of the region including the Yaqui, Huichol, Tarahumara, and Zapotec of Mexico; the Maya of Guatemala; the Miskito of Nicaragua; the Cuna of Panama; and the Taino of Puerto Rico.

**ANTH 499. Senior Honors Thesis.** (2) On sufficient demand. Open only to seniors in the arts and sciences honors program.

## Undergraduate and graduate credit in minor field

**ANTH 501. Proficiency Development.** (1-3) I, II. Integrative review of anthropological concepts and skills under faculty supervision. For single students or groups of students. Not applicable to major field requirements. Not repeatable. For undergraduate credit only. Pr.: Consent of instructor and superior performance in relevant course.

**ANTH 505. Introduction to the Civilizations of South Asia I.** (3) I. Interdisciplinary survey of the development of civilizations in India, Pakistan, Sri Lanka, Bangladesh, and Afghanistan; geographical and demographic context; philosophical and social concepts; social and political institutions; literature and historical movements. Pr.: ANTH 200. Same as HIST 505, ECON 505, POLSC 505, SOCIO 505.

**ANTH 506. Introduction to the Civilizations of South Asia II.** (3) II. Interdisciplinary survey of recent and contemporary civilizations in India, Pakistan, Sri Lanka, Bangladesh, and Afghanistan, including recent history, current economy, religion, culture, languages, literature, geography, social and political structure, ideas. Pr.: ANTH 200. Same as HIST 506, ECON 506, POLSC 506, SOCIO 506.

**ANTH 507. Folk Cultures.** (3) I or II. A comparative approach to agrarian societies; the investigation of economic, political, social, and ideological aspects of peasantry. Pr.: Sophomore standing.

**ANTH 508. Male and Female: Cross-Cultural Perspectives.** (3) I or II. Sex roles and male-female relationships in the world's cultures. Stresses sex-role complementarity within the anthropological framework of cultural relativism. Pr.: Sophomore standing.

**ANTH 510. Kinship and Marriage in Cross-Cultural Perspective.** (3) II, in even years. Systems of family, marriage, descent, and sex tabus in cross-cultural perspective. Pr.: ANTH 200 or SOCIO 211.

**ANTH 511. Cultural Ecology and Economy.** (3) I or II. Cultural ecology and organization in the world's cultures. Discussion of environment and culture, exchange and display, money, trade and markets, and economic development and social change in selected societies. Pr.: Sophomore standing.

**ANTH 512. Political Anthropology.** (3) I or II. Ethnological approaches to politics in societies around the world. Structural-functional, evolutionary, and conflict theories. A comparison of the political systems of small-scale and complex societies; political modernization. Pr.: Sophomore standing.

**ANTH 515. Creativity and Culture.** (3) I, in even years. How ethnologists view the expressive and creative aspects of culture. A cross-cultural survey of the verbal, visual, and performing arts. Pr.: Sophomore standing.

**ANTH 516. Ethnomusicology.** (3) I, in even years. Ethnic, popular, and traditional musics from around the world. The course samples a wide range of stylistic traditions from Africa, Asia, Oceania, Europe, and the Americas. Emphasis is on understanding musical style in cultural context.

**ANTH 517. African American Music and Culture.** (3) I, in odd years. Continuity and tradition in the musical styles and cultural patterns of African Americans in the United States, the Caribbean, and South America. Music, art, religion, social organization, from African roots to modern forms.

**ANTH 519. Practical Anthropology.** (3) I or II. Application of anthropological principles and insights to programs of planned change, cultural innovation, and contemporary problems. Pr.: Sophomore standing.

**ANTH 520. Research Seminar.** (Var.) On sufficient demand. Intensive exploration of anthropological problems for both majors and nonmajors of sufficient background. High levels of individual participation. Pr.: 9 hours of anthropology.

**ANTH 522. Special Topics in Anthropology.** (1-4) On sufficient demand. Variable topics within cultural anthropology, linguistic anthropology, archaeology, or physical anthropology. Pr.: Consent of instructor.

**ANTH 532. Central America: Its Peoples and Problems.** (3) I. An anthropological perspective of the interactions of indigenous and foreign populations with an examination of the geographic, social, economic, political, and ideological bases of the problems facing Central America today. A look at the seven countries composing Central America in terms of their particular problems and unique solutions. Pr.: ANTH 200.

**ANTH 533. Indians of Kansas.** (3) I, in even years. Description and comparison of native cultures of the prairies and plains of Kansas. Culture contact and change in surviving tribes. Pr.: Sophomore standing.

**ANTH 536. African American Cultures.** (3) I or II. Description and comparison of African-derived cultural patterns in the Americas, stressing culture contact and acculturation, retention and syncretism, social and economic organization, religion, language, the arts. Pr.: Sophomore standing.

**ANTH 545. Cultures of India and Pakistan.** (3) I or II. Cultural survey of the contemporary tribes and Hindu caste communities in their historical and geographical context, followed by a more intense analysis of selected Indian and Pakistani village case studies stressing indigenous economic, social, political, and religious structures. Pr.: Sophomore standing.

**ANTH 550. Cultures of Africa.** (3) I or II. Family life, subsistence patterns, exchange systems, languages, religions, and development of the peoples of Africa.

**ANTH 570. American Indian Archaeology.** (3) I or II. Peopling of the New World; the Archaic period; spread of agriculture; prehistoric village community life. Specific cultural sequences of the U.S. and Arctic. Pr.: ANTH 200 or 260.

## Undergraduate and graduate credit

**ANTH 600. Cultural Dynamics.** (3) I or II. Cultural processes and their conditions and consequences; mechanisms by which customs originate and become culturally significant; development, modification, and decline of customs and cultures; processes and consequences of intercultural contact; applied anthropology. Pr.: ANTH 200 or consent of instructor.

**ANTH 602. Anthropological Theory.** (3) I or II. Review and integration of the major theoretical approaches in the principal branches of anthropology. Pr.: ANTH 200 or consent of instructor.

**ANTH 604. Culture and Personality.** (3) I or II. Anthropological contributions to personality study; cross-cultural comparisons of personality types, means of personality formation in different cultures; cultural change and personality. Pr.: Three hours of anthropology.

**ANTH 618. Religion in Culture.** (3) II, in odd years. The nature of religion in different cultural systems. Pr.: ANTH 200 or SOCIO 211 or consent of instructor. Same as SOCIO 618.

**ANTH 625. Independent Reading and Research in Anthropology.** (1-3) I, II. Guided reading and research on a specific anthropological topic of student interest, leading to preparation of a research paper. Topic and credit to be arranged. Pr.: Three hours of anthropology and consent of instructor.

**ANTH 626. Internship in Museology.** (3) I, II, S. Practical professional museum experience of at least three weeks full time or 150 hours part time in the processing of collections, conservation, cataloging, archive and library maintenance, and/or the planning and preparation of exhibits. Only fulfills option requirements for anthropology majors. May be repeated once for credit if at a different type of museum. Pr.: ANTH 200 or 260.

**ANTH 630. Indians of North America.** (3) I, in odd years. Description and comparison of native cultures of Canada and the United States; culture contact and change among surviving groups. Pr.: ANTH 200 or 260.

**ANTH 633. Gender, Power, and International Development.** (3) II, in even years. Examination of various models of development and their impact on roles of women and men in various cultures. Emphasis upon Africa, Asia, and Latin America. Comparisons of public, service, and economic sectors, including agriculture, marketing, and industry. Examination of policy issues. Pr.: SOCIO 211 or ANTH 200 and 3 additional hours in sociology or cultural anthropology. Same as SOCIO 633.

**ANTH 634. Indian Cultures of South America.** (3) On sufficient demand. A survey of the nature and variability of the original cultures of South America. Analysis of sample cultures, stressing economic, social, political, and religious structures. Pr.: ANTH 200 or 260.

**ANTH 640. Pro-seminar in Applied Anthropology.** (3) I. Study and analysis in selected subfields of the discipline related to professional experience and problem solving outside the academic discipline. Critical emphasis is on analytical and evaluative skills in relation to the organization and objectives of groups, agencies, and institutions for which applied work is conducted. Only fulfills option requirements for anthropology majors. Pr.: Consent of instructor.

**ANTH 641. Internship in Applied Anthropology.** (3) I, II, S. Supervised field experience of at least three weeks full time or 150 hours part time with an organization or institution in the application of anthropological approaches to problem solving and working in a professional setting. Emphasis is on anthropological skills in relation to the objectives and operations of an institution. Only fulfills option requirements for anthropology majors. May be repeated once for credit. Pr.: Completion of all other option requirements and consent of the instructor.

**ANTH 673. Precolumbian Civilizations of Mexico and Guatemala.** (3) I or II. Early foraging societies, the beginnings of agriculture; the rise of civilization; the classic empires of the Maya, Aztec, Tarascans, and their neighbors; relationships with the United States. Pr.: ANTH 200 or 260.

**ANTH 676. Archaeology of the Old World.** (3) I or II. Origin and evolution of human culture and technology with a particular focus on the cultural developments in China, India, sub-Saharan Africa, and Polynesia as well as the Bronze and Iron Ages of Europe and the early Mediterranean civilizations. Pr.: ANTH 200, 260, or consent of instructor.

**ANTH 679. Archaeological Field Methods.** (3) I. Archaeological site survey, site excavation, and laboratory analysis of sites and artifacts from the Manhattan, Kansas region. Field work on Saturday, 8 a.m.-5 p.m., while weather permits, laboratory work thereafter. Pr.: Consent of instructor.

**ANTH 680. Survey of Forensic Sciences.** (3) Anthropological survey of the predominantly biological areas of forensic science, their methods and techniques, as they pertain to the application of that science to the purpose of the law. Particular emphasis will be given to perspectives about the science itself, its application to anthropology, and the unique ways in which that science may be used by the law. Pr.: A life science with laboratory requirement in the College of Arts and Sciences or consent of the instructor.

**ANTH 685. Race and Culture.** (3) on demand. The biological meaning of race; the interrelationships of biological and cultural traits in human evolution; processes of racial formation of man; methods of classifying human races; cultural inheritance; the distinction of race, culture, personality, and intelligence; a review of modern racism; race as an evolutionary episode.

**ANTH 688. Paleoanthropology.** (3) II, in odd years. Human origins and evolution as indicated by fossil evidence; interpretation of man-apes, Pithecanthropus, Neanderthal, Cro-Magnon, and other major fossil groups within the context of evolutionary theory, primate comparisons, and cultural evolution. Pr.: ANTH 200 or 280 or consent of instructor.

**ANTH 691. Primatology.** (3) I, in even years. Survey of the primate order including considerations of evolution, morphology, and behavior. Particular emphasis will be given to developing perspectives about the origin and evolution of hominids in the context of the primate order. Pr.: ANTH 280 or consent of instructor.

**ANTH 694. Osteology.** (3) II, in even years. Detailed study of human skeleton, with special attention to health and demographic conditions in prehistoric cultures and the evaluation of physical characteristics and genetic relationships of prehistoric populations. Pr.: ANTH 280 or consent of instructor.

**ANTH 695. Laboratory in Osteology.** II, in even years. Laboratory demonstration and exercise in working with skeletal material for analysis of sex, age, stature, and race. Complete metric and nonmetric analysis with consideration given to paleodemography, paleopathology, *in situ* analysis and excavation, and preservation. Written reports on bone material remains will be necessary. Pr.: ANTH 694 or conc. enrollment and consent of instructor.

**ANTH 730. Field and Laboratory Techniques in Archaeology.** (1-9) S. Participation in archaeological excavations; techniques, methods, and procedures in a field research situation. The laboratory work of cleaning, cataloging, analyzing, and preliminary report preparation of materials recovered. May be repeated once if the areas or problems involved are different. Pr.: ANTH 200 or 260 or consent of instructor.

**ANTH 736. Applied Agricultural and Rural Change.** (3) I, in even years. Examination of agricultural and rural development projects and programs and how they fit into national and regional social and cultural systems. Emphasis on locally and regionally based development strategies. Examination of the role of international agencies in understanding shifts in dominant approaches to applied rural change. Pr.: SOCIO 211 or ANTH 200. Same as SOCIO 736.

**ANTH 792. Field Methods in Linguistics.** (3) On sufficient demand. Techniques of collecting and analyzing linguistic data in the field. Work with language consultants in class, on languages such as Swahili. Pr.: ANTH 220 or LING 280 or 600. Same as LING 792 and LG 792.

## Art

Gary Woodward,\* Head

Professors Garzio,\* Ikeda,\* Pujol,\* Stroh,\* and Sturr;\* Associate Professors Clore, Culley,\* Harmes,\* Hower,\* Kren,\* Munce,\* Noblett,\* Rex Replogle,\* and Woodward;\* Assistant Professors Dollar, Love,\* Ogg, O'Shea,\* Renata Replogle, Routson,\* Schmidt,\* Swiler,\* and Winegardner; Instructor Andrus; Emeriti: Professors Garzio\* and Larmer;\* Associate Professor Hill.

### Bachelor of arts

The B.A. degree in art consists of three parts: the general education courses outlined under the humanities curriculum; a core of beginning art courses to provide

prerequisites and a broad range of art experience for the art major; and 16 hours concentration of related subjects that should provide a minimal basis for establishing professional competence. Concentration possibilities will be in one of the following: painting, printmaking, ceramics, sculpture, drawing, art history, metalsmithing and jewelry, or graphic design. The bachelor of arts degree requires a minimum of 48 semester hours in art. The major requirements are as follows:

Art history (12 hours)	
ART 195	Survey of Art History I . . . . . 3
ART 196	Survey of Art History II . . . . . 3
ART 545	Twentieth Century Art History I . . . . 3
ART 550	Twentieth Century Art History II . . . . 3
Design (8 hours)	
ART 100	Design I . . . . . 2
ART 200	Design II . . . . . 2
ART 190	Drawing I . . . . . 2
ART 210	Drawing II . . . . . 2
ART 225	Figure Drawing I . . . . . 2
ART 230	Sculpture I . . . . . 2
ART 245	Painting I . . . . . 2
ART 235	Printmaking I . . . . . 2
ART 220	Water Color I . . . . . 2
ART 265	Ceramics I . . . . . 2
Major concentration . . . . . 16	

### Bachelor of fine arts

The bachelor of fine arts degree is the more professionally oriented undergraduate degree in art. It is designed primarily for those planning to become professional artists, artist-teachers, or art therapists. Greater emphasis is placed on actual practice in the creative art disciplines. The degree is considered the appropriate preparation for a master of fine arts degree, which is recognized as the terminal degree in studio arts, and for a master's degree in art therapy, which is required for registration as an art therapist. The B.F.A. in art is a four-year, 120-hour program with concentrations possible in painting, sculpture, ceramics, graphic design, printmaking, drawing, metalsmithing and jewelry, and pre-art therapy. The major requirements are as follows:

Art history (15 hours)	
ART 195	Survey of Art History I . . . . . 3
ART 196	Survey of Art History II . . . . . 3
ART 545	Twentieth Century Art History I . . . . 3
ART 550	Twentieth Century Art History II . . . . 3
Art history electives . . . . . 3	
ART 100	Design I . . . . . 2
ART 200	Design II . . . . . 2
Drawing (8 hours)	
ART 190	Drawing I . . . . . 2
ART 210	Drawing II . . . . . 2
Drawing electives . . . . . 4	
ART 225	Figure Drawing I . . . . . 2
ART 245	Painting I . . . . . 2
ART 230	Sculpture I . . . . . 2
ART 265	Ceramics I . . . . . 2
ART 235	Printmaking I . . . . . 2
ART 270	Metalsmithing and Jewelry . . . . . 2
ART 410	B.F.A. Exhibition . . . . . 0
Major concentration . . . . . 20	
Art electives . . . . . 16	
75	

### Art education

Students may satisfy requirements to teach art in public schools by any of three programs: B.A. and teacher certification; B.F.A. and teacher certification; or B.S. in education with art concentration. Under the first two options students qualify for teacher certification by completing specified courses in the College of Education. See the College of Education approved programs section for more information.

Studios, laboratories, and equipment for creative work are provided and adequate to the needs of the art areas. Student work may be retained at the discretion of the faculty for an indefinite period of time for instructional and exhibition purposes.

### Pre-art therapy

The B.F.A. with a pre-art therapy concentration provides a strong background in studio art and psychology plus an introduction to the field of art therapy. This program of study prepares students to do graduate studies in art therapy and related fields.

### Transfer students

Art hours transferred to K-State will be assigned by the art department. Students may use transfer hours toward their area of concentration only when obtained from a four-year college or university.

### Art courses

**ART 095. Art Assembly.** (0) I, II. Recommended for all art and art education majors each semester. By appt.

### Undergraduate credit

**ART 100. Design I.** (2) I, II, S. Introduction to and laboratory practice in the principles and elements of design. Four hours lab.

**ART 190. Drawing I.** (2) I, II, S. Fundamentals of drawing as applied to the realistic and expressive representation of objects through the use of a variety of media and approaches. Four hour lab.

**ART 195. Survey of Art History I.** (3) I. Historical development of art from pre-history through the Middle Ages.

**ART 196. Survey of Art History II.** (3) II. Historical development of art from the Renaissance to the nineteenth century.

**ART 200. Design II.** (2) I, II. Further work in the principles and elements of design, with emphasis on color, texture, and pictorial composition. Four hours lab. Pr.: ART 100.

**ART 205. Graphic Design Techniques.** (2) I, II. Layout and drawing techniques and tools used in various media related to reproducing art for commercial reproduction purposes. Four hours lab. Pr.: ART 100, 190.

**ART 210. Drawing II.** (2) I, II. Continuation of Drawing I, with strong emphasis on creative expression. Four hours lab. Pr.: ART 100, 190.

**ART 215. Design III.** (2) I, II. Work in three dimensions in sheet metal, plaster, plastics, paper, wire, etc., using the principles and elements of design. Four hours lab. Pr.: ART 100.

**ART 220. Water Color I.** (2) I, II. Painting in water color and other water-soluble media; includes both studio and outdoor painting and sketching. Four hours lab. Pr.: ART 100, 190.

**ART 225. Figure Drawing I.** (2) I, II. Sustained drawings of the human figure using a variety of media; introduction to human anatomy used by artists. Four hours lab. Pr.: ART 210.

**ART 230. Sculpture I.** (2) I, II. An introduction to the problems of sculptural form; fundamental techniques and theory in clay modeling, molding, casting, and direct plaster. Four hours lab. Pr.: ART 100, 190.

**ART 235. Printmaking I.** (2) I, II. Introduction to the intaglio, lithographic, and serigraphic printmaking techniques and tools. Four hours lab. May be taken for three semesters in order to obtain experience in each of the three techniques. Pr.: ART 100, 190.

**ART 240. Drawing III.** (3) I, II. Continuation of Drawing II, emphasizing exploration in mixed media. Six hours lab. May be taken for two semesters. Pr.: ART 210.

**ART 245. Painting I.** (2) I, II. Introduction to painting through a variety of media and techniques. Four hours lab. Pr.: ART 100, 190.

**ART 250. Spinning and Natural Dyes.** (2) I, II. Basic instruction in use of spindle and spinning wheel; process of extracting and use of dye from commonly available plants. Four hours lab. Pr.: ART 100, 190.

**ART 255. Primitive Loom Construction.** (2) I, II. Exploration of primitive loom systems and construction of some suited to individual purposes. Basic instruction in weaving with emphasis on acquisition and aesthetic use of commonly available materials. Four hours lab. Pr.: ART 100, 190.

**ART 260. Design in the Crafts.** (2) I. Crafts work in various media, with emphasis on contemporary design. Four hours lab. May be taken for credit two semesters. Pr.: ART 100.

**ART 265. Ceramics I.** (2) I, II. Introduction to basic hand building techniques; decoration of ceramic forms using slips, stains, glazes, etc. Student participation in Raku firing procedures; stacking and firing of electric kilns. Four hours lab. Pr.: ART 100.

**ART 270. Metalsmithing and Jewelry.** (2) I, II, S. Design and execution of small-scale, three-dimensional objects, involving the basic processes of raising, forging, and fabrication in semi-precious metals. The techniques of centrifugal and vacuum casting of precious metals will also be introduced as well as soldering and piercing. Four hours lab. May be taken for credit three semesters. Pr.: ART 100 or nonmajors consent of instructor.

**ART 275. Weaving I.** (2) I, II. Introduction to basic weaving techniques and the use of four harness looms. Emphasis on the aesthetic use of fibers. Four hours lab. Pr.: ART 100, 190.

**ART 280. Art Education Seminar.** (2) II. An introduction to concepts in art education. Research, literature, creativity, aesthetics, and the history of art education as they relate to teaching art.

**ART 285. Introduction to Color Media.** (2) I, II, S. Materials and teaching for the use of air brush, color markers, and other color media used in comprehensive rendering as well as finished illustrations. Resources include photography and life. Pr.: ART 100, 190.

**ART 290. Lettering.** (2) I, II. Study of traditional lettering forms, including Roman, Gothic, text, script, and some contemporary adaptations of these. Four hours lab. Pr.: ART 100, 190.

**ART 295. Photography in Art I.** (2) I, II. Understanding and using photography as an art form. The basic elements and principles of art are explored. Camera usage and photographic processing are covered. An adjustable camera is required. Pr.: ART 100, 190.

**ART 300. Special Studies in Art.** (1, 2) I, II. Specialized workshops or seminars conducted in studio, art therapy, art education, or art history.

**ART 301. Human Form and Composition.** (2) Intersessions only. Building stylization and expressive image making of the human form with experimental methods: use of color, mono-print, mixed media. A connected and sustained studio time available during intersession only, providing students a working rhythm without interruption from other course work. Four hours lab. Pr.: ART 100, 190.

**ART 305. Introduction to Museum Studies.** (3) I, II. Fundamentals of museum work including specific museum functions, role of professional personnel, and proper care and handling of art works.

**ART 310. Sophomore Honors Seminar in Art.** (3) Selected topics in art. Pr.: For students in the honors program only.

**ART 400. Computer Imaging.** (3) I, II, S. Exploration of computer imaging through the use of paint system and image processing technologies. Two hours lecture, four hours lab a week. Pr.: ART 200 and 210.

**ART 410. B.F.A. Exhibition.** (0) I, II. The preparation and execution of a senior exhibition of the student's own creative work primarily from his/her area of concentration. The student will be responsible for all the arrangements for the exhibition including scheduling, installation, and publicity.

**ART 425. Art for Elementary Schools.** (3) I, II, S. Art methods, materials, and philosophy of children's art at different grade levels. Six hours lab.

**ART 430. Independent Study—Ceramics.** (1-5) I, II, S. Work in ceramics after competency has been achieved. Personal development is emphasized.

**ART 435. Independent Study—Crafts.** (1-5) I, II, S. Work in crafts after competency has been achieved. Personal development is emphasized.

**ART 440. Independent Study—Drawing.** (1-5) I, II, S. Work in drawing after competency has been achieved. Personal development is emphasized.

**ART 445. Independent Study—Graphic Design.** (1-5) I, II, S. Work in graphic design after competency has been achieved. Personal development is emphasized.

**ART 450. Independent Study—Metalsmithing and Jewelry.** (1-5) I, II, S. Work in metalsmithing and jewelry after competency has been achieved. Personal development is emphasized.

**ART 455. Independent Study—Painting.** (1-5) I, II, S. Work in painting after competency has been achieved. Personal development is emphasized.

**ART 460. Independent Study—Printmaking.** (1-5) I, II, S. Work in printmaking after competency has been achieved. Personal development is emphasized.

**ART 465. Independent Study—Sculpture.** (1-5) I, II, S. Work in sculpture after competency has been achieved. Personal development is emphasized.

**ART 470. Independent Study—Water Color.** (1-5) I, II, S. Work in water color after competency has been achieved. Personal development is emphasized.

**ART 480. Independent Study/Research Computer Art and Design.** (3) I, II, S. This course is intended to provide students an opportunity to focus on a specific visual project/problem that will be solved using computers to focus on as the primary tool/medium. Pr.: ART 400.

### Undergraduate and graduate credit in minor field

**ART 545. Twentieth Century Art History I.** (3) I. Origins and development of twentieth century art from 1890 to 1914. Pr.: ART 195 or 196.

**ART 550. Twentieth Century Art History II.** (3) II. Origins and development of twentieth century art from 1914 to 1950. Pr.: ART 195 or 196.

**ART 560. Art for the Exceptional Individual.** (3) I, II. Using art concepts and activities to meet the needs of the mentally retarded, physically impaired, emotionally disturbed, or gifted. Three hours lec. Pr.: PSYCH 110. Same as EDCI 560.

**ART 565. Ceramics II.** (3) I, II. Advanced work on potter's wheel combined with hand-built forms. Consideration of simple kiln design, firing techniques, and procedures using various fuel burning kilns. Six hours lab. May be taken for four semesters. Pr.: ART 265.

**ART 570. Painting II.** (3) I, II. Continuation of Painting I. Emphasis on a more extensive understanding of concepts about painting which will lead to the development of a wider range of personal experience and expression. Six hours lab. Pr.: ART 245.

**ART 575. Graphic Design and Illustration.** (3-4) I, II, S. Problems in layout design and illustration for newspapers, magazines, and general advertising. Six hours lab. May be taken for four semesters. Final semester will include a portfolio project. Pr.: ART 205, 290, or consent of instructor.

**ART 590. Studies in Art Therapy.** (3) I, II, S. Supervised studies in research relating to the art therapy profession, its current developments, and goals. Pr.: ART 560 or junior standing in a program that emphasizes work with special population groups and consent of instructor.

**ART 595. Independent Study in Art Therapy.** (1-5) I, II, S. This course offers students who have fulfilled the full sequence of art therapy course work an opportunity for individual advanced study. Area of research to be selected by the student under the advisement of the instructor. Pr.: ART 560, 590 and consent of the instructor.

**ART 602. Art since 1950.** (3) I, II. Art movements beginning with abstract expressionism and continuing through pop, op, minimal, and conceptual art movements up to the present time. Pr.: ART 195 or 196.

**ART 604. Greek Art History.** (3) I, II. The art of classical Greece, from its Aegean origins through the Hellenistic period. Pr.: ART 195 or 196.

**ART 612. Renaissance Art History.** (3) I, II. Renaissance art of northern and southern Europe in the fifteenth and sixteenth centuries, with a brief discussion of its fourteenth century origins. Pr.: ART 195 or ART 196.

**ART 622. Baroque Art History.** (3) I, II. The development of the baroque period in northern and southern Europe, from its beginnings in the early seventeenth century to the rococo style of the eighteenth century. Pr.: ART 195 or 196.

**ART 632. The Development of American Art.** (3) I, II. American art from the Colonial period to the beginnings of abstract expressionism in the early 1940s, with major emphasis on the late nineteenth and early twentieth century developments. Pr.: ART 195 or 196.

**ART 634. History of Modern Sculpture.** (3) I, II. Directions in sculpture since the time of Rodin. Pr.: ART 195 or 196.

**ART 642. Nineteenth Century Art History.** (3) I, II. Painting, sculpture, and architecture of the late eighteenth and nineteenth centuries, with emphasis on the art of France. Pr.: ART 195 or 196.

**ART 654. Women in Art.** (3) I, II. The work of women artists from early Middle Ages to the twentieth century, with emphasis on the contemporary period. Pr.: ART 195 or 196.

**ART 662. Southwestern Indian Arts and Culture.** (3) I, II. The development of southwestern Indian silversmithing, weaving, pottery, basketry, and painting from the prehistoric period through the twentieth century. Pr.: ART 195 or 196.

### Undergraduate and graduate credit

**ART 600. Advanced Drawing.** (1-5. Credits over 3 hours must be approved by the instructor.) I, II. Upper-level drawing, development, and personal motivation. Lectures and problems directed toward an understanding of the historical development of drawing as well as investigations of contemporary attitudes. May be taken for four semesters. Pr.: ART 225, 240.

**ART 610. Figure Drawing II.** (3) I, II. Continuation of Figure Drawing I, with emphasis on individual expression. Six hours lab. May be taken for four semesters. Pr.: ART 225.

**ART 615. Figure Painting.** (3) I, II. Painting from the human figure with oil and plastic media. Six hours lab. May be taken for two semesters. Pr.: ART 245, 610.

**ART 620. Water Color II.** (3) I, II. Continuation of Water Color I. Emphasis on individual expression within limitations of medium. Six hours lab. May be taken for two semesters. Pr.: ART 220.

**ART 623. Advanced Concepts in Computer Art and Design.** (3) I, II, S. Advanced level studio exploration of computers as a tool/medium for art disciplines. Two hours lec., four hours lab. a week. Pr.: ART 200, 400, and instructor permission.

**ART 625. Independent Study—Art Education.** (1-5) I, II, S. Work offered in art education after competency has been achieved. Personal development is emphasized. Pr.: Full sequence of courses related to art education subject matter.

**ART 635. Printmaking II.** (3) I, II. Advanced work in blockprints, serigraphy, lithography, and intaglio. Six hours lab. May be taken for four semesters. Pr.: ART 235.

**ART 645. Sculpture II.** (3) I, II. Emphasis on artistic development through exploratory experiences in the various media. Introduction to foundry techniques and welding processes. Nine hours lab. May be taken for four semesters. Pr.: ART 230.

**ART 650. Painting III.** (1-5) I, II. Continuation of Painting II. Emphasis on individual directions in painting to attain personal expression and competency. Primarily for undergraduate painting majors. May be taken for four semesters. Pr.: ART 570.

**ART 655. Metalsmithing Techniques.** (3) I, II. Surface embellishment, container construction of various techniques, linkage, and mechanical problems will be explored in addition to stone setting. Nine hours lab. May be taken for three semesters. Pr.: ART 270.

**ART 660. Sculpture III.** (1-5) I, II. Continuation of Sculpture II. Further exploration of media and technique, emphasizing the development of individual direction and expression. Primarily for undergraduate sculpture majors. May be taken for four semesters. Pr.: ART 645.

**ART 665. Ceramics III.** (1-5) I, II. Individual exploration and further development of ceramic design and glaze technology; continuation of kiln design and construction. Six hours lab. May be taken for three semesters. Pr.: ART 565.

**ART 675. History of Ceramics.** (3) I, II. History and development of ceramics; study of the use of pottery and other aspects of ceramics from earliest known records to present day. Use of slides and other visual materials. Pr.: ART 195 or 196.

**ART 680. Metals Workshop.** (1-5) I, II. A number of metalsmithing techniques will be explored by the upper division student with emphasis on experimental problems and possibilities. The development of an individual point of view will predominate throughout the course. May be repeated twice. Pr.: ART 655.

**ART 685. Advanced Independent Study Design.** (Var.) I, II, S. Advanced work in design-related subjects. Pr.: Full sequence of courses related to problem subject matter.

**ART 690. Techniques in Teaching Art.** (Var.) I. Lectures and class discussion of methods, consideration of suitable laboratory equipment, use of illustrative material, and preparation of courses of study. Pr.: Twelve hours in art or consent of instructor.

**ART 695. Topics in Art History.** (Var.) I, II, S. Independent exploration in selected problems in art history. Pr.: Twelve hours art history.

## Biochemistry

Thomas E. Roche,\* Head

Professors Davis,\* Hedgcoth,\* Kramer,\* Muthukrishnan,\* Reeck,\* and Roche;\* Associate Professors Mueller\* and D. Takemoto;\* Assistant Professors Anderson, Kanost, Krishnamoorthi,\* and Wang; Emeriti: Professors Burkhard, Clegg, Koeppe, Mitchell, Nordin, Parrish, and Ruliffson.

Biochemistry seeks to understand the molecular events of life processes. It applies chemical and physical techniques to elucidate the structure and organization of molecules, particularly macromolecules that are responsible for the structural organization as well as operation and control of all cellular processes. The emerging knowledge has broad importance and consequences for all areas of the life sciences.

The Department of Biochemistry offers work leading to bachelor of arts and bachelor of science degrees with majors in biochemistry. The B.A. degree provides a liberal education with sufficient emphasis on science for students who wish to prepare for certain professional schools. The B.S. degree prepares students for professional careers in biochemistry or entry into graduate biochemistry training programs.

### Bachelor of arts

The requirements for the B.A. degree with a major in biochemistry include the general requirements of the College of Arts and Sciences plus the following:

BIOCH 100	Biochemistry Orientation	1
CHM 220	Chemical Principles I	5
	<b>and</b>	
CHM 250	Chemical Principles II	5
	<b>or</b>	
CHM 210	Chemistry I	4
	<b>and</b>	
CHM 230	Chemistry II	4
	<b>and</b>	
CHM 271	Chemical Analysis	4
CHM 531	Organic Chemistry I	3
CHM 550	Organic Chemistry II	3
CHM 532	Organic Chemistry Laboratory	2
BIOCH 290	Biochemistry Seminar	2
BIOCH 522	General Biochemistry Laboratory	2
BIOCH 755	Biochemistry I	3

BIOCH 765	Biochemistry II	3
MATH 220	Analytic Geometry and Calculus I	4
MATH 221	Analytic Geometry and Calculus II	4
PHYS 113	General Physics I	4
PHYS 114	General Physics II	4
BIOL 198	Principles of Biology	4
	Biological science electives	8

These science courses satisfy the mathematics and natural sciences requirements shown in the general requirements for the B.A. degree.

### Bachelor of science

The requirements for the B.S. degree with a major in biochemistry include the general requirements of the College of Arts and Sciences plus the following:

BIOCH 100	Biochemistry Orientation	1
CHM 220	Chemical Principles I	5
	<b>and</b>	
CHM 250	Chemical Principles II	5
	<b>or</b>	
CHM 210	Chemistry I	4
	<b>and</b>	
CHM 230	Chemistry II	4
	<b>and</b>	
CHM 271	Chemical Analysis	4
CHM 531	Organic Chemistry I	3
CHM 550	Organic Chemistry II	3
CHM 532	Organic Chemistry Laboratory	2
BIOCH 290	Biochemistry Seminar	2
BIOCH 755	Biochemistry I	3
BIOCH 756	Biochemistry I Laboratory	2
BIOCH 765	Biochemistry II	3
CHM 585	Physical Chemistry I	3
CHM 595	Physical Chemistry II	3
	Upper-division biochemistry or chemistry electives (one hour of which must be BIOCH 799 Problems in Biochemistry)	3
MATH 220	Analytic Geometry and Calculus I	4
MATH 221	Analytic Geometry and Calculus II	4
MATH 222	Analytic Geometry and Calculus III	4
PHYS 213	Engineering Physics I	5
	<b>and</b>	
PHYS 214	Engineering Physics II	5
	<b>or</b>	
PHYS 113	General Physics I	4
	<b>and</b>	
PHYS 114	General Physics II	4
BIOL 198	Principles of Biology	4
	Biological science electives	8
	Biology, statistics, or computer science elective	3-4

The science courses in this list satisfy the natural science and quantitative reasoning requirements shown in the general requirements for the B.S. degree.

### Transfer students

Community college students who plan to transfer into either of the biochemistry curricula at the junior level should take the following science courses during their first two years of college:

A year of freshman chemistry—lecture and laboratory

A semester of analytical chemistry—lecture and laboratory

A year of organic chemistry—lecture and laboratory

A year of analytic geometry and calculus

A year of biology—lecture and laboratory

Completion of these science courses should allow students to go directly into biochemistry and advanced biology courses upon entry into a biochemistry curriculum. For those planning to complete the B.S. requirements, it is advisable to have completed all three of the required semesters of analytic geometry and calculus before the junior year.

### Biochemistry courses

#### Undergraduate credit

##### BIOCH 100. Biochemistry Orientation. (1) I.

Discussion of biochemistry as a discipline in the life sciences.

##### BIOCH 101. Biochemistry Colloquium. (2) I, II.

Offered by TELENET. Topics in biochemistry chosen to illustrate current research of scientists and methods chosen to study biological problems from a biochemical point of view. At each offering of this course a syllabus will be available giving the topics to be studied and the details of administration of the course. May be repeated once. Not open to biochemistry majors.

**BIOCH 110. Biochemistry and Society.** (3) I, H. A cultural and environmental approach to biochemical compounds and circumstances affecting man. Topics to be discussed include compounds of biochemical interest, biochemical evolution, food additives, heavy metals, drugs, and certain control chemicals, e.g., pesticides. Intended for nonscience majors.

##### BIOCH 265. Introductory Organic and Biochemistry.

(5) I, H. For students in human ecology, nursing, and other areas desiring an integrated organic and biochemistry course to provide an understanding of carbohydrates, proteins, lipids, and digestive and metabolic systems. Three hours lec. and six hours lab a week. Pr.: CHM 110.

**BIOCH 290. Biochemistry Seminar.** (2) H. Lectures and discussions on basic topics in biochemistry. Pr.: BIOCH 100.

**BIOCH 300. Sophomore Honors Seminar in Biochemistry.** (3) H. Lecture, guided reading, and discussion of topics of general interest in biochemistry. Topics will vary depending on the interests and backgrounds of students enrolled. Pr.: Freshman Honors Seminar.

**BIOCH 365. Elementary Biochemistry.** (3) I. An elementary treatment of the chemistry and metabolism of carbohydrates, lipids, proteins, and nucleic acids. Pr.: CHM 350.

**BIOCH 499. Senior Honors Thesis.** (2) I, H, S. Open only to seniors in the arts and sciences honors program. May be used by honors students to satisfy B.S. requirement for BIOCH 799. Pr.: BIOCH 665 or conc. enrollment.

### Undergraduate and graduate credit in minor field

**BIOCH 521. General Biochemistry.** (3) I, II, S. A basic study of the chemistry and metabolism of carbohydrates, lipids, proteins, and nucleic acids, but at a more advanced level than BIOCH 201. Pr.: CHM 350.

**BIOCH 522. General Biochemistry Laboratory.** (2) I, II, S. A one-semester laboratory course with experiments relating to carbohydrates, lipids, proteins, nucleic acids, and enzymes. Six hours lab a week. Pr.: CHM 351 and BIOCH 521 or conc. enrollment, or BIOCH 665 or conc. enrollment.

### Undergraduate and graduate credit

##### BIOCH 700. Advanced Topics in Plant Biochemistry.

(3) I; Fall 1992 and alternate years or on sufficient demand. An advanced treatment of topics of current interest in plant biochemistry, including photosynthesis and carbon metabolism, nitrogen fixation and nitrogen

metabolism, structure and function of the higher plant genome, and production of material of economic interest. Pr.: \*BIOCH 510 or 521 or 765.

**BIOCH 755. Biochemistry I.** (3) I. An introduction to physical methods, kinetics, and thermodynamics of biochemical reactions and bioenergetics, chemistry of proteins and amino acids, carbohydrate chemistry, and metabolism. BIOCH 755 and 765 are for students interested in a two-semester comprehensive coverage of biochemistry. For a one-semester course, enroll in BIOCH 521. Pr.: \*Chemical analysis, one year of organic chemistry, differential and integral calculus.

**BIOCH 756. Biochemistry I Laboratory.** (2) I. An intensive laboratory course to accompany BIOCH 755. BIOCH 756 and 766 are sequential courses for students interested in a two-semester comprehensive coverage of experiments in biochemistry. For a one-semester laboratory course, enroll in BIOCH 522. Six hours lab a week. Pr.: \*BIOCH 755 or conc. enrollment.

**BIOCH 765. Biochemistry II.** (3) H. Continuation of BIOCH 755; lipid chemistry and metabolism, amino acid metabolism, nutrition, nucleic acid chemistry and metabolism, integration of biochemical pathways and metabolic control mechanisms. Pr.: \*BIOCH 755.

**BIOCH 766. Biochemistry II Laboratory.** (2) H. A continuation of CHM 756. Six hours lab a week. Pr.: \*BIOCH 756 and 765 or conc. enrollment.

**BIOCH 790. Physical Biochemistry.** (3) I. A survey of biophysical methods most frequently encountered in biochemistry and related disciplines. The course emphasizes principles underlying methods used to determine the molecular weight and shape of biopolymers, and techniques used to detect conformational changes in polynucleotides, proteins, and polysaccharides. Pr.: \*Calculus, a course in physical chemistry, BIOCH 755, 756, 765, and 766.

**BIOCH 799. Problems in Biochemistry.** (Var.) I, H, S. Problem may include laboratory and/or library work in various phases of biochemistry, agricultural chemistry, or nutrition. Pr.: \*Background adequate for problem undertaken.

\*Nonmajors lacking these prerequisites should obtain consent of instructor before enrollment.

## Biology

T. C. Johnson, Director

Professors Barkley,\* Center,\* Conrad,\* Consigli,\* Denell,\* T. Johnson,\* Kaufman,\* Kramer,\* Robel,\* Roufa,\* C. Smith,\* Spooner,\* Takemoto,\* Wilson,\* Wong,\* and Zimmerman,\* Associate Professors Chapes,\* Guikema,\* Hartnett,\* Klaassen,\* Marchin,\* Perchellet,\* Reichman,\* Rintoul,\* Tomb,\* Urban,\* Weis,\* and Williams,\* Assistant Professors Chitnis,\* Dodds,\* Knapp,\* Montelone,\* Murray,\* A. Smith,\* Ulug,\* Upton,\* and Welti,\* Instructors Davis,\* Fitch,\* Hook,\* Kennedy,\* and Paulsen; Emeriti: Professors Fina,\* Hansen,\* Pady,\* and Pittenger,\* Associate Professors Lockhart\* and McCracken,\* Instructor Kundiger.

The biology undergraduate requirements provide students a basic understanding of biological principles and methods, and allow students to build on that base by further intensive or extensive study.

Course offerings and curricula accurately reflect both recent developments in the field of biology and changing requirements of students. Undergraduate majors are offered in biology, microbiology, and fisheries and wildlife biology, plus the professional (paramedical) and pre-professional areas. Students majoring in areas of the Division of Biology are assigned advisors to assist in planning their academic programs. Course offerings and degree requirements are sufficiently broad to allow great flexibility in tailoring a program of study to the interests and needs of an individual student. Undergraduate curriculum planning, including choice of areas of emphasis and elective courses, is ultimately the responsibility of students in consultation with their advisors.

### Biology degree

Students in this major may obtain either the B.A. or B.S. degree. In addition to the requirements of the College of Arts and Sciences, biology majors must take the courses of blocks A, B, and C as listed below.

#### Block A: Courses offered by other departments

MATH 220	Analytical Geometry and Calculus I	4
CHM 210	Chemistry I	4
CHM 230	Chemistry II	4
CHM 350	General Organic Chemistry	3
CHM 351	General Organic Chemistry Laboratory	2
BIOCH 521	General Biochemistry	3
PHYS 113	General Physics I	4
PHYS 114	General Physics II	4

Prerequisites for MATH 220 are MATH 100 and 150 or four semesters of high school algebra and one semester of trigonometry plus appropriate math placement exam scores. Upon consultation with a Division of Biology advisor a student may substitute: Biochemistry I and II for General Biochemistry; Organic Chemistry I and II for General Organic Chemistry; Organic Chemistry I Lab for General Organic Chemistry Lab; and Engineering Physics I and II for General Physics I and II.

#### Block B: Division of Biology courses

BIOL 198	Principles of Biology	4
BIOL 201	Organismic Biology	5
BIOL 430	Population Biology	4
BIOL 540	Molecular Biology	3
BIOL 541	Cell Biology	3

#### Block C: Biology major electives

In addition to the Block B courses students must take a minimum of 15 credit hours of biology courses at the 400\* level or higher, including two courses providing a laboratory experience.

\*Students who take BIOL 240 will be awarded 2 hours of biology elective credit.

Because the biology major has room for at least 20 hours of free electives beyond the 15 hours of biology electives, it is a popular major for students aiming at a variety of professional health disciplines, at graduate programs ranging from molecular biology to ecology, and at a diversity of bachelor's-level jobs. Depending on the student, free electives could be courses in computer

science, statistics, foreign language, business, etc. and/or additional courses in biology, biochemistry, chemistry, and math.

**Microbiology degree**

Students in microbiology may obtain either the B.A. or B.S. degree. The requirements for a microbiology major, in addition to those requirements of the College of Arts and Sciences, include blocks A, B, and C as listed below.

**Block A: Courses offered by other departments**

MATH 220	Analytical Geometry and Calculus I	4
CHM 210	Chemistry I	4
CHM 230	Chemistry II	4
CHM 350	General Organic Chemistry	3
CHM 351	General Organic Chemistry Laboratory	2
BIOCH 521	General Biochemistry	3
PHYS 113	General Physics I	4
PHYS 114	General Physics II	4

Prerequisites for MATH 220 are MATH 100 and 150 or four semesters of high school algebra and one semester of trigonometry plus appropriate math placement exam scores. Upon consultation with a Division of Biology advisor a student may substitute: Biochemistry I and II for General Biochemistry; Organic Chemistry I and II for General Organic Chemistry; Organic Chemistry I Lab for General Organic Chemistry Lab; and Engineering Physics I and II for General Physics I and II.

**Block B: Division of Biology courses**

BIOL 198	Principles of Biology	4
BIOL 455	General Microbiology	4
BIOL 540	Molecular Biology	3
BIOL 670	Immunology	4
BIOL 675	Genetics of Microorganisms	3
BIOL 690	Microbial Physiology and Metabolism	2

**Block C: Microbiology major electives**

Students must take an additional 14 hours from courses listed below. At least half the 14-hour total must be laboratory courses.

BIOL 397,	495, or 697	Topics in Biology	1-3
BIOL 410		Biology of the Cancer Cell	2
BIOL 415		Genetic Engineering	2
BIOL 530		Pathogenic Microbiology	3
BIOL 541		Cell Biology	3
BIOL 545		Human Parasitology	3
BIOL 546		Human Parasitology Lab (lab course)	1
BIOL 604		Biology of Fungi	3
BIOL 625		Animal Parasitology (lab course)	4
BIOL 671		Immunology Lab (lab course)	2
BIOL 691		Microbial Genetics Laboratory (lab course)	3
BIOL 698		Problems in Biology (lab course)	1-3
BIOL 705		Advanced Mycology (lab course)	3
BIOL 730		General Virology	3
BIOL 755		Specialized Cell Functions	3

By consultation with a Division of Biology advisor a student may choose elective courses from Block C that allow a more specific focus on interest and experience. Areas of specialization would include prokaryotic microbiology, eukaryotic microbiology, biotechnology/genetic engineering, and infectious diseases. The microbiology curriculum coupled with appropriate electives provides an excellent

education base for students moving directly into the job market, for students headed toward medical, dental, medical technology, and veterinary programs, and for students going into graduate programs in the biological sciences.

**Fisheries and wildlife biology**

Students in this major may obtain either the B.A. or B.S. degree. In addition to the requirements of the College of Arts and Sciences, fisheries and wildlife biology majors must take the courses of Block A, Block B, and one of the three options of Block C as shown below. Students who wish to qualify for professional certification as a fisheries or wildlife biologist should consult their academic advisors about any additional courses needed for such certification.

**Block A: Courses offered by other departments**

SPCH 106	Public Speaking I	3
	One math course*	3-4
	Chemistry courses**	13
PHYS 113	General Physics I	4
	<b>and</b>	
PHYS 114	General Physics II	4
	<b>or</b>	
PHYS 115	Descriptive Physics	4
CIS 110	Introduction to Personal Computing	3
	<b>or</b>	
CIS 200	Fundamentals Computer Programming and Lab	4
STAT 340	Biometrics I	3
		<u>29-35</u>

\*To be selected from among MATH 100, 150, or 220.  
\*\*To be fulfilled by CHM 210, 230, 350, and 351 or by CHM 210, 230, and BIOCHM 265.

Students who plan to proceed into graduate programs should take MATH 220; CHM 210, 230, 350, and 351; PHYS 113 and 114; and CIS 200.

**Block B: Division of Biology courses**

BIOL 198	Principles of Biology	4
BIOL 201	Organismic Biology	5
BIOL 430	Population Biology	4
BIOL 433	Wildlife Conservation	3
BIOL 529	Fundamentals of Ecology	3
BIOL 632	Ecology Laboratory	1
	Plus at least two courses in the Division of Biology (400 level or above) totaling 5 hours or more	<u>5</u>
		<u>25</u>

**Block C: Options**

**Fisheries biology option**

STAT 341	Biometrics II	3
BIOL 513	Physiological Adaptations of Animals	3
	<b>and</b>	
BIOL 514	Physiological Adaptations of Animals Lab	1
	<b>and</b>	
BIOL 542	Ichthyology	3
BIOL 612	Introductory Limnology	4
BIOL 680	Aquaculture	3
BIOL 696	Fisheries Management	4
		<u>21</u>

**Wildlife biology option**

STAT 341	Biometrics II	3
AGRON 501	Range Management	3
AGEC 525	Natural Resource Economics	3
ENTOM 312	General Entomology	2
	<b>and</b>	
ENTOM 313	General Entomology Lab	1

BIOL 513	Physiological Adaptations of Animals	3
	<b>and</b>	
BIOL 514	Physiological Adaptations of Animals Lab	1
BIOL 543	Ornithology	3
BIOL 544	Mammalogy	3
BIOL 551	Taxonomy of Flowering Plants	4
BIOL 684	Wildlife Management	3
BIOL 685	Wildlife Management Techniques	3
		<u>32</u>

**Natural history option**

BIOL 551	Taxonomy of Flowering Plants	4
	<b>or</b>	
FOR 330	Dendrology I	2
	<b>and</b>	
FOR 340	Dendrology II	2
BIOL 542	Ichthyology	3
BIOL 543	Ornithology	3
BIOL 544	Mammalogy	3
BIOL 513	Physiological Adaptations of Animals	3
	<b>and</b>	
BIOL 514	Physiological Adaptations of Animals Lab	1
	<b>or</b>	
BIOL 500	Plant Physiology	4
	Nine hours of biology electives (400 level or above)	<u>9</u>
		<u>26</u>

Hours from Block B may not be counted as a part of Block C electives.

**Pre-professional curricula**

Students preparing to seek admission to veterinary, medical, dental, optometry, physical therapy, medical technology, and other professional schools may major in biology (or another discipline) provided the specific pre-professional requirements are met. Students should work with both an appropriate pre-professional advisor in the College of Arts and Sciences dean's office and a biology advisor to assure the proper planning of an academic program to meet their professional goals.

Students preparing to be biology teachers in secondary education are encouraged to pursue a degree program in the Division of Biology. Students should utilize both an advisor in the College of Education (regarding certification requirements and education courses) and a Division of Biology advisor.

**Research facilities**

**Konza Prairie**

Konza Prairie Research Natural Area is an 8,616-acre area within a few miles of the university dedicated to ecological research by the Division of Biology and the Kansas Agricultural Experiment Station. This nationally important research facility provides an opportunity for basic research on the prairie and for baseline information needed to assess the nature and magnitude of the ecological changes resulting from human activity.

**Center for Basic Cancer Research**

The Center for Basic Cancer Research offers research awards to allow deserving

undergraduate students an opportunity to participate in cancer research that is ongoing in the Division of Biology. The anticancer drug laboratory allows students to focus research on anticancer compounds—determining the mode of action of these compounds, their molecular action, the reasons for their toxicity, and the reasons why some cancers have developed a resistance to them.

### **BioServe Space Technologies**

The Division of Biology, in cooperation with Aerospace Engineering Sciences at the University of Colorado, was selected by the National Aeronautics and Space Administration to lead BioServe Space Technologies, a center for the commercial development of space. This space training and research program gives young biologists, plant scientists, engineers, and others an awareness of opportunities in space sciences that will intellectually involve them in space missions of the future. Initial research projects are directed towards an understanding of many biological processes in the absence of gravity. Projects also are focused on areas of significant market value, such as biotechnology and bioengineered pharmaceuticals, synthetic organ products, and high efficiency agriproducts and agrigenetic materials.

### **The Center for Gravitational Studies in Cellular and Development Biology**

NASA's funding of this research program carries with it the designation of the Division of Biology as a NASA Specialized Center of Research and Training. As such, the Division will be NASA's only research center to focus on the role of gravity in cellular and developmental processes. The training and research components offer students training in space life sciences.

### **Cooperative Fish and Wildlife Research Unit**

The Kansas Cooperative Fish and Wildlife Research Unit was established by the Fish and Wildlife Service of the U.S. Department of the Interior, Kansas State University, the Kansas Department of Wildlife and Parks, and the Wildlife Management Institute. Faculty scientists hold appointments in the Division of Biology and participate in its graduate education programs in the area of fisheries and wildlife.

## **Biology courses**

### **Undergraduate credit**

**BIOL 101. Introduction to Biological Research.** (1) S. An introduction to research strategies and techniques in the biological sciences. Current topics will be selected and studied through laboratory experience and lecture in a short course workshop format. May be repeated once.

**BIOL 107. Biological Science Colloquium.** (2) I, II. Offered by TELENET. Topics in biological science chosen to illustrate current research of scientists and

methods used to study the biological world. At each offering of this course a syllabus will be available giving the topics to be studied and the details of administration of the course. May be repeated once. Not open to biology majors.

**BIOL 198. Principles of Biology.** (4) I, II, S. An introductory course concerned with the behavior of molecules, cells, organisms, and populations in an ecosystem-bound and evolving world. Audiotutorial format, equiv. to two hours lec., one hour rec., and three hours lab a week.

**BIOL 201. Organismic Biology.** (5) I, II. A study of the structure and function of organisms with special attention paid to the phylogenetic origins of taxonomic groups and the integration of their structural systems. Three hours lec. and four hours lab. Pr.: BIOL 198 or equiv.

**BIOL 210. General Botany.** (4) I, II. Plant groups and their evolutionary development. Physiology, anatomy, ecology, identification of seed plants, and economic applications. Two hours lec. and six hours lab a week.

**BIOL 222. Field Ornithology.** (1) II, in odd years. Identification of bird species in the field and the illustration of attributes of avian behavior and ecology. One three-hour lab a week. Pr.: Sophomore standing.

**BIOL 240. Structure and Function of the Human Body.** (6) I, II. Anatomy and physiology of the organ systems of the body. Course is directed toward non-biology majors. Four hours lec. and two three-hour lab sessions a week. Pr.: BIOL 198.

**BIOL 303. Ecology of Environmental Problems.** (3) II. Principles of ecology and their application to such problems as pollution, human population growth, and land-use planning. Two hours lec. and one hour discussion a week. Pr.: Two courses in natural science.

**BIOL 310. Biology and the Future of Man.** (3) II. Discussions of recent developments in biological research and their impact on the social, moral, and ethical dimensions of man's existence. Topics covered include human reproduction, human genetics, aging, death, and organ transplantation. Three hours lec. a week. Pr.: Junior standing.

**BIOL 320. Economic Botany.** (3) I, II. Origin and uses of cultivated plants useful to humans, especially grains, legumes, spices, beverage plants, fibers, and dyes. Pr.: BIOL 198 or BIOL 210.

**BIOL 365. Practicum in Biology.** (1-4) I, II. Experimental approaches to learning biology through teaching. One hour rec. a week plus three to nine hours lab a week. Pr.: Permission of instructor and credit with superior performance in the course in which the student will be involved.

**BIOL 397. Topics in Biology.** (1-6) I, II, S. Pr.: Consent of instructor.

**BIOL 399. Honors Seminar in Biology.** (1-3) II. Selected topics. Open to nonmajors in the honors program.

**BIOL 400. Human Genetics.** (3) I. A course dealing exclusively with human heredity and with those genetic principles that can be illustrated in humans. Pr.: BIOL 198.

**BIOL 404. Biology of Aging.** (3) II, in even years. An introduction to theories, both physiological and evolutionary, proposed to explain the aging phenomena. Major emphasis on a systems approach, e.g., circulatory, nervous, etc. A coverage of each system includes a review of normal structure and function, age related changes and age related dysfunctions and diseases. Pr.: BIOL 198; and DAS 315 or a second course in biology.

**BIOL 410. Biology of the Cancer Cell.** (2) I. Current concepts of cancer biology including roles of cell surfaces, cell division, viruses, self-recognition, and chemical carcinogens. Pr.: Two courses in biology.

**BIOL 430. Population Biology.** (4) I. A study of the patterns and processes of inheritance and of changes in gene frequencies and numbers of individuals in interbreeding populations of individuals. Three hours lec. and one hour rec. Pr.: BIOL 201.

**BIOL 433. Wildlife Conservation.** (3) II. An introductory course to the fields of fisheries and wildlife conservation, history of the conservation movement, review of important wildlife species, overview of management concepts, and exposure to wildlife-related issues. Pr.: BIOL 201.

**BIOL 455. General Microbiology.** (4) I, II. Microorganisms; their handling, morphology, growth, and importance. Two hours lec. and four hours lab a week. Pr.: BIOL 198 and one course in chemistry.

**BIOL 495. Topics in Biology.** (1-6) I, II, S. Pr.: Consent of instructor.

**BIOL 496. Honors Tutorial in Biology.** (1-3) I, II, S. Individual directed research and study of a topic in biology, normally as a prerequisite to writing a senior honor thesis. May be repeated once to a total of 3 hours credit. Pr.: Sophomore standing, membership in the honors program of the College of Arts and Sciences, and permission of instructor.

**BIOL 497. Senior Honor Thesis.** (2) I, II, S. Open only to seniors in the arts and sciences honors program.

## **Undergraduate and graduate credit in minor field**

**BIOL 500. Plant Physiology.** (4) I. Detailed consideration of physiological processes of higher plants. Three hours lec. and three hours lab a week. Pr.: BIOL 201 or 210; and a course in organic chemistry.

**BIOL 505. Comparative Anatomy of Vertebrates.** (4) I. Interpretation of vertebrate structure with emphasis on function and phylogeny. Two hours lec. and six hours lab a week. Pr.: BIOL 198.

**BIOL 510. Embryology.** (3) II. Developmental anatomy and physiology of reproduction of birds and mammals. Three hours lec. a week. Pr.: BIOL 198.

**BIOL 511. Embryology Laboratory.** (1) II. One three-hour lab a week. Pr.: BIOL 510 or conc. enrollment.

**BIOL 513. Physiological Adaptations of Animals.** (3) I. Integration of physiological mechanisms as the basis for adaptive responses of animals to different environments. Pr.: BIOL 201; and a course in organic chemistry or biochemistry.

**BIOL 514. Physiological Adaptations of Animals Laboratory.** (1) I. One three-hour lab a week. Pr.: Conc. enrollment in BIOL 513.

**BIOL 526. Human Physiology.** (3) II. Functions of various organ systems of mammals, primarily humans. Three hours lec. a week. Pr.: BIOL 198; and a course in biochemistry or organic chemistry.

**BIOL 529. Fundamentals of Ecology.** (3) I. Ecosystem structure and function including energy flow; biogeochemical cycling; effect of climate, soil, fire, succession; application to land management practices. Three hours lec. a week and optional field trips. Pr.: BIOL 201 or 210; and CHM 210.

**BIOL 530. Pathogenic Microbiology.** (3) I. Etiology and descriptions of major infectious diseases of humans within the perspective of host defenses. Two hours lecture and one hour laboratory-demonstration a week. Pr.: BIOL 455.

**BIOL 540. Molecular Biology.** (3) I. An introduction to the synthesis and regulation of DNA, RNA, and protein. Mutation and the chromosome are studied at the molecular level. Emphasis is placed on recombinant DNA technology and on the handling of biological information in both higher and lower organisms. Pr.: BIOL 201 and CHM 350.

**BIOL 541. Cell Biology.** (3) II. Structure and function of cells and subcellular components. A molecular understanding of membranes and cellular physiology will be emphasized. Three hours lec. Pr.: BIOL 540 and CHM 350.

**BIOL 542. Ichthyology.** (3) II, in even years. Classification, morphology, physiology, distribution, and natural history of fishes. Two hours lec. and three hours lab a week. Pr.: BIOL 201.

**BIOL 543. Ornithology.** (3) II. Classification, morphology, physiology, distribution, and natural history of birds. Two hours lec. and three hours lab a week. Pr.: BIOL 201.

**BIOL 544. Mammalogy.** (3) I. Characteristics, evolution, life histories, and ecology of mammals, especially North American game species. Two hours lec. and three hours lab a week. Pr.: BIOL 201.

**BIOL 545. Human Parasitology.** (3) II. Protozoan and helminth parasites of man with lesser emphasis on ectoparasitic arthropods. Emphasis on life cycles, control, and laboratory diagnosis. Three hours lec. a week. Pr.: BIOL 201.

**BIOL 546. Human Parasitology Laboratory.** (1) II. Examination of prepared materials and identification of internal parasites of man. Two hours lab a week. Pr.: Conc. enrollment in BIOL 545.

**BIOL 547. Herpetology.** (2) II, in odd years. Classification morphology, physiology, distribution, and natural history of amphibians and reptiles. One hour lec. and three hours lab a week. Pr.: BIOL 201.

**BIOL 550. Lower Plants.** (3) II, in odd years. Morphology, adaptive mechanisms, and evolutionary relationships of the cellular and vascular cryptograms. Two hours lec. and one three-hour lab a week. Pr.: BIOL 201 or 210.

**BIOL 551. Taxonomy of Flowering Plants.** (4) I. Morphology, taxonomy, and biogeography of the vascular plants. Two hours lec. and two three-hour labs a week. Pr.: BIOL 201 or 210.

### Undergraduate and graduate credit

**BIOL 604. Biology of the Fungi.** (3) I. An introduction to fungal structure, function, physiology, ecology, and genetics. Importance of fungi as disease organisms, as saprotrophs, and in industry. Techniques of isolation, cultivation, and as experimental organisms. Two hours lec. and two hours lab a week. Pr.: BIOL 198 or 210.

**BIOL 612. Introductory Limnology.** (4) I, in even years. Basic ecological principles of aquatic environments. Plants and animals of local streams, rivers, ponds, and reservoirs are used to demonstrate the interaction of biological processes with the chemical and physical features of natural aquatic environments. Three hours lec., three hours lab a week; two optional weekend field trips. Pr.: BIOL 201 and CHEM 110 or 210.

**BIOL 615. Cytogenetics.** (4) I, in even years. Chromosome structure and mechanics, cytotaxonomy, and karyotypic analysis in eukaryotes. Two hours lec. and six hours lab a week. Field trips. Pr.: BIOL 430 or a course in genetics.

**BIOL 620. Evolution.** (3) II, in even years. A study of the theory of evolution including its historical and social implications. Three hours lec. a week. Pr.: BIOL 430 or a course in genetics.

**BIOL 625. Animal Parasitology.** (4) I, in odd years. Biology and pathology of the principal protozoan, helminth, and arthropod parasites of domestic animals and wildlife. Three hours lec. and two hours lab a week. Pr.: BIOL 198 and junior standing.

**BIOL 631. Ecology.** (3) II. Descriptive and mathematical understanding of ecosystem structure and dynamics, including succession, energy flow, and nutrient cycling. Pr.: BIOL 430.

**BIOL 632. Ecology Laboratory.** (1) II. Laboratory and field experiences with ecological problems. Pr.: STAT 340 or equiv., BIOL 631 or conc. enrollment.

**BIOL 645. Advanced Field Studies.** (1-2) Offered in intersession only. Different ecosystems and the opportunity to apply classroom knowledge to field biology situations under the guidance of experienced biologists. Pr.: One course in field biology at or above the 400 level.

**BIOL 655. Genetics Laboratory.** (3) II. Basic genetic principles of prokaryotic and eukaryotic organisms will be demonstrated through isolation and analysis of gene mutations. Two hours lec. and four hours of lab a week. Pr.: BIOL 430 or a course in genetics.

**BIOL 670. Immunology.** (4) II. Chemical, genetic, and biological properties of the immune response, acquired immunity, and antibody production. Pr.: Two courses in biology; and a course in biochemistry or equiv.

**BIOL 671. Immunology Lab.** (2) II. Laboratory exercises in immunology. Pr.: BIOL 670 or conc. enrollment. Three-hour lab a week plus one hour rec.

**BIOL 675. Genetics of Microorganisms.** (3) I. The genetics of bacteria, viruses, and other microorganisms. Both the use of genetics in microbiological studies and the use of microbial systems to investigate basic genetic problems will be covered. Pr.: BIOL 455.

**BIOL 680. Aquaculture.** (3) I, in odd years. Principles and methods of culturing fishes for commercial purposes. Topics of study include: species of fishes used in production; breeding; feeds and feeding of fishes; fish parasites and diseases; environmental requirements; facilities; and potential markets. Two hours lec. and three hours lab a week. Pr.: Two courses in biology, two courses in chemistry, and junior standing.

**BIOL 684. Wildlife Management.** (3) II. Concepts of managing wildlife with emphasis on North American game species. Applied population dynamics as they relate to management, historical, and recent developments in wildlife management, habitat improvement, and related material. Three hours lec. a week. Pr.: BIOL 430 and 433.

**BIOL 685. Wildlife Management Techniques.** (3) I. Ecology and management techniques. Two hours lec. and three hours lab a week. Pr.: BIOL 430 and 433.

**BIOL 687. Microbial Ecology.** (3) II, in even years. The ecology of aquatic and terrestrial microorganisms in their natural environment. Pr.: BIOL 455.

**BIOL 690. Microbial Physiology and Metabolism.** (2) II. The study of structure, function, regulation, and intermediary metabolism of bacteria. Pr.: BIOL 455; and BIOCH 521 or 765.

**BIOL 691. Microbial Genetics Laboratory.** (3) II. Examination of the genetic processes of bacteria. A self-paced experimental regimen emphasizing current methodology employed in mutagenesis, selection, gene transfer, gene analysis, plasmid manipulation, and recombinant DNA technology. Pr.: BIOL 540 and 675. Enrollment limited to 12 students.

**BIOL 696. Fisheries Management.** (4) I, in even years. Methods of managing fisheries resources; physical and biological survey methods; methods of aquatic environment improvement; fish population manipulation; management of streams, ponds, and lakes. Three hours lec. and three hours lab a week. Pr.: BIOL 433.

**BIOL 697. Topics in Biology.** (1-6) I, II, S. Pr.: Consent of instructor.

**BIOL 698. Problems in Biology.** (1-8) I, II, S. Pr.: Consent of instructor.

**BIOL 699. Undergraduate Seminar in Biology.** (1) I, II. Pr.: Consent of instructor.

**BIOL 702. Radiation Safety in the Research Laboratory.** (1) I. Principles of radioactive safety and

radioisotope handling, licensing procedures, and laboratory techniques. Pr.: BIOL 198 or 555; and CHM 210 or PHYS 113.

**BIOL 710. Endocrinology.** (3) II, in even years. A survey of the glands of internal secretion in vertebrates with emphasis on mechanisms of control of hormone secretion and mechanisms of hormone action. Pr.: BIOL 198; and a course in organic chemistry or biochemistry.

**BIOL 730. General Virology.** (3) II. Theoretical and experimental basis of virology, with emphasis on the role of the virus as a controlling force in cellular biology; principles of host-virus interactions; introduction to use of mammalian cell cultures as the host for virus propagation. Pr.: Twelve hours of biological sciences, including BIOL 455 and 540; and BIOCH 521 or equiv.; consent of instructor.

**BIOL 735. Human Oncology.** (3) II, in even years. Etiology and pathogenesis of human cancer, with emphasis on the biology and biochemistry of the neoplastic process; host-tumor relationships; mechanism of action of anti-cancer drugs; and the clinical polychemotherapy of cancer. Pr.: BIOL 540 and BIOCH 521 or equiv.

**BIOL 736. Cancer Therapy.** (3) II, in odd years. Current methods of cancer management with emphasis on the kinetic principles of chemotherapy and radiation therapy; diagnosis; surgical oncology; oncologic emergencies; adverse effects of cancer therapy; and the new therapies. Pr.: BIOL 540 and BIOCH 521 or equiv.

**BIOL 740. Anatomy of Higher Plants.** (3) II. Structure and development of the various tissues and organs of seed plants. Two hours lec. and one two-hour lab a week. Pr.: BIOL 201 or 210.

**BIOL 755. Specialized Cell Functions.** (3) I, in even years. *In vitro* cell and organ culture techniques as tools for differentiation and specializations studies. Emphasis on mammalian cell culture systems with some study of plant cell culture. Two hours lec. and one three-hour lab a week. Pr.: BIOL 541.

**BIOL 760. Genetic Engineering.** (2) I. An in-depth coverage of techniques and approaches currently used in gene cloning. Recent papers which describe the application of gene cloning to basic research will be read and discussed. Pr.: BIOL 540.

## Chemistry

M. Dale Hawley, Head

Professors Copeland,\* Fateley,\* Hammaker,\* Hawley,\* Hua,\* Isenhour,\* Klabunde,\* Kruh,\* Maatta,\* McDonald,\* Meloan,\* J. Paukstelis,\* Purcell,\* Setser,\* and Sherwood;\* Assistant Professors Buszek,\* Duneczky,\* Lenhart, and Rajca;\* Instructor M. Paukstelis; Director of Laboratories E. Dikeman; Emeriti: Professors Lambert,\* Moser,\* and Schrenk;\* Associate Professors Johnson\* and Lanning;\* Instructor Weyerts.

The Department of Chemistry occupies the Chemistry/Biochemistry Building, the H.H. King Chemical Laboratory, and part of Willard Hall. The faculty of the department consists of 19 Ph.D. chemists representing a broad range of specialization in the chemistry field. The department offers programs leading to the B.S., B.A., M.S., and Ph.D. degrees.

Instruction and research in chemistry are conducted in laboratories equipped with modern facilities and instruments.

A significant number of graduates use their course of study as an effective preparation for further study in a life science such as medicine.

### High school preparation

High school students who plan to major in chemistry should have a good background in mathematics and English composition. Trigonometry and two years of algebra are recommended, as are courses in chemistry and physics.

### Transfer students

It is recommended that community college students take general chemistry, qualitative and quantitative analysis, one year of organic chemistry, analytic geometry, calculus, physics, and English composition prior to entering K-State.

### Independent study and research

Many chemistry students are engaged in independent study and research, some as early as their first year. One semester of research experience for academic credit is possible, under the supervision of a faculty member of the student's choice.

### Dual degrees

Programs are available that lead to a dual degree in chemistry and another field such as chemical engineering, mechanical engineering, or agriculture. The degree requirements of both curricula must be met and a minimum of 150 credit hours completed.

Graduates of such a program are highly sought by industry and are well suited for graduate study in either field of their dual degrees.

### Secondary education certification

Students who desire to become high school chemistry teachers may prepare for teacher certification while completing requirements in either the chemistry or chemical science curriculum. A student pursuing this plan will have advisors in both chemistry and education. For specific certification requirements in secondary education, see the College of Education section of this catalog.

### General undergraduate major requirement

Students majoring in chemistry or chemical science must earn grades of C or better in all courses prescribed for these curricula, as outlined below.

### Chemistry curriculum for the B.S. degree\*

120 credit hours required for graduation

The following is the preferred curriculum for students preparing for employment as chemists or for graduate study in chemistry. This curriculum is approved by the American Chemical Society.

#### Chemistry (41–43 hours)

CHM 220	Chemical Principles I .....	5
	<b>and</b>	
CHM 250	Chemical Principles II .....	5
	<b>or</b>	
CHM 210	Chemistry I .....	4
	<b>and</b>	
CHM 230	Chemistry II .....	4
	<b>and</b>	
CHM 271	Chemical Analysis .....	4
CHM 531	Organic Chemistry I .....	3
CHM 532	Organic Chemistry Laboratory .....	2
CHM 545	Chemical Separations .....	2
CHM 550	Organic Chemistry II .....	3
CHM 585	Physical Chemistry I .....	3
CHM 595	Physical Chemistry II .....	3
CHM 598	Physical Chemistry II Laboratory ..	2
CHM 657	Inorganic Techniques .....	2
CHM 666	Instrumental Analysis .....	3
CHM 667	Instrumental Analysis Laboratory ..	1
CHM 697	Structure and Bonding .....	2
CHM 698	Inorganic Chemistry .....	3
CHM 599	Undergraduate Research .....	2
	<b>or</b>	
CHM 551	Advanced Organic Laboratory (may be taken prior to the senior year.) ..	2

#### Mathematics (12 hours)

MATH 220	Analytic Geometry and Calculus I ..	4
MATH 221	Analytic Geometry and Calculus II .....	4
MATH 222	Analytic Geometry and Calculus III .....	4

\*A program leading to the B.A. degree may be planned by modifying the social sciences and humanities requirements. See general college information for specific requirements for the B.A. degree.

#### Physics (10 hours)

PHYS 213	Engineering Physics I .....	5
PHYS 214	Engineering Physics II .....	5

### Chemical science curriculum for the B.S. degree\*

120 credit hours required for graduation

The following is the preferred curriculum for those intending to use their chemical training as a background for work or study in another area such as medicine, education, law, biology, or agriculture.

#### Chemistry (27–30 hours)

CHM 220	Chemical Principles I .....	5
	<b>and</b>	
CHM 250	Chemical Principles II .....	5
	<b>or</b>	
CHM 210	Chemistry I .....	4
	<b>and</b>	
CHM 230	Chemistry II .....	4
	<b>and</b>	
CHM 271	Chemical Analysis .....	4
CHM 531	Organic Chemistry I .....	3
CHM 532	Organic Chemistry Laboratory .....	2
CHM 545	Chemical Separations .....	2
CHM 550	Organic Chemistry II .....	3
CHM 551	Advanced Organic Laboratory .....	2
	<b>and</b>	
One additional	course in chemistry or biochemistry	
	<b>or</b>	
CHM 666	Instrumental Analysis .....	3
	<b>and</b>	
CHM 667	Instrumental Analysis Laboratory ..	1
CHM 500	General Physical Chemistry .....	3
	<b>or</b>	
CHM 585	Physical Chemistry I .....	3

#### Mathematics (8 hours)

MATH 220	Analytic Geometry and Calculus I ..	4
MATH 221	Analytic Geometry and Calculus II .....	4

#### Physics (8 hours)

PHYS 113	General Physics I .....	4
PHYS 114	General Physics II .....	4

\*A program leading to the B.A. degree may be planned by modifying the social sciences and humanities requirements. See general college section for specific requirements for the B.A. degree.

### Introductory and general chemistry courses

#### Undergraduate credit

**CHM 100. Concepts in Chemistry.** (1) I. A first course in chemistry for students without high school chemistry or students who wish to improve their background in chemistry before taking Chemistry I or General Chemistry. The mole concept, chemical stoichiometry, introduction to atomic structure. One hour lec. a week. Pr.: MATH 010 or equiv.

**CHM 101. Chemical Science Colloquium.** (2) I, II. TELENET only. Current topics in chemistry presented by a distinguished international authority and moderated by a K-State faculty member. Syllabus provided and final original paper required. May be repeated once. Not open to chemistry majors.

**CHM 110. General Chemistry.** (5) I, II, S. Principles, laws, and theories of chemistry; important metallic and nonmetallic substances. Three hours lec., one hour rec., and three hours lab a week.

**CHM 195. Approved Techniques in Criminalistics.** (3) Intersession only. Physical evidence at a crime scene and its examination in the laboratory. Soils, glass, hair fibers, drugs, explosives, poisons, castings, inks, and arson and rape situations are investigated.

**CHM 200. Undergraduate Seminar in Chemistry.** (0, 1) I, II. Programs and activities of chemical interest including lectures given by undergraduate chemistry majors.

**CHM 210. Chemistry I.\*** (4) I, II, S. First course of a two-semester study of the principles of chemistry and the properties of the elements and their compounds. Three hours lec. and three hours lab a week. Pr.: One year of high school chemistry (or CHM 100) and MATH 010 (or equiv.).

\*In the fall semester, the chemistry department conducts an accelerated program that provides the opportunity for students with good preparation in high school chemistry to earn credit in both CHM 210 Chemistry I and CHM 230 Chemistry II. Credit in Chemistry I is earned through satisfactory performance on a review examination given the second week of the semester and completion of a special laboratory of three hours per week. Credit in Chemistry II is earned through a special lecture program. Guidelines for assignment to this program are published in *Your First Year at K-State!* (under CHM 210, 230. The Accelerated Program, Chemistry I and II), and are available from the chemistry department.

**CHM 220. Chemical Principles I.** (5) I. First course of a two-semester study of chemical principles. For students in curricula with a major emphasis in chemistry. Three hours lec. and six hours lab a week. Pr.: High school chemistry (one year) and algebra (one and one-half years).

**CHM 230. Chemistry II.** (4) I, II, S. Second course of a two-semester study of the principles of chemistry and the properties of the elements and their compounds. Three hours lec. and three hours lab a week. Pr.: CHM 210.

**CHM 250. Chemical Principles II.** (5) II. Continuation of CHM 220, covering the principles of chemistry. Laboratory stresses quantitative chemistry. Three hours lec. and six hours lab a week. Pr.: CHM 220.

**CHM 399. Sophomore Honors Seminar.** (3) Open to students in the arts and sciences honors program.

**CHM 498. Senior Honors Thesis.** (2) I, II, S. Open only to seniors in the arts and sciences honors program.

**CHM 499. Problems in Undergraduate Chemistry.** (Var.) I, II, S. Problems may include classroom and/or lab work. Pr.: Consent of instructor.

### Undergraduate and graduate credit in minor field

**CHM 599. Undergraduate Research.** (1, 2, 3) I, II, S. Analytical, inorganic, organic, or physical chemistry.

### Undergraduate and graduate credit

All chemistry courses numbered 600 or above require the following as minimum prerequisites: CHM 550 Organic Chemistry II; CHM 532 Organic Chemistry Laboratory; CHM 595 Physical Chemistry II; and CHM 598 Physical Chemistry II Laboratory.

**CHM 600. Scientific Glassblowing.** (1) II. The basic techniques of bending, sealing, and blowing glass used to fabricate scientific glassware. Three hours of laboratory including one lecture-demonstration a week. Pr.: Senior or graduate standing in physical sciences.

**CHM 700. Practicum in Teaching Chemistry.** (1) I. Principles and methods of instruction in laboratories and recitation classes in chemistry, including one semester of supervised experience as an instructor in a chemical laboratory. This is a required course of all teaching assistants in the Department of Chemistry. May be taken only once for credit. Pr.: Senior standing in chemistry.

**CHM 799. Problems in Chemistry.** (Var.) I, II, S. Problems may include classroom or laboratory work. Not for thesis research. Pr.: Consent of instructor.

### Analytical chemistry courses

#### Undergraduate credit

**CHM 240. Environmental Chemistry Laboratory.** (1) II. Selected experiments in air quality, water quality, and other environmental topics. Three hours lab a week. Pr.: CHM 230 or conc. enrollment.

**CHM 271. Chemical Analysis.** (4) II. Principles of chemical equilibria and qualitative, gravimetric, and titrimetric analyses. Two hours lec. and six hours lab a week. Pr. or conc.: CHM 230.

### Undergraduate and graduate credit in minor field

**CHM 545. Chemical Separations.** (2) II. Principles of modern separation techniques. One hour lec. and three hours lab a week. Pr.: CHM 250 or 271.

### Undergraduate and graduate credit

**CHM 666. Instrumental Analysis.** (3) I. Three hours lec. a week.

**CHM 667. Instrumental Analysis Laboratory.** (1) I. Three hours lab a week.

**CHM 668. Chemical Equilibria.** (1) I. One hour lec. a week.

**CHM 725. Instrumentation in Chemistry.** (3) On sufficient demand. Theory and practice of instrument design for use in chemical research. Study of the flow of energy and information in systems for measurement and control. Two hours lec. and three hours lab a week. Pr.: CHM 666 or consent of instructor.

### Inorganic chemistry courses

#### Undergraduate and graduate credit

**CHM 650. History of Chemistry.** (2) II, in even years. Traces the beginnings of chemistry from 3500 B.C. to 1920 A.D. Early metallurgy, Greek thought about atoms, alchemy, atomic theory, discovery of gases; definition of elements, chemical bonds, organic, inorganic, and physical chemistry. Pr.: CHM 585.

**CHM 657. Inorganic Techniques.** (2) II. The preparation, characterization, and study of transition metal, main group, and organometallic compounds of unusual interest, using techniques commonly encountered in industrial and academic research. Six hours lab a week. Pr.: CHM 585.

**CHM 697. Structure and Bonding.** (2) I. Atomic and molecular structure, bonding concepts used in the practice of inorganic chemistry. This material forms a foundation for higher level courses in inorganic chemistry. Pr.: CHM 550, 595.

**CHM 698. Inorganic Chemistry.** (3) II. Aspects of the structures, reactions, reaction mechanisms, and spectral properties of transition metal and non-metal compounds. Three hours lec. a week. Pr.: CHM 697.

**CHM 710. Chemical Applications of Group Theory.** (1) I. Applications of group theory to molecular structure, bonding, and spectra. One hour lec. a week.

### Organic chemistry courses

#### Undergraduate credit

**CHM 350. General Organic Chemistry.** (3) I, II, S. A survey of types of organic reactions important to biological science areas including pre-veterinary and certain agriculture and home economics programs. Conc. enrollment in CHM 351 is urged. Three hours lec. a week. Pr.: CHM 230.

**CHM 351. General Organic Chemistry Laboratory.** (2) I, II, S. One five-hour lab and one hour of lec. a week. Pr. or conc.: CHM 350.

### Undergraduate and graduate credit in minor field

**CHM 531. Organic Chemistry I.** (3) I, II. General principles of organic chemistry; study of the main types of aliphatic compounds, with an introduction to fats, carbohydrates, amino acids, proteins, and aromatic compounds. Required for the chemistry curricula and for entrance to medical schools. Three hours lec. a week. Pr.: CHM 230 or 250.

**CHM 532. Organic Chemistry Laboratory.** (2) I, II. One five-hour lab and one hour of lec. a week. Pr.: CHM 550 or conc. enrollment.

**CHM 550. Organic Chemistry II.** (3) I, II. Continuation of CHM 531, including additional aromatic chemistry, condensation reactions, and introduction to some advanced topics, such as dyes, polymers, and heterocyclic chemistry. Three hours lec. a week. Pr.: CHM 531.

**CHM 551. Advanced Organic Laboratory.** (2) I, II. One five-hour lab and one hour of lec. a week. Pr.: CHM 550 and 532.

### Physical chemistry courses

#### Undergraduate and graduate credit in minor field

**CHM 500. General Physical Chemistry.** (3) II. Elementary principles of physical chemistry. Three hours lec. a week. Pr.: CHM 230 or CHM 250 and MATH 210 or MATH 220.

**CHM 585. Physical Chemistry I.** (3) I. Elementary chemical thermodynamics and kinetic theory of gases. Three hours lec. a week. Pr.: CHM 230 or CHM 250, MATH 222, PHYS 214.

**CHM 586. Physical Chemistry I Laboratory.** (2) I. Six hours lab a week. Pr.: CHM 250 or CHM 271, CHM 585 or conc. enrollment.

**CHM 595. Physical Chemistry II.** (3) II. Elementary quantum chemistry, spectroscopy, statistical thermodynamics, and chemical kinetics. Three hours lec. a week. Pr.: CHM 585.

**CHM 598. Physical Chemistry II Laboratory.** (2) II. Six hours lab a week. Pr.: CHM 250 or CHM 271 and CHM 595 or conc. enrollment.

## Computing and Information Sciences

Virgil E. Wallentine, Head

Professors Hankley,\* Unger,\* and Wallentine;\* Associate Professors Calhoun,\* Gustafson,\* Melton,\* Schmidt,\* and VanSwaay;\* Assistant Professors Bleyberg,\* Chomicki,\* Danvy,\* Howell,\* Mizuno,\* Ravindran,\* and Singh,\* Instructor Campbell.

The creation and use of the best possible hardware and software is, broadly speaking, the field of computer science.

Two curricula, computer science and information systems, are offered by the Department of Computing and Information Sciences. Many other fields require a minor emphasis in computer science, and students working toward a dual degree (one in computer science and one in some other field) are common.

The department maintains laboratories with extensive mini- and microcomputers. Large computer facilities are provided by Computing and Network Services. Some students choose to own or share microcomputers because of the convenience and learning efficiency of personal interactive computing.

### Computer science curriculum

The computer science curriculum emphasizes a broad foundation of computer organization, software, and mathematics, together with electives that focus on some aspect or application of computers. The computer science curriculum is recommended for students planning graduate studies in computing.

Technical electives consist of a set of computer science courses that permit students to concentrate on an area of technical expertise. The most common technical areas are: software engineering, which involves management and development of large software systems; operating systems, which consist of the supervisory software that controls the operation of a computer; theoretical computer science; computer systems architecture, which involves design of centralized and distributed computer systems; programming languages and their compilers; data base

systems; and knowledge engineering (artificial intelligence).

A person seeking a bachelor of science or bachelor of arts degree in computer science must fulfill the general requirements of the College of Arts and Sciences and the following:

MATH 220	Analytic Geometry and Calculus I ...	4
MATH 221	Analytic Geometry and Calculus II .....	4
MATH 510	Discrete Mathematics .....	3
PHILO 220	Symbolic Logic I .....	3
STAT 410	Probabilistic Systems Modeling ....	3
EECE 241	Introduction to Computer Engineering .....	3
CIS 200	Fundamentals of Computer Programming .....	3
CIS 203	Fundamentals of Computer Programming Laboratory .....	1
CIS 300	Algorithms and Data Structures ...	3
CIS 350	Computer Architecture and Organization .....	3
CIS 500	Analysis of Algorithms and Data Structures .....	3
CIS 505	Introduction to Programming Languages .....	3
CIS 520	Operating Systems I .....	3
CIS 540	Software Engineering Project I .....	3
CIS 541	Software Engineering Project II .....	3
CIS 560	Introduction to Data Management Systems .....	3
CIS 570	Theoretical Foundations of Computing .....	3

With B.A. degree:  
 Technical electives (with advisor's approval) ..... 6

With a B.S. degree:

ENGL 516	Written Communication for the Sciences .....	3
MATH 655	Elementary Numerical Analysis ....	3
CIS 580	Numerical Computing .....	3
CIS/		
PHILO 492	Computers and Society .....	3
Technical electives (with advisor's approval) .....		9

Required courses may not be taken under the A Pass/F option.

**Suggested course schedule for computer science majors**

**Freshman year**

<b>Fall semester</b>		
ENGL 100	Expository Writing I .....	3
SPCH 105	Public Speaking IA .....	2
<b>or</b>		
SPCH 106	Public Speaking I .....	3
MATH 220	Analytic Geometry and Calculus I ...	4
CIS 200	Fundamentals of Computer Programming .....	3
CIS 203	Fundamentals of Computer Programming Laboratory .....	1
KIN 101	Concepts in Physical Education ....	1
		<b>14-15</b>

<b>Spring semester</b>		
ENGL 120	Expository Writing II .....	3
EECE 241	Introduction to Computer Engineering .....	3
CIS 300	Algorithms and Data Structures ...	3
MATH 221	Analytic Geometry and Calculus II .....	4
Social science elective (first of four) .....		3
		<b>16</b>

**Sophomore year**

<b>Fall semester</b>		
PHILO 220	Symbolic Logic I .....	3
CIS 500	Analysis of Algorithms and Data Structures .....	3

Natural science elective with laboratory (first of four) .....	4
Humanities elective (first of four) .....	3
Social science elective (second of four) .....	3
	<b>16</b>

**Spring semester**

CIS 350	Computer Architecture and Organization .....	3
CIS 505	Introduction to Programming Languages .....	3
MATH 510	Discrete Mathematics .....	3
Elective (MATH 551) Applied Matrix Theory .....	3	
Natural science elective with laboratory (second of four) .....	4-5	
	<b>16-17</b>	

**Junior year**

**Fall semester**

CIS 520	Operating Systems I .....	3
CIS 570	Theoretical Foundations of Computing .....	3
MATH 655	Elementary Numerical Analysis ....	3
<b>or</b>		
CIS 580	Numerical Computing .....	3
Humanities elective (second of four) .....	3	
Natural science elective (third of four) .....	3	
	<b>15</b>	

**Spring semester**

CIS 560	Introduction to Data Management Systems .....	3
STAT 410	Statistics for Computer Science ....	3
Technical elective .....	3	
Social science elective (third of four) .....	3	
Elective .....	3-4	
	<b>15-16</b>	

**Senior year**

**Fall semester**

CIS 540	Software Engineering Project I .....	3
Technical elective .....	3	
Natural science elective (fourth of four) .....	3	
ENGL 516	Written Communications for the Sciences .....	3
<b>or</b>		
Humanities elective (third of four) .....	3	
	<b>15</b>	

**Spring semester**

CIS 541	Software Engineering Project II ....	3
CIS/		
PHILO 492	Computers and Society .....	3
Humanities elective (fourth of four) .....	3	
Social science elective (fourth of four) .....	3	
Technical elective .....	3	
	<b>15</b>	

**Information systems curriculum**

The information systems curriculum emphasizes the use of computers to solve problems arising in the operation of business and commerce. The curriculum closely follows programs designed by the Association for Computing Machinery and the Data Processing Management Association.

Five specializations are available, each designed to develop additional skills supportive of needs of the industry. These specializations are database manager (designs, uses, maintains, and manages database systems), management information systems specialist (defines organization requirements, acts as a management-technical communication channel, evaluates information systems, manages analyst/programmers), application programmer (designs detail logic, codes, verifies, documents programs and systems), and communications

analyst (designs and implements distributed information systems, specifies and designs interface to the communication system.)

A person seeking a bachelor of science or bachelor of arts degree in information systems must fulfill the general requirements of the College of Arts and Sciences and the following:

ENGL 516	Written Communication for the Sciences .....	3
MATH 205	General Calculus and Linear Algebra .....	3
MATH 312	Finite Applications of Mathematics .....	3
STAT 320	Elements of Statistics .....	3
EECE 241	Introduction to Computer Engineering .....	3
CIS 200	Fundamentals of Computer Programming .....	2
CIS 203	Fundamentals of Computer Programming Laboratory .....	1
CIS 300	Algorithms and Data Structures ...	3
CIS 350	Computer Architecture and Organization .....	3
CIS 362	Introduction to Business Programming .....	3
CIS 500	Analysis of Algorithms and Data Structures .....	3
CIS 505	Introduction to Programming Languages .....	3
CIS 520	Operating Systems I .....	3
CIS 540	Software Engineering Project I .....	3
CIS 541	Software Engineering Project II ....	3
CIS 560	Introduction to Data Management Systems .....	3
CIS 562	Business Data Processing .....	3
CIS 567	Systems Analysis for Business .....	3
Technical electives (with advisor's approval):		
B.A. Degree .....		6
B.S. Degree .....		12

Required courses may not be taken under the A Pass/F option.

**Suggested course schedule**

**Freshman year**

**Fall semester**

ENGL 100	Expository Writing I .....	3
SPCH 105	Public Speaking IA .....	2
<b>or</b>		
SPCH 106	Public Speaking I .....	3
MATH 205	General Calculus and Linear Algebra .....	3
CIS 200	Fundamentals of Computer Programming .....	3
CIS 203	Fundamentals of Computer Programming Laboratory .....	1
Humanities elective (first of four) .....		3
		<b>15-16</b>

**Spring semester**

ENGL 120	Expository Writing II .....	3
CIS 300	Algorithms and Data Structures ...	3
KIN 101	Concepts in Physical Education ....	1
Humanities elective (second of four) .....	3	
Social science elective (first of four) .....	3	
MATH 312	Finite Applications of Mathematics .....	3
		<b>16</b>

**Sophomore year**

**Fall semester**

EECE 241	Introduction to Computer Engineering .....	3
CIS 500	Analysis of Algorithms and Data Structures .....	3
Elective .....		3
Social science elective (second of four) .....		3

Natural science elective with laboratory (first of four) .....	4
	<b>16</b>

**Spring semester**

CIS 505 Introduction to Programming Languages .....	3
CIS 350 Computer Architecture and Organization .....	3
Natural science elective with laboratory (second of four) .....	4
Technical elective .....	3
STA1 320 Elements of Statistics .....	3
	<b>16</b>

**Junior year****Fall semester**

CIS 520 Operating Systems I .....	3
Technical elective .....	3
Natural science elective (third of four) .....	3
Elective .....	3
CIS 362 Introduction to Business Programming .....	3
	<b>15</b>

**Spring semester**

CIS 560 Introduction to Data Management Systems .....	3
Humanities elective (third of four) .....	3
Technical elective .....	3
Electives .....	3
CIS 562 Business Data Processing .....	3
	<b>15</b>

**Senior year****Fall semester**

CIS 540 Software Engineering Project I .....	3
Elective (CIS 525) .....	3
Social science elective (third of four) .....	3
Natural science elective (fourth of four) .....	3
Technical elective .....	3
	<b>15</b>

**Spring semester**

CIS 541 Software Engineering Project II .....	3
Humanities elective (fourth of four) .....	3
Social science elective (fourth of four) .....	3
ENGL 516 Written Communications for the Sciences .....	3
Elective .....	3
	<b>15</b>

**Computer science courses****Undergraduate credit**

**CIS 110. Introduction to Personal Computing.** (3) I, II, S. Introduction to the use of computers and application software including word processing, spread sheets, graphics, database management, communications, and problem solving; issues of ethical use of computers. Pr.: MATH 100.

**CIS 112. Advanced Personal Computing.** (3). Advanced features of application software for personal computers, including batch files, configuration and maintenance of hardware and software, macros for application software, and sharing of data and programs. Individualized problems. Two hours lec. and four hours lab a week. Pr.: B or better in CIS 110 or permission of instructor.

**CIS 115. Personal Computer Applications.** (3) Introduction to the personal computer environment and operating system; study of various software packages. This course is taught only during intersessions; requires a total of thirty-eight clock hours for completion. Cannot be taken for Arts and Sciences quantitative requirement. Credit will not be given for both CIS 110 and 115.

**CIS 190. Undergraduate Seminar in Computing and Information Sciences.** (1) Topics of special interest in computing and information sciences.

**CIS 200. Fundamentals of Computer Programming.** (3) I, II, S. Abstraction and problem solving, concept of

algorithm and algorithm efficiency, control structures, procedures, arrays and array processing; introduction to a procedural language, and use of that language in selected applications. Pr.: MATH 100; conc. in CIS 203 is required.

**CIS 203. Fundamentals of Computer Programming Laboratory.** (Var.) I, II, S. Programming instruction and assistance in the procedural language taught in CIS 200. May be taken for 0 or 1 credit hour. Conc. enrollment in CIS 200 required.

**CIS 204. FORTRAN Language Laboratory.** (1) I, II. Fundamentals of programming in FORTRAN; applications. Three hours lab a week. Pr.: CIS 200.

**CIS 206. BASIC Language Laboratory.** (1) I, II. Fundamentals of programming in BASIC; applications. Three hours lab a week. Pr.: CIS 200.

**CIS 208. C Language Laboratory.** (1) I, II. Fundamentals of programming in C; applications. Three hours lab a week. Pr.: CIS 200.

**CIS 300. Algorithms and Data Structures.** (3) I, II, S. Structured and modular design and implementation; arrays, records, sets, pointers, files, strings; defined types, stacks, queues; searching, hashing, sorting; recursion; procedure specifications, exceptions, testing, debugging. Pr.: Knowledge of a strongly typed programming language.

**CIS 306. Operating Systems Laboratory.** (3) Advanced programming laboratory for experience in O/S 360/370, job control language, utilities, and access methods. Pr.: CIS 350 or 407.

**CIS 350. Computer Architecture and Organization.** (3) I, II. Introduction to computer architecture as the interface between hardware and software. Register-transfer CPU, memory bus, and input/output structures. Assembler language as the programmer's interface to the bare machine and to the extended machine (including system services). Instruction sequencing, addressing mechanisms, procedure calls, and simple input/output operations. Pr.: EECE 241 and CIS 300.

**CIS 362. Introduction to Business Programming.** (3) I. An introduction to basic business programming techniques including file manipulation operations and sorting. The COBOL language will be used as an implementation tool. Pr.: CIS 200.

**CIS 397. Honors Seminar in Computer Science.** (1-3).

**CIS 407. Assembler Language Programming.** (3) Programming in assembler language under mainframe environment such as IBM, CMS, and VM. Introduction to system services such as file operations and channel programming. Pr.: EECE 241 and CIS 350.

**CIS 490. Special Topics in Computer Science.** (2-4) Current topics in computer science. Pr.: Prerequisite varies with the announced topic.

**CIS 492. Computers and Society.** (1-3) A study of the impact of computers and associated technologies on society, including such topics as ethics of computer use, computer fraud, protection of privacy; legal, moral, and public policy-making responsibility of computer professionals. Pr.: Junior standing and conc. enrollment in PHILO 492; CIS 520.

**CIS 499. Senior Honors Thesis.** (2) I, II, S. Open only to seniors in the arts and sciences honors program.

**Undergraduate and graduate credit in minor field**

**CIS 500. Analysis of Algorithms and Data Structure.** (3) I, II. Analysis of data structures and computer algorithms for trees, lists, graphs, sets. Measures of performance and complexity of algorithms and structures. Pr.: CIS 300.

**CIS 505. Introduction to Programming Languages.** (3) II. History, processors, programming environments; types, scope and extent, abstraction mechanisms, exceptions, and concurrency; functional and object-

oriented languages; formal syntax and semantics; structure of compilers for block-structured languages. Pr.: CIS 300.

**CIS 520. Operating Systems I.** (3) I. Basic operating systems concepts and services: interrupt processing, processes, concurrency, deadlock, resource scheduling and system structure; resource management: real and virtual storage, input/output systems, disk scheduling and file systems; design and construction of concurrent programs. Pr.: CIS 350 or 407 or EECE 631; and CIS 300.

**CIS 521. Real-Time Programming Laboratory.** (3) I. Project-oriented introduction to asynchronous processes and related system software: device drivers, event-driven operations, hierarchical and time sliced process scheduling, spooling operations, interjob and intermachine communications. Projects will be built on a single-use environment. Pr.: EECE 241 and CIS 350, conc.: CIS 520.

**CIS 525. Telecommunications and Data Communication Systems.** (3) Study of the architecture and data systems level of data transport between cooperating autonomous systems including the management and organizational impact issues. Pr.: CIS 520 and 560.

**CIS 535. Introduction to Computer-Based Knowledge Systems.** (3) I. Introduction to the application of artificial intelligence concepts to solving knowledge-dependent tasks. Review of knowledge-representation ideas. Survey of expert system design. Introduction to existing knowledge-based tools available on personal computers. Development of an intelligent system. Pr.: CIS 200.

**CIS 540. Software Engineering Project I.** (3) I. Current practices of software development, requirements, design, prototyping, measures, and evaluation. Specification, design, and prototyping of a software system. Pr.: CIS 500.

**CIS 541. Software Engineering Project II.** (3) II. Final implementation, integration, and testing of a software system. Introduction to configuration management, project management, and software maintenance. Pr.: CIS 500; CIS 540 (which must be taken in the preceding semester).

**CIS 560. Introduction to Data Management Systems.** (3) II. Representation of information as data, storage and manipulation of large amounts of data, logical data models, data storage techniques, data retrieval, integrity, and security. Pr.: CIS 500.

**CIS 562. Business Data Processing.** (3) I, II. Advanced topics in COBOL with application to typical business data processing systems such as payrolls, file systems, inventories, and management information systems. Pr.: CIS 362.

**CIS 570. Theoretical Foundations of Computing.** (3) I. Specification and correctness of algorithms, formal languages and automata, introduction to computability, computational complexity of algorithms. Pr.: PHIL 220, MATH 510, CIS 300.

**CIS 580. Numerical Computing.** (3) I. Introduction to numerical algorithms fundamental to scientific computer work, including elementary discussion of error, roots of equations, interpolation, systems of equations, quadrature, and introduction to methods for solution of ordinary differential equations. Pr.: CIS 300 and MATH 221 and 551.

**CIS 591. Computer Science Applications.** (3) I, II, S. Programming, program libraries, and design of algorithms. For students with minimal background in computer science. Not for credit by CIS majors. Pr.: Graduate standing in student's own area and knowledge of at least one procedural programming language.

**Undergraduate and graduate credit**

**CIS 600. Microcomputer Software.** (3) I. Contemporary software packages for microcomputers, including graphics, word processing, spreadsheets, desktop

publishing, Events, resources, and the graphical user interface. Student programming project. Pr.: CIS 300.

**CIS 605. Programming Languages Practicum.** (3) II. Concepts and problems in modern programming languages; implementation studies. Current programming paradigms. Conc. enrollment in CIS 505 required.

**CIS 606. Translator Design I.** (3) Compilers and interpreters, including description of languages, finite state scanners, LL(1) parsing, symbol tables, syntax-directed semantics, simple code generation. Constructing a simple PASCAL compiler. Pr.: CIS 300, 500, 505.

**CIS 620. Operating System Practices.** (3) Structure and functions of modern operating systems. Emphasis on reading and modifying the source code of a working operating system. This includes memory management, input/output, process management, file systems, and network interconnection software construction. Pr.: CIS 500 and 520.

**CIS 630. AI Programming Techniques.** (3) I. Introduction to tools, techniques, and issues in artificial intelligence programming. Fundamentals of function-, logic-, and object-oriented programming styles. Implementation projects. Pr.: CIS 505.

**CIS 636. Introduction to Computer Graphics.** (3) I, II. Devices and software for graphics display and user interaction, development of software for direct graphic manipulation applications. Cross-listed with EECE 636. Pr.: CIS 300.

**CIS 690. Implementation Projects.** (3) I, II, S. The department will suggest various design or implementation projects for individuals or groups in areas such as translators, interpreters, microprogramming, minicomputer operating systems, graphics, numerical software, etc. Pr.: Junior standing.

**CIS 697. Seminar in Computer Science.** (1-3) Pr.: Junior standing.

**CIS 705. Programming Language Design.** (3) Fundamental design principles: abstraction, parameterization, qualification. Lambda-calculus as a metalanguage for design and analysis. The role of data typing, predicate calculus-based typing. Intuitionistic Type Theory. Pr.: CIS 605 or equivalent experience.

**CIS 710. Computer Simulation Experiments.** (3) Principles of digital computer simulations; discrete and continuous simulation method, statistics of simulations; implementations. Pr.: CIS 300.

**CIS 720. Operating Systems II.** (3) Design of operating systems, concurrent programs, scheduling, memory management, protection, file systems, methods, and languages for operating system development. Pr.: CIS 520 and 500.

**CIS 725. Computer Networks.** (3) Data communications; network topology design; design and implementation of point to point network protocols; local area networks; interconnection of networks; network-based applications. Pr.: CIS 520.

**CIS 730. Principles of Artificial Intelligence.** (3) Introduction to the fundamental concepts and techniques of AI: problem solving, search and planning, knowledge representation and qualitative reasoning, expert systems, natural language processing and cognitive modeling, computer vision, and machine learning. Pr.: CIS 630, 771.

**CIS 736. Computer Graphics.** (3) Topics in computer representation and display of images and graphic interaction. Pr.: CIS 636 or EECE 636.

**CIS 740. Software Engineering.** (3) Software life cycle, requirements, specifications, design, validation, measures, and maintenance. Pr.: CIS 540.

**CIS 745. Software Development Management.** (3) Development models, cost estimation, management of programmer teams, acceptance criteria, reliability estimation, development standards. Pr.: CIS 541.

**CIS 750. Advanced Computer Architecture Experiments.** (3) Characteristics of various computers including those with execution support of multiprocessing, multiprogramming, microprogrammable, high-level language, stack processing, and communication architectures. Two hours lec. and three hours lab a week. Pr.: CIS 350 or 407.

**CIS 761. Data Base Management Systems.** (3) Data models and languages, hierarchical, network, relational systems; implementation and operational requirements; programming projects using data base management systems. Pr.: CIS 560.

**CIS 762. Office Automation.** (3) Characteristics of information work; modelling systems for characterizing aspects of office environment; form-based systems; office automation and description languages; ergonomics, local area networks and tools used in the automation of offices. Pr.: CIS 560.

**CIS 770. Formal Language Theory.** (3) Regular languages, finite automata, context-free languages, pushdown automata, context-sensitive languages, linear bounded automata, recursively enumerable languages, Turing machines. Pr.: CIS 570.

**CIS 771. Programming Science.** (3) Use of formal logic for specification and verification of programs; abstractions and assertions for data structures, procedures, packages, loops, and tasks. Pr.: CIS 505, and either CIS 570 or PHILO 220.

**CIS 775. Analysis of Algorithms.** (3) Study and application of techniques and procedures used in the analysis of algorithms including the worst and average cases of both time and space. Study of the P and NP classes. Pr.: CIS 500 and MATH 220.

**CIS 780. Numerical Solution of Ordinary Differential Equations.** (2) Computer algorithms and techniques for solving ordinary differential equations; programming exercises on the digital computer. Pr.: One CIS language lab and MATH 555 or CIS 580 and MATH 240 plus conc. enrollment in MATH 780.

**CIS 785. Numerical Solution of Partial Differential Equations.** (2) Computer algorithms and techniques for solving partial differential equations; programming exercises on the digital computer. Pr.: CIS 780 and MATH 780 plus conc. enrollment in MATH 785.

**CIS 791. Intensive Computer Science: Concepts.** (1-3) I, II, S. Principles of data structure, assembly language programming, structure of operating systems and programming languages. Intended for entering graduate students in computer science. Pr.: CIS 300.

**CIS 798. Topics in Computer Science.** (Var.) I, II, S. Pr.: Prerequisite varies with the announced topic.

## Economics

James F. Ragan,\* Head

Professors Babcock,\* Emerson,\* Nafziger,\* Ragan,\* and Thomas;\* Associate Professors Akkina,\* Chang,\* Gormely,\* McNulty,\* Oldfather, and Olson;\* Assistant Professors Bratsberg, Megna, and Terrell; Instructors Hula\* and Trenary; Emeriti: Professors Bagley,\* Chalmers,\* and Nordin.\*

Economics is concerned with the principles governing the production and distribution of goods and services, the best use of resources, and the causes of economic prosperity, depression, growth, inflation, and deflation. Students may pursue specialized study in economic theory,

econometrics, economic development, economic fluctuations, economic systems, industrial organization, international trade, labor economics, managerial economics, mathematical economics, monetary theory and policy, public finance, regional economics, and transportation economics.

A student majoring in economics may earn either the bachelor of arts or the bachelor of science degree.

### Requirements

Requirements for an economics major for either the B.A. or B.S. degree are:

ECON 110	Principles of Macroeconomics . . . . .	3
ECON 120	Principles of Microeconomics . . . . .	3
ECON 510	Intermediate Macroeconomics . . . . .	3
ECON 520	Intermediate Microeconomics . . . . .	3
ECON 580	Senior Seminar in Economics . . . . .	3

Five additional economics department courses at the 500 level or above (except ECON 505 and 506).

Two courses in statistics. One course must be an introductory course: STAT 320, 330, 340, 350, 510, 702, or 703. The other course must be STAT 351, 511, or 705.

Either MATH 205 (General Calculus and Linear Algebra), or MATH 220 (Analytic Geometry and Calculus I).

To graduate a student must receive a grade of C or higher in Intermediate Macroeconomics and Intermediate Microeconomics. In addition, a student must either (a) receive a grade of C or higher in all other 500-level or higher economics courses used to satisfy the degree requirements or (b) have a GPA of at least 2.50 in all economics courses used to satisfy the degree requirements.

Courses taken A/Pass/F may not be used to fulfill these requirements.

Students interested in graduate study in economics should take MATH 220 and 221. Additional courses in calculus, matrix algebra, and statistics are also recommended. Early counsel with an advisor is encouraged.

### Secondary education certification

Students majoring in economics may also prepare for teacher certification at the secondary level. This program leads to the bachelor of science degree. The sequence of courses should be planned in cooperation with advisors in both economics and education so that the requirements of secondary education are met.

### Secondary major in industrial and labor relations

See the Secondary Majors section of this catalog.

### Accelerated undergraduate and graduate programs

Students who begin graduate work after completing the B.A. or B.S. degree generally require more than one year to complete work for a master's degree. However, a five-year program leading to a B.A. or B.S. in economics at the end of four years and a

master of arts in economics at the end of five years is available for promising undergraduate students. Students who have completed their sophomore year and have outstanding scholastic records (GPA 3.2 or higher) are invited to join the program.

Each student, in consultation with a faculty advisor, will plan an individualized program of study that meets requirements for the B.A. or B.S. and the M.A. degrees. Features of the program include participation in research as an undergraduate, and enrollment in graduate-level courses in the senior year. Students participating in the program will be considered for financial assistance in the form of scholarships, fellowships, research assistantships, and part-time work.

### Economics courses Undergraduate credit

**ECON 110. Principles of Macroeconomics.** (3) I, II, S. Basic facts, principles, and problems of economics; determination of the level of employment, output, and the price level; the monetary and banking system; problems and policies of economic instability, inflation, and growth; principles of economics development; other economic systems. Pr.: Two years of high school algebra or MATH 010.

**ECON 111. Principles of Macroeconomics Honors.** (3) I. Course description same as ECON 110. Pr.: Two years high school algebra or MATH 010; open to students in honors program.

**ECON 120. Principles of Microeconomics.** (3) I, II, S. Basic facts, principles, and problems of economics including study of the determination of prices; the determination of wages, rent, interest, and profit; theory of the firm; monopoly and government regulation; international economic relations. Pr.: Two years of high school algebra or MATH 010.

**ECON 399. Honors Seminar in Economics.** (3). For sophomores in honors program—scheduled irregularly. Readings and discussions. Open to students in the honors program not majoring in economics.

**ECON 499. Seniors Honors Thesis.** (2) I, II, S. Open only to seniors in the arts and sciences honors program.

### Undergraduate and graduate credit in minor field

**ECON 505. Introduction to the Civilization of South Asia I.** (3) I. Interdisciplinary survey of the development of civilization in India, Pakistan, Sri Lanka, Bangladesh, and Afghanistan; geographical and demographic context, philosophical and social concepts, economic, social and political institutions, literature and historical movements. Same as HIST 505, POLSC 505, SOCIO 505, ANTH 505.

**ECON 506. Introduction to the Civilization of South Asia II.** (3) II. Interdisciplinary survey of recent and contemporary civilization in India, Pakistan, Sri Lanka, Bangladesh, and Afghanistan, including recent history, current economy, religion, culture, languages and literature, geography, social and political structures and ideas. Same as HIST 506, POLSC 506, SOCIO 506, ANTH 506.

**ECON 510. Intermediate Macroeconomics.** (3) I, II, S. An examination of the behavior of the economy as a whole, including an analysis of the national income account, consumption, investment, money, interest, the price level, the level of employment, monetary and fiscal policy, and economic growth. Pr.: ECON 110; ECON 120 or AGEC 120.

**ECON 520. Intermediate Microeconomics.** (3) I, II, S. An examination of the theories of consumer behavior and demand, and the theories of production, cost, and supply. The determination of product prices and output in various market structures, and an analysis of factor pricing. Introduction to welfare economics. Pr.: ECON 120.

**ECON 530. Money and Banking.** (3) I, II, S. Nature, principles, and functions of money; development and operation of financial institutions in the American monetary system, with emphasis on processes, problems, and policies of commercial banks in the United States. Pr.: ECON 110.

**ECON 532. Fiscal Operation of State and Local Government.** (3) I. Designed for students who plan careers related to state or local government. Selected topics in state and local taxation and expenditure. Pr.: ECON 110 and permission of instructor.

**ECON 540. Managerial Economics.** (3) II, some S. Microeconomic topics applicable to understanding and analyzing firm behavior: optimization, demand, estimation, production, and cost theory. Applications to business problems. Pr.: ECON 120, an introductory-level statistics course, and MATH 205.

**ECON 555. Urban and Regional Economics.** (3) I. An examination of the determinants of the economic performance of urban and regional economies, including theory, problems, and policy. Pr.: ECON 120.

**ECON 580. Senior Seminar in Economics.** (3) I. Topics for class discussion include history of economic thought, research methods in economics, and current economic issues. Students will prepare and present papers written with faculty guidance. Required of all economics majors; open to others with permission of instructor. Pr.: ECON 510 and ECON 520.

**ECON 595. Problems in Economics.** (Var.) I, II, S. Individual study is offered in international trade, labor relations, money and banking, public finance, transportation, general economics.

### Undergraduate and graduate credit

**ECON 620. Labor Economics.** (3) I, some II. Economics of the labor market—labor force composition and trends, structure and characteristics of labor markets, wages, employment, and unemployment, economics of trade unions; current issues. Pr.: ECON 120 or consent of instructor.

**ECON 627. Contemporary Labor Problems.** (3) Some II. Emphasis on current research and public policies dealing with such matters as full employment, poverty, discrimination, social security, unemployment insurance, health care, minimum wages, training, and education. Pr.: ECON 620 or consent of instructor.

**ECON 631. Principles of Transportation.** (3) II. The historical development and economic importance of rail, motor, air, water, and pipeline transportation in the United States—routes, services, rates, public regulation. Pr.: ECON 110; ECON 120 or AGEC 120.

**ECON 633. Public Finance.** (3) II. Course seeks answers to questions such as: Which goods should be provided by the private sector and which by the public sector (government)? With what criteria are public expenditures evaluated? What is an equitable and efficient tax system? Who bears the tax burden? What aspects of existing taxes need reform? Pr.: ECON 110; ECON 120 or AGEC 120.

**ECON 636. Capitalism and Socialism.** (3) II. A survey of Marxian economics, major perspectives on U.S. capitalism, market and self-governing socialism, and the Russian, Chinese, and other major economies. Pr.: ECON 110.

**ECON 640. Industrial Organization and Public Policy.** (3) II. An examination of measures and determinants of industrial concentration, and an analysis of market structure, conduct, and performance, and policies related to performance. Pr.: ECON 120.

**ECON 681. International Trade.** (3) I, some S. Principles of international trade and finance, including production, exchange, commercial policy, resource movements, balance of payments, foreign currency markets, and policies for internal and external balance. Pr.: ECON 110; ECON 120 or AGEC 120.

**ECON 682. Economics of Underdeveloped Countries.** (3) I, some S. Factors influencing the economic modernization of the less-developed countries. Emphasis on capital formation, investment allocation, structural transformation, population growth, development planning, and the international economics of development. Pr.: ECON 110.

**ECON 686. Business Fluctuations and Forecasting.** (3) I. Types of business fluctuations; measurement of business cycles; theories of the causes of business cycles; proposals for stabilizing business activity; techniques of forecasting business activity. Pr.: ECON 110; ECON 120 or AGEC 120.

**ECON 690. Monetary, Credit, and Fiscal Policies.** (3) II. Goals of aggregative economic policy; conflicts among goals, and measures to resolve conflicts; money markets; targets of central bank control; the relative strength of monetary and fiscal policies; rational expectations hypothesis and policy ineffectiveness debate; term structure of interest rates. Pr.: ECON 530.

**ECON 699. Seminar in Economics.** (1–3) On sufficient demand. Seminars of special interest will be offered on demand. Pr.: ECON 120.

**ECON 720. Microeconomic Theory.** (3) I. Demand, cost, and production theories; price and output determination in different market structures; the theory of factor market pricing; an introduction to general equilibrium and welfare analysis. Pr.: ECON 520; MATH 205 or MATH 220.

**ECON 730. Introduction to Econometrics.** (3) II. Analytical and quantitative methods used in economics. Applications to specific problems. Pr.: MATH 220 or 205; STAT 550 or both STAT 510 and 511.

**ECON 735. Mathematical Economics.** (3) I. Application of mathematical tools of concrete problems in micro- and macro-economics; mathematical treatment of models of consumption, production, market equilibrium, and aggregate growth. Pr.: ECON 520, MATH 205 or 220, or consent of instructor.

## English

Dean G. Hall,\* Head

Professors Dees,\* Hedrick,\* Heller,\* Holden,\* Keiser,\* McGhee,\* Nyberg,\* Rees,\* and L. Warren;\* Associate Professors Brondell,\* Cohen, Conrow,\* Donnelly,\* Gillespie, Grindell,\* Hall,\* Machor,\* T. Murray,\* Nelson,\* and Smit;\* Assistant Professors Brigham, Dayton, Dodd,\* Franko,\* Rodgers,\* and Tabbi;\* Instructors Baker, Bussing, J. Clark, M. Clark, Clift, Dillon, Frazier, Friedmann, Hajda, Kolonosky, Kremer, Mosher, D. Murray, Rankin, Ransom, Roper, Seltzer, P. Stewart, A. Warren, and Wheatley; Emeriti: Professors Eitner, Johnston, McCarthy, Moses, Noonan, and M. Schneider; Associate Professors Adams, Ansdell, Geissler, and H. Schneider; Assistant Professor Glenn; Instructors Bergman, Pelischek, Roehat, and Vance.

## Bachelor of arts

Students may elect to earn a B.A. in the department through a course of study based on one of the following three patterns.

### Literature track

ENGL 252 Introduction to Literary Studies . . . . .	3
One Shakespeare course . . . . .	3
One language course (430, 476, 490, or 790) . . . . .	3
Two "Survey" courses in one national literature . . . . .	6
(361 and 362 or 381 and 382)	
Three English courses numbered 320–599 . . . . .	9
Four English courses numbered 600 and above . . . . .	12
	<b>36</b>

Students must take at least 6 hours of American literature and 6 hours of British literature other than Shakespeare. At least 15 of the 21 hours in courses numbered 320 and above must be literature courses.

### Literature and creative writing track

ENGL 252 Introduction to Literary Studies . . . . .	3
One Shakespeare course . . . . .	3
One language course (430, 476, 490, or 790) . . . . .	3
Any two "Survey" courses . . . . .	6
ENGL 410 Introduction to Creative Writing . . . . .	3
Three advanced creative writing courses in at least	
two genres . . . . .	9
Two literature courses numbered 605 and above . . . . .	6
One course in literature or language numbered 320	
and above . . . . .	3
	<b>36</b>

Students must take at least 6 hours of American literature and 6 hours of British literature other than Shakespeare.

### Literature with teaching certification track

ENGL 252 Introduction to Literary Studies . . . . .	3
ENGL 400 Advanced Expository Writing for	
Prospective Teachers . . . . .	3
ENGL 430 The Structure of English . . . . .	3
ENGL 490 Development of the English	
Language . . . . .	3
One Shakespeare course . . . . .	3
Any two "Survey" courses . . . . .	6
A world literature course . . . . .	3
ENGL 545 Literature for Adolescents . . . . .	3
Three literature courses numbered 605 and above . . . . .	9
Composition elective . . . . .	3
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Students must take at least 6 hours of American literature and 6 hours of British literature other than Shakespeare.

## Teacher certification

Students preparing to teach English in high school may adopt either of two programs: the major outlined above, leading to the B.A. degree; or the College of Education major in secondary education, leading to the B.S. degree. Majors desiring certification should consult their advisors in both the English department and the College of Education.

For specific certification requirements in secondary education, see the College of Education section of this catalog.

## English courses

**ENGL 030. Writing Laboratory.** (2) I, II, S. Credit/No Credit. Laboratory practice in writing for all students who need review in fundamentals of composition. Especially for students who have difficulty in meeting standards in Expository Writing I and II, but also designed to assist students who desire to improve their composition skills. Hours are not applicable toward degree requirements. Pr.: Consent of instructor.

**ENGL 035. Special Studies in Intensive English.** (2–12) I, II, S. Equivalent to enrollment in one or two segments (structure, writing, reading, or speaking and listening) of Intermediate Intensive English I or II. Placement by the English Language Program according to the student's needs and ability level.

**ENGL 036. Beginning Intensive English I.** (15) I, II. Introduction to basic English syntax, writing, reading, speaking, and listening for native speakers of other languages. No prior knowledge of English required.

**ENGL 038. Beginning English II.** (15) I, II. Intensive study of basic English syntax, writing, reading, speaking, and listening for native speakers of other languages. Pr.: Minimum TOEFL score of 350.

**ENGL 040. Intermediate Intensive English I.** (15) I, II. Intensive study of basic English sentence structure, writing, reading, speaking, and listening for native speakers of other languages. Pr.: Minimum TOEFL score of 400.

**ENGL 050. Intermediate English II.** (15) I, II. Continued intensive study of English structure, writing, reading, speaking, and listening. Placement by the English Language Program.

**ENGL 052. Advanced Intensive English.** (15) I, II. Advanced intensive study of English writing, reading, speaking, and listening with emphasis on university-level tasks. Placement by the English Language Program.

**DAS 060. Intensive English.** (10) S. Intensive study of English for native speakers of other languages. Instruction in English language structure, writing, reading, speaking, and comprehension.

**ENGL 070. Advanced English as a Second Language.** (6) I, II. A support course required of international students whose performance on the English screening test indicates that they would still benefit from half-time instruction in English. Three specialized sections are offered: for undergraduates, for graduate students in technical fields, and for graduate students in non-technical fields. Placement by the English Language Program or on the recommendation of an advisor.

**ENGL 075. English for International Students.** (3) I, II. Distinguished from DAS 060 by being a nonintensive, 3-hour university support course. English structure, reading, and writing for graduate or undergraduate nonnative speakers who wish to reduce a written language deficiency or to prepare for Composition I. Required of students who do not pass the Written English Proficiency Test. Students may also be admitted on recommendation of their advisor. Repeatable if necessary.

## Undergraduate credit

**Introductory courses not for major credit, except for the required ENGL 252. Repeatable once (where indicated) with change of syllabus.**

**ENGL 100. Expository Writing I.** (3) I, II, S. Introduction to expressive and informative writing. Frequent discussions, workshops, and conferences. Offers extensive practice in the process of writing: getting ideas, drafting, analyzing drafts, revising, and editing.

**ENGL 110. English Honors Composition I.** (3) I, II, S. Critical reading and composition for freshmen whose scores on their entrance examinations indicate that they will benefit from a more sophisticated and challenging program than that of ENGL 100. Students may also be admitted at the discretion of the chairperson of the English department honors committee.

**ENGL 120. Expository Writing II.** (3) I, II, S. Introduction to writing persuasively and in response to literature. As with ENGL 100, uses discussions, workshops, and conferences, and emphasizes the writing process. Pr.: ENGL 100 or 110.

**ENGL 125. English Honors Composition II.** (3) I, II. Advanced critical reading and composition. Students who receive A in ENGL 100 may, on the recommendation of their instructor and the chairperson of the English department honors committee, be admitted to ENGL 125. Students who are members in good standing of one of the various college honors programs may also be admitted. Otherwise, admission is on the same basis as that for ENGL 110.

**ENGL 150. English Studies Abroad.** (2–3) Intersession only. Travel abroad, with selected readings, lectures, and discussions which explore the relationships between literary texts and their physical and cultural environments.

**ENGL 210. The Uses of Poetry.** (1) I, II, S. Credit/No Credit only. The experience of poetry read for pleasure, for knowledge, and for personal fulfillment. Repeatable once.

**ENGL 220. Fiction into Film.** (2) I, II, S. Discussions of film adaptation of works of literature.

**ENGL 230. Humanities: Classical Cultures.** (3) I, II, S. As do the following three courses (ENGL 231–234), develops an understanding, appreciation, and enjoyment of the humanistic resources of Western culture by examining great works of literature, philosophy, art, music, and religion in each major or period. The four courses may be taken individually and in any order.

**ENGL 231. Humanities: Medieval and Renaissance.** (3) I, II, S.

**ENGL 233. Humanities: Baroque and Enlightenment.** (3) I, II, S.

**ENGL 234. Humanities: Modern.** (3) I, II, S.

**ENGL 251. Introduction to Literature.** (3) I, II, S. Study of form and technique in works of fiction, poetry, and drama.

**ENGL 252. Introduction to Literary Studies.** (3) I, II, S. Elements of literary form and style: an introduction to criticism for English majors. Intended as a first course in the analysis of form and technique, an introduction to literary terms commonly used in later courses, and practice in critical writing. Readings from a broad range: poems, plays, essays, and novels.

**ENGL 261. British Literature: Medieval and Renaissance.** (3) I, II, S. Major works to about 1700, selected for the general student; emphasizing Chaucer, Shakespeare, and Milton. Will not apply to survey requirement for English majors.

**ENGL 262. British Literature: Enlightenment to Modern.** (3) I, II, S. Major works since about 1700, selected for the general student. Will not apply to survey requirement for English majors.

**ENGL 271. American Literature: Colonial through Romantic.** (3) I, II, S. Major works selected for the general student. Will not apply to survey requirement for English majors.

**ENGL 272. American Literature: Realists and Moderns.** (3) I, II, S. Major works selected for the general student. Will not apply to survey requirement for English majors.

**ENGL 280. Selected American Ethnic Literatures.** (3) I, II, S. Selected studies in ethnic literatures of the United States, including African, Asian, Hispanic, Jewish, and Native Americans. Repeatable.

**ENGL 287. Great Books.** (3) I, II, S. Introduction to world classics from past to present. Repeatable.

**ENGL 297. Honors Introduction to the Humanities I.** (3) I. Study of selected major works of history, literature, and philosophy of central importance in the Western cultural tradition. Emphasis on classroom discussion and writing interpretive essays. Limited to entering freshmen. Pr.: Consent of instructor. Same as HIST 297, MLANG 297, PHILO 297.

**ENGL 298. Honors Introduction to the Humanities II.** (3) II. Continuation of ENGL 297. Pr.: ENGL 297

or consent of instructor. Same as HIST 298, MLANG 298, PHILO 298.

**ENGL 299. Honors Topics in English.** (3) I, II. Readings and colloquia in selected topics in literature or language. Pr.: Open only to arts and sciences honors program students and to others completing ENGL 100 or 120 and 110 or 125 with a 3.5 GPA.

### Courses for major credit (except ENGL 300 and 399)

**ENGL 300. Expository Writing III.** (3) I, II, S. Advanced practice in writing a variety of expository forms: personal essays and informative and persuasive reports. Additional work on style and the demands of various rhetorical situations. Pr.: ENGL 120 or 125.

**ENGL 320. The Short Story.** (3) I, II, S. Study of short stories from world literature with emphasis on American, British, and Continental.

**ENGL 330. The Novel.** (3) I, II, S. Novels selected from various periods and cultures. Concern for form and critical analysis.

**ENGL 340. Poetry.** (3) I, II, S. Close reading of poems and analysis of poetic genres, with emphasis on modern poetry.

**ENGL 345. Drama.** (3) I, II, S. Study of drama from classical times to the present.

**ENGL 350. Introduction to Shakespeare.** (3) I, II, S. Study of representative comedies, histories, and tragedies.

**ENGL 355. Literature for Children.** (3) I, II, S. Survey of literature for children. Emphasizes the reading and evaluating of books for children. For teachers of elementary grades. Pr.: Sophomore standing.

**ENGL 361. British Survey I.** (3) I, II, S. English literature from Anglo-Saxon times through Milton. Will apply to survey requirement for English majors.

**ENGL 362. British Survey II.** (3) I, II, S. English literature from Dryden to the end of the nineteenth century. Will apply to survey requirement for English majors.

**ENGL 381. American Survey I.** (3) I, II, S. American literature from the early accounts of colonization through the American Renaissance. Will apply to survey requirement for English majors.

**ENGL 382. American Survey II.** (3) I, II, S. American literature from the Civil War to the present. Will apply to survey requirement for English majors.

**ENGL 390. Fable and Fantasy.** (3) I, II, S. Study of modern works in the fabulous or fantastic modes in relation to the traditions underlying them. Pr.: ENGL 100 or 110.

**ENGL 395. Topics in English.** (1-3) I, II, S. Selected studies in literature and language. Repeatable with change in topic.

**ENGL 399. Honors Seminar in English.** (1-3) I. Readings and colloquia in selected masterpieces. May not be used for English major credit. Pr.: Honors students only.

### Courses for major and nonmajor credit

**ENGL 400. Advanced Expository Writing for Prospective Teachers.** (3) I, II, S. Expository writing and a brief introduction to the history and theory of teaching writing, primarily for candidates for Secondary certification in English. Pr.: ENGL 120 or 125.

**ENGL 410. Introduction to Creative Writing.** (3) I, II, S. For those beginning the craft of imaginative writing. A practical introduction to poetry and short fiction. Pr.: ENGL 120 or 125.

**ENGL 415. Written Communication for Engineers.** (3) I, II, S. Study and intensive use of writing forms characteristic of professional practice. Pr.: Enrollment in the College of Engineering with junior or senior standing and ENGL 100 or equivalent with A or B credit or ENGL 120.

**ENGL 420. Literature and Film.** (3) I, II, S. Emphasizes such matters as the turning of a story, novel, play into film; the handling of point of view; the interrelating of techniques between fiction and film; and the comparing of the forms of fiction and film. Pr.: ENGL 120 or 125.

**ENGL 425. Women in Literature.** (3) I, II, S. Literary works by or about women. Treats individual writers, writers considered within various traditions, themes, or formal issues. Pr.: ENGL 120 or 125.

**ENGL 430. The Structure of English.** (3) I, II, S. Systematic study of the structure of the English language and a consideration of the current theories of analysis: traditional, structural, and transformational-generative. Primarily for candidates for secondary certification in English or for elementary language arts majors. Pr.: ENGL 120 or 125.

**ENGL 440. Themes in Literature.** (1-3) I, II, S. Explores the literary treatment of important and recurring themes. Repeatable once. Pr.: ENGL 120 or 125.

**ENGL 445. Literary Kinds.** (1-3) I, II, S. Examines the characteristics, the growth and development, or the uses of specified literary genres. Repeatable once. Pr.: ENGL 120 or 125.

**ENGL 450. Literature and Society.** (1-3) I, II, S. Literature in relation to social and cultural patterns and influences. Repeatable once. Pr.: ENGL 120 or 125.

**ENGL 460. American Folklore and Folk Literature.** (3) I, II, S. Focuses on definition, form, and function of folktales and anecdotes, legends, proverbs, riddles, beliefs, and customs. Pr.: ENGL 120 or 125.

**ENGL 470. English Bible.** (3) I, II, S. The Bible as literature and history and the cultural and historical backgrounds of the Old Testament. Pr.: ENGL 120 or 125.

**ENGL 476. American English.** (3) I, II, S. A systematic study of the English language as it has been and is spoken in the continental United States. Topics may include Tall Talk, Americanisms, Colonial and Modern dialects, and American dictionaries. Pr.: ENGL 120 or 125.

**ENGL 485. Introduction to History and Theory of Composition and Rhetoric.** (3) I, II, S. Introduction to primary issues and representative writers on rhetoric from ancient Greece and Rome to the present. Emphasizes the relationship of such material to writing instruction in Western civilization.

**ENGL 490. Development of the English Language.** (3) I, II, S. Depicts the English language in its place among other world languages, and introduces students to the major ways in which English has changed through time. Considers both internal and external influences as causes of language change. Pr.: ENGL 120 or 125.

**ENGL 492. Humanities Seminar.** (3) I, II. Study in depth of selected major figures and movements in Western arts, ideas, and literature. Offered each semester within one of the chronological periods of the introductory courses. Pr.: Appropriate introductory humanities course (or an equiv. background, such as courses in Western civilization, art, or world literature, with consent of instructor).

**ENGL 498. Honors Tutorial in English.** (1-3) I, II, S. Individually guided study in which the student will formulate and explore a narrowly defined topic in literature or language. May be used to initiate research for senior honors thesis. Pr.: Consent of tutorial instructor.

**ENGL 499. Senior Honors Thesis.** (2) I, II, S. Open only to seniors in the arts and sciences honors program.

### Undergraduate and graduate credit in minor field

**ENGL 501. Writing Children's Literature.** (3) I, II, S. Writing magazine- or book-length prose or material for or to be presented to children. Pr.: ENGL 120-125.

**ENGL 502. Writing Literary Non-Fiction.** (3) I, II, S. An introduction to the genres of literary non-fiction and practice in writing those forms. Pr.: ENGL 120 or 125.

**ENGL 516. Written Communication for the Sciences.** (3) I, II, S. Theory and intensive writing practice for students in the basic and applied sciences. Pr.: Junior standing and ENGL 120 or 125. Will not substitute for ENGL 415.

**ENGL 535. Literature of Aging.** (3) I, II, S. Concerned with the problems of and the responses to aging as reflected in fiction, drama, and poetry. Pr.: ENGL 120 or 125.

**ENGL 545. Literature for Adolescents.** (3) I, II, S. Selecting, reading, and evaluating books for adolescents. For those seeking junior and senior high school certification and students of guidance for adolescents. Pr.: ENGL 120 or 125.

### Undergraduate and graduate credit

**ENGL 604. Expository Writing Workshop.** (3) I, II, S. Course emphasizes style analysis of modern non-fiction prose in the sciences, social sciences, and humanities. Extensive student writing on assignments appropriate to germane topics. Pr.: Junior standing.

**ENGL 605-660. Readings Courses.** Readings courses are designed primarily for advanced undergraduates although graduate students may also enroll in them. These courses constitute a sequence of period studies covering the chronological range of English and American literature. Within these historical periods, the specific course contents will vary by semester and instructor. They may emphasize literary figures and movements, historical and cultural contexts, or different genres and forms within the periods. Each semester's offerings will be specifically described before each enrollment period in university and department publications. The courses require junior standing and are repeatable with change of subject matter.

**ENGL 605. Readings in Medieval Literature.** (3) I, II, S.

**ENGL 610. Readings in Renaissance Literature.** (3) I, II, S.

**ENGL 620. Readings in Seventeenth Century British Literature.** (3) I, II, S.

**ENGL 625. Readings in Eighteenth Century British Literature.** (3) I, II, S.

**ENGL 630. Readings in Nineteenth Century British Literature.** (3) I, II, S.

**ENGL 635. Readings in Twentieth Century British Literature.** (3) I, II, S.

**ENGL 640. Readings in Early American Literature.** (3) I, II, S.

**ENGL 645. Readings in Nineteenth Century American Literature.** (3) I, II, S.

**ENGL 650. Readings in Twentieth Century American Literature.** (3) I, II, S.

**ENGL 655. Readings in American Ethnic-Minorities Literature.** (3) I, II, S.

**ENGL 660. Readings in Major Authors.** (3) I, II, S.

**ENGL 661. Advanced Creative Writing: Prose Fiction.** (3) I, II, S. Advanced writing of prose fiction. Repeatable once. Pr.: ENGL 500 or instructor permission

**ENGL 663. Advanced Creative Writing.** (3) I, II, S. Advanced writing of poetry. Repeatable once. Pr.: ENGL 500 or instructor permission.

**ENGL 670-695. Topics Courses.** Topics courses are designed primarily for advanced undergraduates although graduate students may enroll in them. These courses address topics not confined to a single period in a national literature. Specific course content will vary by semester and instructor. It may emphasize cross-national subjects, literary criticism, the development of a theme or genre over time, new perspectives from

social, intellectual, or cultural studies, or non-traditional texts and topics. Each semester's offerings will be described more specifically in university and department publications before each enrollment period. The courses require junior standing and are repeatable with change of subject matter.

**ENGL 670. Topics in British Literature.** (3) I, II, S.

**ENGL 680. Topics in American Literature.** (3) I, II, S.

**ENGL 690. Topics in Literature for the Young.** (3) I, II, S.

**ENGL 695. Topics in Literature.** (3) I, II, S.

**ENGL 700. Old English.** (3) I, II, S. The elements of Old English grammar, with readings in prose and poetry. Pr.: Instructor permission.

**ENGL 705. Theory and Practice of Cultural Studies.** (3) I, II, S. An overview of selected approaches to the study of culture and of their current application in English studies, including psychoanalytic, feminist, marxist, and structuralist approaches. Pr.: Junior standing.

**ENGL 710-759. Studies Courses.** Studies courses are designed primarily for graduate students, although advanced undergraduate students may also enroll in them. Their specific contents will vary by semester and instructor, but the courses will reflect concerns with literary and rhetorical forms and genres; with specific authors, periods, or literary movements; with perspectives from social, intellectual, and cultural studies; or with literary themes. Each semester's offerings will be described more specifically in university and department publications before each enrollment period. The courses require junior standing and are repeatable with change of subject matter.

**ENGL 710. Studies in a Literary Genre.** (3) I, II, S.

**ENGL 720. Studies in a Major Author.** (3) I, II, S.

**ENGL 730. Studies in a Literary Period.** (3) I, II, S.

**ENGL 740. Studies in a Literary Theory.** (3) I, II, S.

**ENGL 755. Studies in Composition and Rhetoric.** (3) I, II, S.

**ENGL 759. Studies in Technical Communications.** (3) I, II, S.

**ENGL 760. American Humor and Satire.** (3) I, II, S. Emphasizes works produced in the nineteenth and twentieth centuries.

**ENGL 761. Creative Writing Workshop: Short Fiction.** (3) I, II, S. Advanced writing of short prose fiction. Repeatable twice for credit. Pr.: ENGL 661 or instructor permission.

**ENGL 762. Advanced Playwriting.** (3) I, II, S. Same as THRE 762.

**ENGL 763. Creative Writing Workshop: Poetry.** (3) I, II, S. Advanced writing of poetry. Repeatable twice. Pr.: ENGL 663 or instructor permission.

**ENGL 771. Creative Writing Workshop: Novel.** (3) I, II, S. Repeatable twice. Pr.: ENGL 661 or instructor permission.

**ENGL 790. History of the English Language.** (3) I, II, S. The development of British and American English from Indo-European origins to the present. Pr.: Senior standing or instructor permission.

**ENGL 795. Literary Criticism.** (3) I, II, S. Major points of view in modern American and British criticism, with practice in the analysis and judgment of individual literary works. Pr.: Senior standing.

**ENGL 796. Theories of Grammar.** (3) I, II, S. Comparative examination of the assumptions, aims, and procedures of four types of English grammar: the normative grammar of Robert Lowth, the historical grammar of Otto Jespersen, the structural grammar of Leonard Bloomfield, and the generative-

transformational grammar of Noam Chomsky and their application. Pr.: Junior standing and ENGL 430 or 600.

**ENGL 799. Problems in English.** (Var.) I, II, S. Independent study in major authors, genres, and periods of English and American literature and language. Pr.: Background of courses needed for problem undertaken.

## Linguistics courses

### Undergraduate and graduate credit

**ENGL 600. Principles of Linguistics.** (3) I, II. The scientific study of language, with examples from English, Spanish, French, German, and others. Overview of language origins, phonetics, phonology, syntax, semantics, language acquisition, dialects, language change, and writing systems. Same as LING 600 and LG 600.

**ENGL 601. General Phonetics.** (3) I or II, in alternate years. Description and classification of speech sounds according to point and manner of articulation. Transcription in the International Phonetic Association Alphabet. Includes sounds of English, French, Spanish, German, and others. Same as LING 601 and LG 601.

**ENGL 602. Historical Linguistics.** (3) I or II, in alternate years. Internal and comparative reconstruction of earlier forms of languages. Genetic relationships in language families, and various typological considerations. Includes French, Spanish, and others. Same as LING 602 and LG 602.

**ENGL 603. Topics in Linguistics.** (3) I or II, in alternate years. Seminar on a special topic in linguistics. Topic to be announced for semester in which offered. Repeatable for credit on a different topic. Same as LING 603 and LG 603.

**ENGL 783. Phonology I.** (3) Same as LING 783 and MLANG 783.

**ENGL 785. Syntax I.** (3) Same as LING 783 and MLANG 785.

**ENGL 791. Methods and Techniques of Learning a Second Language.** (3)

## Geography

M. D. Nellis,\* Head

Professors Kromm,\* Nellis,\* Siddall,\* and White;\* Associate Professors Bussing,\* Seamon,\* and Seyler;\* Assistant Professors DeBres,\* Martin,\* Paul,\* and Smith;\* Adjunct Professor Nair; Emeritus: Professor Self and Stover.\*

Geographers, in studying the differences in human activities from one place to another, and human impact and responses to the environment, deal with vital questions about current national and international situations.

Geographers also may pursue a more theoretical inquiry into the major problems of human society by examining spatial structure and processes using various techniques of mathematical and cartographic analysis of spatial phenomena, computer mapping, geographic information systems, and remote sensing.

A typical and traditional problem in geography concerns human impact on the land. Air pollution, contamination of waterways,

decaying urban areas, destruction of the landscape, and the like, can only be well understood by examining the interrelations of factors such as technology, population density, legal structure, affluence, cultural traditions, and environment.

## Geography (B.A. or B.S.)

Students of geography may pursue a traditional major in geography or choose the geography-pre-planning option. The bachelor of science or the bachelor of arts degree may be earned for either option.

### Requirements for a major in geography:

GEOG 100	World Regional Geography	3
	<b>or</b>	
GEOG 200	Human Geography	3
GEOG 220	Environmental Geography I	4
GEOG 221	Environmental Geography II	4
GEOG 440	Geography of Natural Resources	3
GEOG 450	Geography of Economic Behavior	3
GEOG 470	Cartography	3
STAT 330	Elementary Statistics for the Social Sciences (or its equivalent)	3
	One course at 500 or 600 level (except GEOG 505 or 506)	
	One course at 700 level (except GEOG 700, 702, 705, or 708)	
	Additional courses at the 490 level or above to total 30 hours	

Although the major requirements for the B.A. or B.S. degrees are the same, college requirements differ as described earlier in the College of Arts and Sciences section.

Students may pursue a general program in geography, or may choose to develop a concentration in either environmental studies or community studies. Other concentrations may be developed to reflect the particular interests of a student. For example, a student may earn a teaching certificate while working toward a degree in geography.

Another curriculum leads to the bachelor of science degree in secondary education. For information concerning this program see the College of Education section of this catalog.

### Geography: pre-planning option (B.A. or B.S.)

Geography is an appropriate discipline for students who wish to pursue a career in a planning-related field or desire to take graduate training in planning. The geography pre-planning option provides a broad interdisciplinary background and a core curriculum in geography. Completion of the requirements will also yield a certificate in community planning from the Department of Regional and Community Planning.

The courses for the pre-planning option include all of those required for a geography major, and GEOG 750 Urban Geography, which will count as part of the

30 hours needed for a degree. In addition, students must take:

Select one of the following (3 hours):

GEOG 700	Quantitative Analysis in Geography	3
GEOG 702	Computer Mapping	3
GEOG 705	Remote Sensing/Environment	3

Select one of the following (3 hours):

ECON 555	Urban and Regional Economics	3
POLSC 718	Urban Politics	3
SOCIS 531	Urban Sociology	3

From the Department of Regional and Community Planning (15 hrs.):

PLAN 315	Introduction to Planning	3
PLAN 715	Planning Principles	
PLAN 736	Planning Implementation	3
PLAN 770	Planning Law	
Three additional planning courses		9

## Geography courses

### Undergraduate credit

**GEOG 100. World Regional Geography.** (3) I, II. Introduction to geography structured on a framework of major world regions and countries. With the regional approach is an explicit discussion of the essential concepts of certain systematic specialties, such as political, social, economic, and urban geography.

**GEOG 200. Human Geography.** (3) I, II. A geographical assessment of the way human activities shape landscapes throughout the world. The course is especially appropriate for students interested in the social and behavioral sciences.

**GEOG 201. Human Geography (Honors).** (3) I, in odd years. Spatial aspects of human organization and behavior are examined through selected concepts in modern geography. The course is especially appropriate for students interested in the social and behavioral sciences. Pr.: Membership in arts and sciences honors program.

**GEOG 220. Environmental Geography I.** (4) I, II. A basic physical geography course emphasizing the atmosphere and hydrosphere and treating related problems such as air pollution, drought, and floods. Introduces tools used by geographers in environmental analysis. Three hours lec. and one two-hour lab a week.

**GEOG 221. Environmental Geography II.** (4) I, II. Emphasizes the geosphere and biosphere, including processes, patterns, and physical background for related issues such as energy, soil erosion, and natural hazards. Introduces remote sensing as a tool for environmental study. Three hours lec. and one two-hour lab a week. Pr.: Environmental Geography I.

**GEOG 300. Geography of Tourism.** (3) II. The geography of tourism is concerned with the structure, form, use, and conservation of the landscape as well as with such spatial conditions as the location of tourist areas and the movements of people from place to place. This course addresses such concepts as the economic, environmental, social, and cultural impacts of tourism as well as examining the tourist geography of each of the world's regions, focusing on the major tourist areas.

**GEOG 310. Geography of Kansas.** (3) I. A regional geographical analysis of Kansas including discussion of climate, landforms, soil, water, and minerals as well as patterns of settlement, population, agriculture, industry, transportation, and urban development.

**GEOG 399. Honors Seminar in Geography.** (2-3) I, in odd years. Selected topics. Open to nonmajors in the honors program.

**GEOG 440. Geography of Natural Resources.** (3) I. The distribution, significance, and environmental consequences of world agriculture, fishing, forestry, and mining, emphasizing the principles which account for

the spatial variation in the extraction and consumption of natural resources.

**GEOG 450. Geography of Economic Behavior.** (3) II. The location of manufacturing industries and patterns of commercial activity. Case studies and simulations are used with emphasis on modern concepts of site selection and community development.

**GEOG 460. Future Worlds.** (3) S. Alternative future distributions of population, pollution, resource depletion, economic development, and human conflict will be treated in lectures and reading, and discussed by representatives of business, politics, religion, and academia.

**GEOG 470. Cartography.** (3) I. Theory, interpretation, design, and drafting of maps, with emphasis on presenting quantitative data.

**GEOG 490. Problems in Geography.** (Var.) I, II, S. Pr.: Consent of instructor.

**GEOG 498. Honors Tutorial in Geography.** (1-3) I, II. Individual directed research and study of a topic in geography, normally as a preliminary to writing a senior honors thesis. May be repeated once to a total of 3 hours. Pr.: Sophomore standing, membership in the honors program of the College of Arts and Sciences, and permission of the instructor.

**GEOG 499. Senior Honors Thesis** (2) I, II, S. Open only to seniors in the arts and sciences honor program.

### Undergraduate and graduate credit

**GEOG 500. Geography of the United States.** (3) II, in odd years. A regional analysis of the United States with special attention to the historical, political, economic, and social factors which contribute to areal differentiation within the area.

**GEOG 505. Introduction to the Civilization of South Asia I.** (3) I. Interdisciplinary survey on the development of civilization in India, Pakistan, Sri Lanka, Bangladesh, and Afghanistan, including consideration of the geographical and demographic context, philosophical and social concepts, social and political institutions, literature, and historical movements. Same as ECON 505, HIST 505, POLSC 505, SOCIO 505, ANTH 505.

**GEOG 506. Introduction to the Civilization of South Asia II.** (3) II. Interdisciplinary survey of recent and contemporary civilization of India, Pakistan, Sri Lanka, Bangladesh, and Afghanistan, including recent history, current economy, religion, culture, language and literature, geography, social and political structure and ideas. Same as ECON 506, HIST 506, POLSC 506, SOCIO 506, ANTH 506.

**GEOG 620. Geography of Latin America.** (3) II, in even years. A broad survey of the physical and human patterns of the Latin American culture area, past and present, with emphasis on the changing landscape features in the successive patterns of human occupancy.

**GEOG 640. Geography of Europe.** (3) I. People and their environment, their cultures, problems, and prospects in Europe west of the Soviet Union; trends of development as affected by changing political and economic factors.

**GEOG 650. Geography of Former Soviet Lands.** (3) II, in odd years. Physical limitations, resource potentials, economic capabilities, and political and nationality issues, with particular emphasis on agriculture, manufacturing, urbanization, cultural diversity, and regional development. Pr.: Six hours of social science.

**GEOG 680. Seminar in Regional Geography.** (1-3) Pr.: Consent of instructor.

**GEOG 700. Quantitative Analysis in Geography.** (3) II. Quantitative methods employed in modern geographical research. Applications of both statistical and mathematical approaches will be treated. Emphasis will be placed on interpretation and evaluation of techniques employed in spatial analysis. Pr.: One course in statistics.

**GEOG 702. Computer Mapping.** (3) I. Familiarizes students with computer applications to mapping problems. Students will produce a series of maps on the printer and plotter using prepared programs, and in the process develop computer graphics skills to address problems in areal analysis, planning, and public administration. Pr.: One course in social science and one in natural science and junior standing.

**GEOG 705. Remote Sensing of the Environment.** (3) II. Remote sensing and its application to earth study, especially environmental problems and land use. Course employs both readings and the use of imagery. Two hours lec., two hours lab. Pr.: One course in physical science and one in biological science.

**GEOG 708. Geographic Information Systems.** (3) II. Examines both theoretical and applied dimensions of geographic information systems (GIS) in the contexts of environmental impact analysis, natural resource inventories, and community development studies. Applications of GIS concepts and procedures will be built around the use of PC Arc-Info, where case studies will be completed by teams of students. Pr.: GEOG 702 or 705.

**GEOG 710. Geography of Hunger.** (3) I, in odd years. The problem of an adequate food supply for a rapidly growing world population; food deficit and surplus areas, possibilities of increased production, problems of distribution, and the future outlook. Pr.: Six hours of social science and junior standing.

**GEOG 715. World Population Patterns.** (3) I, in even years. Geographical processes that govern population distributions, growth rates, and migrations. Emphasis on international comparisons and the implications for world society of continued differential growth rates. Pr.: Six hours of social science.

**GEOG 720. Geography of Land Use.** (3) I, in odd years. Critical factors affecting land use, scarcity, and management examined in a regional, national, and global context; land use classification systems and variation of land use patterns. Pr.: Six hours of social science and junior standing.

**GEOG 725. Geography of Water Resources.** (3) II, in even years. Interpretation and analysis of the physical geography of water and water as a resource. Evaluation of water, emphasizing quality, hazards, institutions, and selected domestic and global issues. Pr.: Six hours of social science and junior standing.

**GEOG 730. World Agricultural Systems.** (3) II, in odd years. Description and analysis of the spatial distribution of farm systems emphasizing traditional resource systems in the third world. The major objective is to analyze the interrelationships between natural and human elements in farm systems in order to gain an awareness and understanding of the complex issues involved in agricultural change and development. Pr.: Six hours of social science and junior standing.

**GEOG 740. Geography of Transportation.** (3) II, in even years. A consideration of the nature of spatial interaction, the various kinds of transport media, and the relationship between transportation and economic and social patterns. Pr.: Junior standing or consent of instructor; six hours of social science.

**GEOG 750. Urban Geography.** (3) II. A study of geographic principles relating to the distribution, function, and structure of cities; a geographic analysis and classification of urban settlements. Pr.: Six hours of social science or planning.

**GEOG 760. Human Impact on the Environment.** (3) I, in even years. The social, economic, and political implications of the impact of human activity on the natural environment. Field research in environmental impact assessment. Pr.: Six hours of social science.

**GEOG 770. Perception of the Environment.** (3) II, in even years. An examination of the way people perceive their geographic environment and the role of perception in spatial behavior. Perceptions of neighborhoods, cities, states, nations, frontier regions, and environmen-

tal processes are explored. Pr.: Six hours of social science with one course above the introductory level, and 6 hours of natural science with one course above the introductory level.

**GEOG 780. Cultural Geography.** (3) II, in even years. A study of the forms of human occupancy of landscapes, with consideration of innovations in the use of the landscape, the origins and dispersals of these innovations, and human attitudes toward the natural environment. Pr.: Six hours of social science.

**GEOG 790. Seminar in Cultural-Economic Geography.** (1-3) Pr.: Consent of instructor.

## Geology

Joseph L. Graf,\* Head

Professors Chaudhuri,\* Clark,\* Cullers,\* Doveton,\* Martin,\* Schultze,\* Twiss,\* Underwood,\* and West;\* Associate Professors Graf,\* Jones,\* and Oviatt;\* Assistant Professors Archer,\* Franseen,\* Maples,\* and Watney;\* Emeriti: Professors Chelikowsky,\* Shenkel,\* and Walters;\* Assistant Professor Riseman.\*

Traditionally defined as the study of the earth's composition, behavior, and history, geology now includes the study of the members of the solar system. As a science, it is both practical and highly theoretical.

Geologists operate in two laboratories: the earth itself (field laboratory) and the standard chemical, physical, or biological laboratory. However, geologists cannot control the variables affecting the natural processes operating in the field, as a chemist can control the variables experimentally in a laboratory. Geologists are the observers of processes in operation or already concluded and often must deduce conclusions from incomplete data or by analogy with processes that may be reproduced only in part in a laboratory.

The Department of Geology offers programs of study in geology and geophysics and cooperates with the College of Education in an earth science program for high school teachers. It also cooperates with the Department of Civil Engineering in a dual degree in civil engineering and geology. For detailed plans of study, consult the head of the department.

Students in geology and in geophysics must have an overall average grade of C (not a C grade in each course) in their geology, other natural science, mathematics, and computer science courses.

### Geology option

In addition to the general requirements for the B.A. or B.S. degree, the following must be completed:

GEOG 100	Introductory Geology	3
GEOG 130	Elementary Geology Laboratory	1
GEOG 300	Historical Geology	4

GEOG 502	Mineralogy	3
GEOG 503	Petrology	3
GEOG 520	Geomorphology	2
GEOG 581	Paleobiology	4
GEOG 530	Structural Geology	3
GEOG 630	Stratigraphy/Sedimentology	4
GEOG 680	Field Geology	6
Geology electives (two courses at the 600 or 700 level, or one course at the 600 or 700 level and 3 hours of GEOG 599 Senior Thesis)		
MATH 220	Analytic Geometry and Calculus I	4
PHYS 113	General Physics I	4
PHYS 114	General Physics II	4
CHM 210	Chemistry I	4
CHM 230	Chemistry II	4

Geology majors should consult their advisors about elective courses to meet their career and educational needs. Computer literacy is essential for all geologists. Departmental advisors can recommend electives for students desiring concentrations in energy and minerals, engineering geology, environmental geology, hydrogeology, sedimentary geology, and geochemistry. Students intending to earn advanced degrees should visit with the departmental graduate advisor concerning entrance requirements of graduate programs.

### Geophysics option

In addition to the general requirements for the B.A. or B.S. degree, the following must be completed:

GEOG 100	Introductory Geology	3
GEOG 130	Elementary Geology Laboratory	1
GEOG 300	Historical Geology	4
GEOG 502	Mineralogy	3
GEOG 503	Petrology	3
GEOG 520	Geomorphology	2
GEOG 530	Structural Geology	3
GEOG 581	Paleobiology	4
GEOG 605	Exploration Geophysics	3
GEOG 630	Stratigraphy/Sedimentation	4
GEOG 680	Field Geology	6
MATH 220	Analytic Geometry and Calculus I	4
MATH 221	Analytic Geometry and Calculus II	4
MATH 222	Analytic Geometry and Calculus III	4
MATH 240	Elementary Differential Equations	4
MATH 551	Applied Matrix Theory	3
PHYS 213	Engineering Physics I	5
PHYS 214	Engineering Physics II	5
CHM 210	Chemistry I	4
CHM 230	Chemistry II	4
CIS 200	Fundamentals of Computer Programming	2
CIS 206	BASIC Language Laboratory	2
STAT 703	Statistical Methods for Natural Scientists	3

Geophysics students desiring advanced degrees should consider PHYS 522, 523, 532, and 621 in addition to the above courses as preparation for graduate programs.

### Earth science option for high school teachers

In addition to the general requirements for the B.A. or B.S. degree, the teacher certification requirements and the following must be completed:

GEOG 100	Introductory Geology	3
GEOG 130	Elementary Geology Laboratory	1
GEOG 502	Mineralogy	3
GEOG 520	Geomorphology	2

GEOG 220	Environmental Geography I	4
MATH 100	College Algebra	3
MATH 150	Plane Trigonometry	3
PHYS 113	General Physics I	4
PHYS 114	General Physics II	4
PHYS 191	Descriptive Astronomy	3
BIOL 198	Principles of Biology	4
CHM 210	Chemistry I	4
CHM 230	Chemistry II	4

See the College of Education section of this catalog for teacher certification requirements.

### Dual degree in civil engineering and geology

Students interested in a career in foundation engineering and construction must complete the B.S. degree requirements in civil engineering and complete the general requirements for a B.A. or B.S. degree in the College of Arts and Sciences and the following: GEOG 300, 502, 503, 520, 530, 630, and 680 (see lists above).

### Transfer students

In addition to the general instructions to transfer students, students planning to pursue one of the degree options in geology should complete as many of the following courses or their equivalents as possible:

CHM 210	Chemistry I	4
CHM 230	Chemistry II	4
ENGL 100	Expository Writing I	3
ENGL 120	Expository Writing II	3
MATH 100	College Algebra	3
MATH 150	Plane Trigonometry	3
MATH 220	Analytic Geometry and Calculus I	4
MATH 221	Analytic Geometry and Calculus II	4
SPCH 105	Public Speaking IA	2
GEOG 100	Introductory Geology	3
GEOG 130	Elementary Geology Laboratory	1
GEOG 300	Historical Geology	4
PHYS 113	General Physics I	4
PHYS 114	General Physics II	5

### Geology courses

#### Undergraduate credit

**GEOG 100. Introductory Geology.** (3) I, II, S. The earth's physical, structural, and dynamic features; the most common minerals and rocks; processes affecting the earth. Three hours rec. a week.

**GEOG 101. Geology Colloquium.** (1-3) I, II. Topics in earth science chosen to illustrate current research of scientists and methods chosen to study the physical universe. At each offering of this course a syllabus will be available giving the topics to be studied and the details of administration of the course. May be repeated once. Not open to geology majors.

**GEOG 105. Oceanography.** (3) I, II. The oceans: their boundaries, contents, and processes. Three hours rec. a week.

**GEOG 110. Introductory Geology, Honors.** (3) I. Survey of earth materials, features, and processes. Higher level of sophistication and challenge than GEOG 100. Three hours rec. a week.

**GEOG 125. Natural Disasters.** (3) I, II, S. Discussion of geological phenomena such as earthquakes, volcanic eruptions, landslides, and floods, with particular emphasis on their causes, effects, and significance as hazards. Three hours rec. a week.

**GEOG 130. Elementary Geology Laboratory.** (1) I, II, S. Field and laboratory investigation of minerals, rocks; use of maps; environmental studies; erosion, transportation, sedimentation. Two hours lab a week. Pr.: GEOG 100, 105, or 125 or conc. enrollment.

**GEOL 300. Historical Geology.** (4) I, II. Physical and biological events that have occurred on planet earth throughout geologic time. Three hours rec. and three hours lab a week. Pr.: GEOL 100 or 105.

**GEOL 305. Earth Resources.** (3) I, II. Origin and geologic settings of energy, water, and mineral resources. Additional emphasis will be placed upon exploration and development. Pr.: GEOL 100 or GEOG 221.

**GEOL 310. Topics in Geology.** (1-3) I, II. Seminar discussion of subjects of current interest in geology. Pr.: A course in natural science at the 100 level or higher.

**GEOL 399. Honors Seminar in Geology.** (1-3) I, II. Selected topics. Open to nonmajors in the honors program.

**GEOL 499. Senior Honors Thesis.** (2) I, II, S. Open only to seniors in the arts and sciences honors program.

## Undergraduate and graduate credit in minor field

**GEOL 501. Independent Study in Geology.** (1-3) I, II, S. Independent reading; field or laboratory investigations, or both, of geologic problems. Pr.: GEOL 300 and junior standing.

**GEOL 502. Mineralogy.** (3) I. Crystallography; physical and chemical properties of minerals; descriptive mineralogy. Two hours lec. and three hours lab a week. Pr.: GEOL 100 or 105, 130, and CHM 230.

**GEOL 503. Petrology.** (3) II. Petrology of igneous, metamorphic, and sedimentary rocks. Two hours lec. and three hours lab a week. Pr.: GEOL 502.

**GEOL 506. Environmental Studies.** (2) I, II, S. Physical and chemical qualities of natural environments and health from a geologic perspective—detection and prediction of environmental changes, identification of sources of pollutants and their movements in soils, rocks, and waters. Pr.: GEOL 100.

**GEOL 510. Geology of Planets.** (3) I. Origin, evolution, and surficial geology of the extraterrestrial planets and satellites. Three hours rec. a week. Pr.: GEOL 100.

**GEOL 512. Earth Science.** (3) I, II. A critical study of the atmosphere, weather, climate, composition, and processes of the earth; also, the interaction of these in producing the pattern of landforms and human activity. Three hours rec. a week. Pr.: GEOL 100 or GEOG 220 or junior standing.

**GEOL 515. Geology of the National Parks.** (3) On sufficient demand. Stratigraphy, structure, and geological history that produced the scenery of the national parks. Selected national monuments also will be studied. Pr.: GEOL 100 or 105.

**GEOL 520. Geomorphology.** (2) I, II. Laboratory exercises in reading and interpreting topographic maps and aerial photographs; field studies of landforms and surficial deposits, with an emphasis on earth-surface processes. One hour rec. and three hours lab a week. Pr.: GEOL 100.

**GEOL 530. Structural Geology.** (3) II. Mechanics of the earth's crust; origin and interrelation of structures of the earth. Two hours rec. and three hours lab a week. Pr.: GEOL 503.

**GEOL 540. Recent Earth History.** (3) I. Studies of the recent geologic past, especially of the last major ice age to the present. Causes of glaciation and climatic change, ways of reconstructing past geologic environmental and geologic environmental changes during the time when human civilization developed, including recent historic time. Three hours rec. a week. Pr.: GEOL 100 or GEOG 221.

**GEOL 581. Paleobiology.** (4) I. Biological principles applied to fossils; introduction to contributions of pro- and eukaryotic organisms, especially algae and marine

invertebrates to earth history. Two hours rec. and six hours lab a week. Pr.: GEOL 300 and 503; MATH 220; PHYS 114.

**GEOL 599. Senior Thesis.** (1-3) I, II. Directed research and preparation of a senior thesis. May be repeated once to a maximum of 3 hours credit. Open only to seniors in geology or geophysics.

## Undergraduate and graduate credit

**GEOL 601. Geologic Presentation.** (1) I, II. Application of oral communication techniques to the effective presentation of geologic concepts. One hour rec. a week. Pr.: GEOL 530 and SPCH 105.

**GEOL 602. Mineral Exploration.** (3) I, II. Geological, geochemical, and geophysical prospecting techniques and their application in the exploration for metallic mineral deposits. Three hours rec. a week. Pr.: GEOL 503.

**GEOL 605. Exploration Geophysics.** (3) I. Seismic, gravity, magnetic, and electrical methods used in geophysical exploration for petroleum accumulations and for mineral deposits. Three hours rec. a week. Pr.: PHYS 214; GEOL 530.

**GEOL 608. Optical Mineralogy-Petrography.** (3) I. Identification of minerals and rocks as crushed fragments and in thin section. Two hours lec. and one four-hour lab a week. Pr.: GEOL 503 and PHYS 214 or 114.

**GEOL 610. Sedimentary Geochemistry.** (3) I, II. Geochemical principles and processes in deposition and diagenesis of sediments; different chemical pathways in the exogenic cycle. Two hours rec. and three hours lab a week. Pr.: GEOL 503 and MATH 220.

**GEOL 630. Stratigraphy-Sedimentation.** (4) II. Description, classification, correlation, chronology, and paleogeography of sedimentary rock systems and the depositional environments in which they formed. Three hours rec. and three hours lab a week. Pr.: GEOL 581.

**GEOL 680. Field Geology.** (6) S. Geologic mapping projects along the Colorado Front Range using Brunton compass, aerial photographs, topographic maps, and plane table; special problems in stratigraphy, structure, and petrology. Five six-day weeks in the field. Pr.: GEOL 503, 520, and 530.

**GEOL 702. Economic Geology.** (3) I. Geology and origin of metallic mineral deposits and of some nonmetallic deposits. Three hours rec. a week. Pr.: GEOL 503.

**GEOL 703. Economic Geology Laboratory.** (1) I. Laboratory activities related to metallic and nonmetallic mineral deposits, including detailed studies of selected deposits. Pr.: GEOL 702 or conc. enrollment.

**GEOL 704. Paleocology.** (3) I. Application of biological, physical, and chemical factors in modern marine environments to the quantitative study of the structure and dynamics of fossil populations and communities. Two hours rec. and three hours lab a week. Pr.: GEOL 581.

**GEOL 705. Geobiology.** (3) II. Discussion and critique of current and classic research in geobiology. Three hours rec. a week. Pr.: GEOL 581.

**GEOL 711. Water Resources Geochemistry.** (2) II. Geochemistry of ground and surface waters; emphasis on mineralogic and hydrologic controls on inorganic constituents and properties. Two hours rec. a week. Pr.: GEOL 503 or AGRON 705 or 755.

**GEOL 712. Advanced Geochemistry.** (3) II. Application of chemical principles to igneous, metamorphic systems; emphasis on equilibria, oxidation-reduction, crystal chemistry, and thermodynamics. Three hours lec. a week. Pr.: GEOL 503 and CHM 500 or 585.

**GEOL 716. Hydrogeology.** (3) I, II. Origin, geologic occurrence, and migration of subsurface water; laws governing ground water flow and yield of aquifers.

Three hours rec. a week. Pr.: GEOL 520, 530, or 630, or consent of instructor.

**GEOL 720. Quaternary Geology.** (3) II. Quaternary stratigraphy as the framework for studying the geomorphic, climatic, archaeological, and biological changes of the last two million years, with emphasis on the North American record. Three hours rec. a week and one field trip a semester. Pr.: GEOL 630.

**GEOL 730. Petroleum Geology.** (3) I, II. Origin, migration, and accumulation of petroleum; stratigraphy and structure of important fields. Three hours rec. a week. Pr.: GEOL 530 and 630.

**GEOL 740. Regional Geology.** (3) I. Structure and stratigraphy of the major tectonic units of North America. Pr.: GEOL 530, 630.

**GEOL 770. Subsurface Methods.** (3) II. Principles and applications of subsurface geology. Two hours rec. and three hours lab a week. Pr.: GEOL 530 or conc. enrollment.

**GEOL 790. Problems in Geology.** (Var.) I, II, S. Work is offered in mineralogy, paleobiology, paleoecology, stratigraphy, structural geology, igneous, metamorphic, and sedimentary petrology, geomorphology, planetary geology, hydrogeology, geochemistry, and isotope geology. Pr.: Background of courses needed for problem undertaken.

## History

Donald J. Mrozek,\* Head

Professors Frey,\* Gray,\* Hamscher,\* Higham,\* Holl,\* Jones,\* Kren,\* Linder,\* and McCulloh;\* Associate Professors Donovan,\* Ferguson,\* Feyerharm, and Page;\* Assistant Professors Daly,\* Knupfer,\* Williams,\* and Zschoche;\* Emeriti: Professors Carey,\* Socolofsky,\* and Wilcoxon;\* Associate Professor Crawford.\*

The history program appeals not only to majors but to all students seeking a rewarding educational experience. The curriculum includes courses in traditional and nontraditional fields of interest taught by a nationally respected faculty willing to try new and innovative teaching techniques. A program of speakers, seminars, colloquia, and films supplements the curriculum to stimulate student interest in the discipline of history and how it is expressed.

Undergraduate advisors in the history department maintain up-to-date information regarding requirements of graduate and professional schools and relevant course offerings in history and other departments.

## Transfer students

Normally the history department will accept transfer credit for history courses taught at accredited institutions of higher education. In the case of students transferring from community colleges, only courses equivalent to those taught at the freshman-sophomore level at K-State (courses numbered HIST 100 through HIST 299) may receive credit for the history major.

**History**

Students may earn a B.A. or a B.S. in history using one of the following three options:

**History major**

Requirements for a history major consist of a minimum of 36 hours in history including HIST 101 The Rise of Europe; HIST 102 The Modern Era; and HIST 586 The Junior Seminar. At least 18 hours of those courses must be numbered 300 or above. The courses must be distributed as follows:

I. The 18 hours of courses numbered 300 or above must include a minimum of 6 hours in each of the following two categories:

A. History of nation-states, diplomacy, politics, or military affairs;

B. Social, economic, cultural or agricultural history; history of science, technology, or religion.

II. Courses taken at any level must also include the following chronological and geographical distribution. (Courses taken to fulfill this requirement may also satisfy the requirements in section I above.)

A. Six hours (in addition to HIST 101) in courses whose primary chronological emphasis is prior to 1800;

B. Six hours in U.S. history;

C. Three hours in Third World history.

**Double majors and teacher certification**

Students earning double majors may satisfy the requirements with 30 hours in history. The remaining 6 hours will be waived by the completion of an additional major. The required courses and the topical, chronological, and geographical distribution apply to the 30 hours of course work in history.

Students majoring in history may also prepare for teacher certification in social studies at the secondary level. They must meet the same requirements as students earning double majors (30 hours in history rather than 36). They should select their courses in consultation with advisors in both the history department and the College of Education to ensure that they meet the requirements of both programs. (See the College of Education section of this catalog for social science certification requirements.) Students seeking certification with a major in history must also include HIST 599 Senior Seminar for Secondary Teachers among their courses.

**Advanced program in history**

Certain highly qualified students may elect to define their own programs for the major in consultation with a committee of three faculty members chosen by the student and approved by the head. This program of study should be broadly conceived, not narrowly circumscribed. This option is available only to students seeking a B.A. degree in history. To enter this program a student must have a grade point average of 3.5 at the end of the freshman year or later, submit two letters of recommendation and a statement of purpose, and receive

approval from the undergraduate studies committee.

A student selecting this option must enroll prior to his or her senior year and meet the following minimum requirements:

Write a senior thesis (6 hours credit over one or two semesters);

Pass an oral examination over a specific body of historical knowledge, the scope of which will be defined by the student in consultation with the faculty committee;

Enroll in 30 hours of history courses (24 hours for double majors and teacher education students) including the Junior Seminar to be selected by the student in consultation with the faculty committee. Students are encouraged to supplement regular course offerings with tutorial instruction.

**History courses****Undergraduate credit**

**HIST 100. Introduction to History.** (3) I, II. What history is, how it is produced, and what its functions are. Designed for freshmen who want an introductory course which explains the methodology, purposes, and career options of the discipline.

**HIST 101. Western Civilization: The Rise of Europe.** (3) I, II, S. Major trends in Western history from the beginnings of European civilization to the end of the seventeenth century. The scope of this course includes classical antiquity, the Middle Ages, the Renaissance, the Reformation, and early modern Europe, but chronological and topical emphases vary with individual sections. Required of all majors in history. Pr.: Not open to juniors and seniors except with consent of instructor.

**HIST 102. Western Civilization: The Modern Era.** (3) I, II, S. Principal developments in Western civilization from the beginning of the eighteenth century to the present. The scope of the course includes the Enlightenment, the French Revolution, the Industrial Revolution, nationalism, imperialism, communism, fascism, and the two world wars, but chronological and topical emphases vary with individual sections. Required of all history majors. Pr.: Not open to juniors and seniors except with consent of instructor.

**HIST 103. Overseas European Studies.** (2-3) Intersession only, in alternate years. Selected aspects of European history and culture with readings, lectures, and discussions which will relate historical events to places visited.

**HIST 105. Western Civilization: The Rise of Europe (Honors).** (3) I, in alternate years. Course description same as HIST 101.

**HIST 106. Western Civilization: The Modern Era (Honors).** (3) II, in alternate years. Course description same as HIST 102.

**HIST 200. Topics in History for Freshmen and Sophomores.** (1-3) In alternate years. Exploration of the historical dimensions of a particular topic or theme. Topics vary. May be repeated once.

**HIST 250. Russian Culture and Civilization.** (3) I, in alternate years. Russia's past and present in the light of principle ideologies with emphasis upon fine arts, literature, music, religion, politics, and education. Equal time will be given to the Tsarist and the Soviet periods. Knowledge of Russian language is not required. Same as MLANG 250.

**HIST 251. History of the United States to 1877.** (3) Includes ethnic, social, military, political, economic, diplomatic, and ideological themes. The chronological emphasis varies with instructor. The aim of the course is to achieve a broad understanding of American civilization to 1877.

**HIST 252. History of the United States Since 1877.** (3) Ethnic, social, political, economic, and diplomatic history. The goal of the course is to achieve a broad understanding of American civilization since 1877.

**HIST 297. Honors Introduction to the Humanities I.** (3) I. Study of selected major works of history, literature, and philosophy which have been of central importance in the Western cultural tradition. Considerable emphasis is placed on classroom discussion and writing interpretive essays. Limited to entering freshmen students. Pr.: Consent of instructor. Same as ENGL 297, MLANG 297, PHILC 297.

**HIST 298. Honors Introduction to the Humanities II.** (3) II. Continuation of HIST 297. Pr.: HIST 297 or consent of instructor. Same as ENGL 298, MLANG 298, PHILO 298.

**HIST 350. Gandhi and the Indian Revolution.** (3) II, in alternate years. An introduction to Mahatma Gandhi, his life and career in India, England, and South Africa, his techniques of nonviolent struggle, and the revolution which destroyed the British Empire and created the new countries of India and Pakistan.

**HIST 398. Sophomore Honors Seminar in History.** (3) In alternate years. Selected topics in history. May be repeated once for credit. Pr.: Membership in honors program or consent of instructor.

**HIST 401. Technology, Science, and History.** (3) II, in alternate years. A nontechnical historical survey of the more significant interactions of technology and science with life and thought in the Western world.

**HIST 459. History of Dance in Its Cultural Setting.** (3) II, in alternate years. The study of developments and changes in the style, technique, and purpose of ceremonial and theatrical dancing from the Greeks to the present. Emphasis on the interaction between this art and the total culture—social, religious, artistic, and political—in which it is performed. Pr.: Sophomore standing. Same as DANCE 459.

**HIST 498. Senior Thesis.** (3-6) I, II, S. May be repeated once to a maximum of 6 hours credit. Pr.: Senior standing.

**HIST 499. Senior Honors Thesis in History.** (2) I, II, S. Open only to seniors in the arts and sciences honors program.

**Undergraduate and graduate credit in minor field**

**HIST 503. Overseas European Studies.** (2-3) Intersession only, in alternate years. Selected aspects of European history and culture with reading, lectures, and discussions which will relate historical events to the places visited. Pr.: Sophomore standing.

**HIST 504. History of Hinduism.** (3) I, in alternate years. Examines one of the world's oldest religions from its origins to the present. Covers the fundamental ideas and practices of Hinduism and the development of related religions such as Buddhism, Jainism, and Sikhism. Pr.: Sophomore standing.

**HIST 505. Introduction to the Civilization of South Asia I.** (3) In alternate years. Interdisciplinary survey of the development of civilization in India, Pakistan, Sri Lanka, Bangladesh, and Afghanistan, including consideration of the geographical and demographic context, philosophical and social concepts, social and political institutions, literature and historical movements. Same as ECON 505, POLSC 505, SOCIO 505, ANTH 505.

**HIST 506. Introduction to the Civilization of South Asia II.** (3) In alternate years. Interdisciplinary survey of recent and contemporary civilization in India, Pakistan, Sri Lanka, Bangladesh, and Afghanistan, including recent history, current economy, religion, culture, language and literature, geography, social and political structure and ideas. Same as ECON 506, POLSC 506, SOCIO 506, ANTH 506.

**HIST 508. Introduction to Modern East Asia.** (3) In alternate years. The history of China, Japan, and surrounding countries including the arrival of Europeans in the sixteenth century, reactions to Western imperialism, the rise of nationalism, and revolution. The impact of the two world wars, the era of post war developments, communism in China, democracy in Japan, and the end of Western colonialism are also examined. Pr.: Sophomore standing.

**HIST 512. Women in European History.** (3) I, in alternate years. A study of women in primitive European societies, in preindustrial times, and in the industrial era. Emphasis will be upon the position and role of women within the society. Pr.: Sophomore standing.

**HIST 513. Battles and Leaders.** (3) I, in alternate years. The course will emphasize military organization, tactics and strategy, generalship and grand strategy, manpower and logistics, and the wartime ramifications of war on land, at sea, and in the air. Pr.: Sophomore standing.

**HIST 514. World War II.** (3) I, in alternate years. Origins, conduct, and consequence of World War II. Films from the TV series "The World at War" form an integral part of the course. Pr.: Sophomore standing.

**HIST 515. History of Sport.** (3) In alternate years. The historical development of sport (especially in Europe and North America) including the growth of competition, the rise of mass spectator sports, elitism, and the changing function of sport. History of sport as business and history of the relationship between sport and other institutions. Same as KIN 515. Pr.: Sophomore standing.

**HIST 516. History of Science I.** (3) I, in alternate years. Scientific activity and thought from antiquity to the end of the sixteenth century, with emphasis on Greek, late medieval, and Renaissance science. No background in science required. Pr.: Sophomore standing.

**HIST 517. History of Science II.** (3) II, in alternate years. Science in the seventeenth and eighteenth centuries, with emphasis on Galileo, Newton, philosophies of science, scientific societies, and developments in the physical, biological, and earth sciences, including the relations of science with technology, medicine, religion, exploration, and the enlightenment. No background in science required. Pr.: Sophomore standing.

**HIST 518. Science in the Modern Age.** (3) I, in alternate years. Science since the eighteenth century, including major developments in the physical, biological, and earth sciences, and the relations of science to scientific societies, technology, medicine, exploration, religion, and archaeology. No background in science required. Pr.: Sophomore standing.

**HIST 519. Science in America.** (3) I, in alternate years. A survey of American science from the colonial era to the present, with special attention to the historical context and the role of institutions and government. Some attention to the social problems faced by scientists and their responses to them. Pr.: Sophomore standing.

**HIST 520. Death and Dying in History.** (3) I, II, in alternate years. Examines European and American attitudes toward death and dying in various historical periods. Topics include: death and dying in the European Middle Ages and in nineteenth and twentieth century America, the impact of the Nazi Holocaust on modern opinions about death, suicide as a historical problem, the fear of cancer in modern times, and others. Pr.: Sophomore standing.

**HIST 521. History of Christianity.** (3) I, in alternate years. A history of the Christian religion from the era of Jesus Christ to the present with special emphasis on people and ideas. Pr.: Sophomore standing.

**HIST 522. Religion in American History.** (3) II, in alternate years. A study of the impact of religion on American culture and of American culture on religion, the Social Gospel and related issues, and the

interrelationship of Christianity and politics. Pr.: Sophomore standing.

**HIST 523. A History of the Occult and Witchcraft.** (3) In alternate years. A study of the history of the occult and witchcraft in Western civilization with special attention to religious, intellectual, and social issues and influences. Pr.: Sophomore standing.

**HIST 525. Colonial America.** (3) In alternate years. About 1450 to 1763. Includes the European background of North American colonization, the rivalry for new world empire, seventeenth century English colonial foundations, and development of the various colonial societies. Pr.: Sophomore standing.

**HIST 526. The American Revolution.** (3) In alternate years. Eighteenth century colonial background of the Revolution and the revolutionary era itself, 1763-1789. Stresses ideological and other causes of the Revolution, the course of the war, its social results, the Confederation and its demise. Pr.: Sophomore standing.

**HIST 527. The Early National Period.** (3) In alternate years. Foundations of the new nation from the adoption of the Constitution to the conclusion of the War of 1812, approximately 1789-1815. Stresses the contest between Hamiltonians and Jeffersonians for philosophical dominance of institutions; other topics include diplomacy, westward expansion, military developments, the social and intellectual life of the era. Pr.: Sophomore standing.

**HIST 529. Civil War and Reconstruction.** (3) I, in alternate years. 1848-1877. Examination of the sectional controversy, the failure of the political system to resolve peacefully the conflict between North and South, the resort to arms, the nature of the post-war settlement. Emphasis is on the attempt of mid-nineteenth-century American leaders to deal with the complex problems of slavery and race. Pr.: Sophomore standing.

**HIST 531. The United States in the Twentieth Century.** (3) In alternate years. Examines the creation of modern America, 1890 to the present. Emphasis on the social and cultural roots, and political consequences, of Progressivism, World War I, the Great Depression, World War II, the Sixties, and Post-Vietnam America. Pr.: Sophomore standing.

**HIST 533. Topics in the History of the Americas.** (1-3) In alternate years. Provides instructor and students the opportunity to investigate in detail a particular theme, event, or problem in the history of North, Central, or South America. Topics vary. May be repeated for credit. Pr.: Sophomore standing.

**HIST 536. The American West.** (3) I, in alternate years. Primary emphasis on the nineteenth century when Americans were rapidly spreading across the continent. Also examines the earlier developments of the frontier and considers the twentieth century role of the trans-Mississippi region. Pr.: Sophomore standing.

**HIST 537. History of the Indians of North America.** (3) In alternate years. A discussion of Indian-white relations from 1492 to the present. Special emphasis given to federal government policy and the cultural decline of the native people of North America. Also includes an examination of Indian reservations and urban Indians.

**HIST 538. The Great Plains.** (3) II, in alternate years. Concentration on the one-fifth of North America identified as the Great Plains; the development of that region in historic times. Pr.: Sophomore standing.

**HIST 539. Black American History.** (3) In alternate years. Blacks in America from the seventeenth century to the present, with special emphasis on political, social, economic, and intellectual developments in the role of the black American and his contributions to American life and culture. Pr.: Sophomore standing.

**HIST 541. Women in American History.** (3) II, in alternate years. An overview of women in the history of the United States, emphasizing both important

individual women and the changing position of women in American society. Pr.: Sophomore standing.

**HIST 543. The United States and World Affairs, 1776-Present.** (3) I, in alternate years. History of U.S. foreign policy since 1776. Stresses the continuity and intellectual foundations of foreign policy. Emphasizes territorial and foreign commercial expansion and America's response to war and revolution in the twentieth century. Pr.: Sophomore standing.

**HIST 544. History of U.S.-Soviet Relations Since 1917.** (3) II, in alternate years. History of U.S.-Soviet relations since 1917 with emphasis on WWI and the New Diplomacy; from nonrecognition to recognition, 1921-1933; the Grand Alliance and WWII; origins of the cold war; economic and atomic diplomacy; the Cuban missile crisis; and prospects for detente. Pr.: Sophomore standing.

**HIST 545. War in the Twentieth Century.** (3) In alternate years. Considers the military theory and practice, the technology, and the political and ideological constraints of World Wars I and II, the Spanish Civil War, the Korean War, and the Indo-chinese wars. Students are to gain an understanding of the varieties of military experience in the twentieth century, including civil wars, "total war," and guerrilla warfare. Pr.: Sophomore standing.

**HIST 546. History of American Military Affairs.** (3) In alternate years. Deals with the development of military institutions in colonial America and the United States, civil-military relations and conflicts between political constraints and strategic demands, popular attitudes toward the military, and the rise of the military-industrial complex. Pr.: Sophomore standing.

**HIST 548. American Business History.** (3) In alternate years. The rise and development of the major commercial, financial, industrial, and transportation enterprises in the United States from the colonial period to the present. Emphasizes the gradual specialization of business through the Civil War, the movement from specialization to combination and integration along vertical-horizontal lines, the conglomerate movement, and the development of multinational enterprises after World War II. Pr.: Sophomore standing.

**HIST 552. Studies in American Social History.** (3) In alternate years. Exploration in depth of one specific topic in American social history, such as the impact of immigration, the development of cities, the history of labor and the rise of unions, development of the family, of education, or of medicine. Topics vary. May be repeated for credit. Pr.: Sophomore standing.

**HIST 553. History of American Culture.** (3) II, in alternate years. Main emphasis is on political, religious, and social thought and ideology, 1620 to present. Pr.: Sophomore standing.

**HIST 555. American Constitutional History.** (3) II, in alternate years. Survey of constitutional and legal development from colonial times to the present. English constitutional ideas and the common law in the American colonies, formation of the Constitution, the role of the Supreme Court, development of the modern American legal system, growth of the legal profession, the problem of civil liberties. The course offers insight into the relationship of constitutional-legal institutions to American society. Pr.: Sophomore standing.

**HIST 557. History of American Agriculture.** (3) In alternate years. Concentrates on the period since 1850 in an attempt to acquaint the student with the political and economic history of American agriculture. No attempt will be made to present the scientific or technological side of agriculture in detail, but agriculture will be shown in relation to the life of the entire United States. The life of the farmer and his family, the relationship between agricultural changes and other parts of the economy will be part of this course. Special attention will be paid to agriculture in Kansas and the Great Plains. Pr.: Sophomore standing.

**HIST 558. History of Kansas.** (3) I, II. Land, people, and cultural developments in Kansas, from the earliest

written records to the present. Provides the student with an intimate understanding of the state of Kansas. Pr.: Sophomore standing.

**HIST 560. Latin American Nations.** (3) In alternate years. Survey of economic, social, and political developments of the Latin American nations from independence to the present decade with emphasis on Argentina, Brazil, Peru, Chile, and Mexico. Stresses reform and revolution of the last 50 years. Pr.: Sophomore standing.

**HIST 561. Colonial Hispanic America.** (3) In alternate years. Iberian and indigenous American background, exploration, conquest, settlement, and development of Latin America. Stresses growth of mestizo culture, colonial styles of living, and wars of independence. Pr.: Sophomore standing.

**HIST 562. Modern Mexico.** (3) In alternate years. Brief survey of lines of national development, 1821–1910, and major emphasis on the twentieth-century revolution and its reforms (1910–1940) as well as its subsequent implications. Pr.: Sophomore standing.

**HIST 563. Topics in Comparative History.** (1–3) In alternate years. Investigation in detail of a particular theme, event, or problem in comparative history. Topics vary. May be repeated once for credit. Pr.: Sophomore standing.

**HIST 564. The Russian Revolutions and the Soviet System** (3) In alternate years. Russia's industrial revolution and its deepening crisis to the present. Emphasis on prospects for constitutional monarchy and a liberal parliamentary order from the revolution of 1905 to 1914, World War I and the February Revolution, social democracy and the roots of Leninism, Bolshevizing Soviet society under war, Communism and the NEP, Stalinism: fulfillment or betrayal of Leninism, the Great Patriotic War and the emergence of the Soviet empire, and de-Stalinization; prospects for the Soviet system. Pr.: Junior standing.

**HIST 565. History and Culture of Greece.** (3) In alternate years. The rise of civilization in the ancient Near East, the migrations of the Greeks and the Heroic Age, the Greek city-states, commerce and colonization, the Persian invasion, Athens' leadership of Greece, the war between Athens and Sparta, Alexander the Great, and the total Hellenic achievement. Pr.: Sophomore standing.

**HIST 566. History and Culture of Rome.** (3) In alternate years. Examines the various theories of Rome's origin, the causes, problems, and influences upon the republican government, political and economic problems of Roman expansion, and the Roman world. Various reforms including those of the Gracchi, Caesar, and Augustus. Contact with Greece and the older areas of civilization. The Roman imperial system, the many causes of Rome's fall, and Rome's role as a synthesizer of the ancient classical culture. Pr.: Sophomore standing.

**HIST 567. Europe in the Middle Ages.** (3) In alternate years. Europe from the fall of the Roman Empire to the thirteenth century. Investigates the conflict and interaction of Roman, Christian, and Germanic ideals and attitudes in the early Middle Ages, and the increasing complexity and sophistication of society, culture, religion, and government of the high Middle Ages. Pr.: Sophomore standing.

**HIST 568. The Renaissance.** (3) In alternate years. The Italian Renaissance as a major phase in the history of Western civilization and its spread to northern Europe. Pr.: Sophomore standing.

**HIST 569. The Reformation.** (3) In alternate years. A study of the Protestant, Catholic, and Radical Reformations with special attention to Luther, Calvin, the origins of the Church of England and the Presbyterian Church, the Anabaptists, the Puritans, and Roman Catholic Reform, and the impact of religious developments on the political, economic, social, and intellectual history of the Western world.

Covers the period from approximately 1500 to 1660. Pr.: Sophomore standing.

**HIST 570. Europe in the Seventeenth Century.** (3) I. In alternate years. Surveys the economic, social, political and intellectual history of western Europe in the seventeenth century, a period marked by economic depression, international conflict, and domestic revolutions as well as by cultural achievement. Emphasizes the complex interaction among social groups; the rise of a European state system; the development of constitutional monarchy in England and absolute monarchy in France; and the change in values generated by the scientific revolution. Pr.: Sophomore standing.

**HIST 571. Revolutionary Europe.** (3) In alternate years. Europe from the death of Louis XIV in 1715 to the fall of Napoleon in 1815. The origins and development of the French Revolution and the Napoleonic legacy, also examines reform and counter-revolutionary movements in England, Italy, Russia, Poland, and the Germanies. Pr.: Sophomore standing.

**HIST 572. Nineteenth Century Europe.** (3) In alternate years. The history of Europe from the French Revolution to the end of the first World War. Major topics covered will include the rise of conservatism as an ideology and its application in practice, the nature of liberalism and socialism, the impact of science and technology, the origins and course of World War I. Pr.: Sophomore standing.

**HIST 573. Twentieth Century Europe.** (3) In alternate years. Examines the political, social, and intellectual developments of Europe in the period of the two world wars. Emphasis on the failure of democracy and the rise of competing antidemocratic and nondemocratic mass movements and ideologies. The course will also deal with the attempted system of collective security, its failure, and the origins and course of World War II. Pr.: Sophomore standing.

**HIST 574. Europe since World War II.** (3) In alternate years. Postwar European society, politics, economy, and culture. The effects of total war on the population; restoration and reconstruction. The influence of the U.S. and U.S.S.R. on Europe. Capitalism, socialism, and communism in technological society. European unity movements and their conflicts with traditional values.

**HIST 576. European International Relations to 1815.** (3) In alternate years. The nature, evolution, and function of the diplomatic system for the Ancient World to 1815. Analyzes the Greek and Roman diplomatic tradition, international relations during the Medieval, Renaissance, and Early Modern periods, and the works of various theorists. Sophomore standing.

**HIST 577. European International Relations Since 1815.** (3) II, in alternate years. The nature, evolution, and functions of the European diplomatic system from 1815 to the present. Focuses on the Vienna settlement, the Eastern Question, the Crimean War, Italian and German unification, origins of World War I, international developments between the two world wars, the cold war, and the post-cold war era. Includes analysis of major theorists. Sophomore standing.

**HIST 578. Central Europe, 1500–1914.** (3) In alternate years. The diplomatic, military, political, cultural, and social aspects of the Hapsburg empire in Central Europe from its foundation to its dissolution in the twentieth century. Pr.: Sophomore standing.

**HIST 579. The British Isles to 1603.** (3) In alternate years. English, Scottish, and Irish culture in the medieval and pre-modern periods. Early folk societies, feudalism, the church in society and politics, the origins of representative institutions and the religious reformations are studied topically. Pr.: Sophomore standing.

**HIST 580. The British Isles Since 1603.** (3) In alternate years. English society and politics in modern times with reference also to Scotland and Ireland. Emphasis on topics such as the three orders of society (king, lords, and commons), the churches and religion, the ap-

pearance of parliamentary sovereignty, the industrial revolution, and the extension of democratic institutions. Pr.: Sophomore standing.

**HIST 582. Modern Eastern Europe.** (3) In alternate years. Eastern Europe as an ethnically diverse region between the Germanic lands and Russia, emphasizing the impact of both external and internal forces upon the political, socioeconomic, and intellectual development of the various nations. Covers the period from the triumph of the three eastern monarchies over Poland to the Brezhnev Doctrine and Ostpolitik, including the growth of national consciousness and the continuing struggle for political independence. Pr.: Junior standing.

**HIST 583. History of France, 1400–1715.** (3) In alternate years. France from the conclusion of the Hundred Years War to the death of Louis XIV. French economy, society, and royal administration, and the changes generated in these areas by significant events: the Reformation and the Wars of Religion; the rise of France to world power; peasant uprisings and constitutional crisis; and the reforms of Richelieu, Colbert, and Louis XIV. Trends in art, architecture, and philosophy. Pr.: Sophomore standing.

**HIST 584. History of France since 1715.** (3) In alternate years. France from the death of Louis XIV to the present. The impact of the French Revolution and the Napoleonic system on the agrarian economy and aristocratic society of the eighteenth century; the evolution of liberalism, socialism, and colonialism; the development of parliamentary democracy and the impact of the Industrial Revolution; the French response to the devastation of World War I, the humiliation of World War II, and the colonial wars of the De Gaulle era. Pr.: Sophomore standing.

**HIST 585. Medieval Religion and Politics.** (3) In alternate years. The interrelationship of religion and politics from the late Roman Empire to the Conciliar Epoch. Christianity in the Roman Empire and the barbarian kingdoms, the development of royal theocracy, the rise of the papacy, the conflict of church and state, the secularization of government, the Avignon papacy, the Great Schism, and conciliarism. Pr.: Sophomore standing.

**HIST 586. Junior Seminar.** (3) I, II. An undergraduate seminar that focuses on the intellectual principles of the historical discipline as well as the fundamental research techniques and writing skills used by historians. Each section of the Junior Seminar will center on a particular topic or historical problem. The students will prepare a research paper on a relevant subject of their choice. All history majors must take this seminar to complete the requirements for their degree.

**HIST 587. Nineteenth-Century Imperial Germany.** (3) In alternate years. Central Europe in the French Revolutionary era, the revolutions of 1848, German unification, imperial Germany, emphasizing social changes, especially the transition from agrarian to industrial society. Pr.: Sophomore standing.

**HIST 588. Rise and Fall of Nazi Germany.** (3) In alternate years. Examines the political, social, economic, and intellectual developments in Germany from World War I to the end of World War II. The establishment of the Weimar republic, the nature of its democratic system, the flourishing of cultural activities and the attack on democratic theory and practice leading to the establishment of a totalitarian dictatorship. National Socialism and its leader and alternative interpretations of National Socialism. Pr.: Sophomore standing.

**HIST 590. History through Film.** (3) I, in alternate years. A study of full-length, major production films to show how films can enhance, distort, or obscure our understanding of the past. Emphasizes historical development, using motion pictures as social documents.

**HIST 591. History of Russia to 1801.** (3) In alternate years. Medieval and early modern Russia with emphasis on the culture of Kievan Rus', the Mongol Yoke, the

rise of Moscow, and the emergence of imperial Russia. Emphasizes those trends that contributed to the character of modern Russian society including Orthodoxy, autocracy, serfdom, and westernization. Pr.: Junior standing or consent of instructor.

**HIST 592. Grandeur and Decline of Imperial Russia.** (3) In alternate years. Russia in the nineteenth century with emphasis on the political, economic, social, and intellectual development of tsarist society. Topics of special concern: origins of the intelligentsia, plans for political reform under absolutism, serfdom and economic development, the legacy of the Great Reforms and counter reforms, origins and evolution of revolutionary populism. Pr.: Junior standing or consent of instructor.

**HIST 596. Holocaust: The Destruction of the European Jews.** (3) I, in alternate years. Analysis of the attempts by the National Socialist government of Germany to exterminate the Jewish population of Europe. Major issues discussed will include: nineteenth-century antidemocratic and antisemitic movements; Hitler's concept of antisemitism and personal sources of Hitler's genocidal policy; evolution of the genocidal policy and its implementation; Jewish resistance and collaboration; long-range consequences of the Holocaust. Pr.: Sophomore standing.

**HIST 597. Topics in European History.** (1-3) In alternate years. Provides instructor and students the opportunity to investigate in detail a particular theme, event, or problem in European history. Topics vary. May be repeated for credit. Pr.: Sophomore standing.

**HIST 598. Topics in Non-Western History.** (1-3) On sufficient demand. Provides instructor and students the opportunity to investigate in detail a particular theme, event, or problem in non-Western history. Topics vary. May be repeated for credit. Pr.: Sophomore standing.

**HIST 599. Senior Seminar for Secondary Teachers.** (3) II. Analysis of the historical content of teaching materials currently in use at the secondary level in public schools to determine the historical validity of the materials. Pr.: Sophomore standing.

## Undergraduate and graduate credit

**HIST 648. Naval History.** (3) I or II, in alternate years. Ships, technological developments, navies, tactics, warfare, strategy, and the interrelationship between naval thinking and national and international politics. Pr.: Junior standing or consent of instructor.

**HIST 649. Introduction to the History of Aviation.** (3) In alternate years. The development of aviation since the Wrights, providing a world view of man's conquest of the air in both human and technological terms including the development of military, commercial, and general aviation. Pr.: Junior standing or consent of instructor.

**HIST 650. Internship in History.** (3) I, II, S. Practical professional experience involving at least three weeks in an archive, museum, historical library, or business. Student projects must be approved in advance and a report submitted at the end of the work period. May be repeated once for credit. Pr.: Junior standing.

**HIST 703. Overseas European Studies.** (2-3) Intersession only, in alternate years. Short-term, intensive, and in-depth study of various aspects of European history and culture with readings, lectures, discussions, and on-the-spot experiences which will relate historical events to the places visited. Pr.: Senior or graduate standing.

**HIST 798. Readings in History.** (1-3) Students will read on a central theme, attend weekly discussions, and write a final report.

**HIST 799. Problems in History.** (Var.) Intensive study of a particular phase of history. Students will attend weekly discussions and write a major research paper on their findings.

# Journalism and Mass Communications

Carol Oukrop, Director  
Paul Parsons, Associate Director

Professors Marsh,\* Nelson,\* Oukrop,\* and Parsons;\* Associate Professors Chastain, Daly, MacFarland,\* Pearce,\* and Princee;\* Assistant Professors Adams,\* El-Ghori,\* Freeland, Grimes,\* Hause, Johnson, Lubbers, Neal-Lunsford, Neibergall, and Puntney.

Journalism and mass communications encompasses the broad field of journalism, advertising, public relations, and radio-television. Students follow a general course of study in the College of Arts and Sciences and a specialized professional curriculum in the A.Q. Miller School of Journalism and Mass Communications. The general college curriculum prepares students to be knowledgeable persons in a complicated world. The professional curriculum educates students in skills, theory, ethics, and other essentials for a mass communications career.

The program offers a hands-on education that provides students with practical experience. Majors have access to the *Kansas State Collegian*, the student newspaper published five days a week, and to the *Royal Purple* yearbook. In 1989, the Columbia Scholastic Press Association awarded the *Collegian* the Gold Crown Award, recognizing it as one of the two best four-year collegiate dailies in the nation. Twice since 1984, the *Collegian* and the *Royal Purple* have won the prestigious national Pacemaker Awards, making K-State the first school in the nation ever to have its newspaper and yearbook win the awards the same year. Majors also have access to campus radio station KSDB-FM, which covers a four-county area, and to television studio and field equipment for producing programming for cable television, for the university's new low-power TV station, and for the Kansas Regents Educational Communications Center. This programming is distributed nationally via the ECC satellite uplink. The school also has a photo lab and two writing, editing, and computer graphics labs.

The school is national headquarters of the Journalism Education Association and the new Huck Boyd National Center for Community Media. The school offers more than \$30,000 in scholarships each year to its outstanding majors, and students participate in the Society of Collegiate Journalists, the Advertising Club, the Public Relations Student Society of America, the Society of Professional

Journalists, and Women in Communications Inc.

The JMC program is housed in Kedzie Hall, with radio-television studios and offices in McCain Auditorium and the Educational Communications Center.

A student may apply to become a major upon completion of 30 hours at the 100-level and above. To be admitted as a major, a student must have at least a 2.5 GPA overall, including completion of at least one semester at K-State. Until then, a student will be designated "Pre-JMC" as a pre-professional.

A major requires a minimum of 36 credit hours in the School of Journalism and Mass Communications and a minimum of 90 hours outside the school, as required by JMC's national accrediting agency, for a total of 126 hours.

A student must fulfill the general requirements of the College of Arts and Sciences for either the B.A. or the B.S. degree, in addition to completing ECON 110 Principles of Macroeconomics and completing at least 65 hours in the basic liberal arts and sciences.

Beyond this, a student selects a 15-hour outside concentration in another department. Two of the outside concentration courses must be advanced (500-level or above, or requiring a prerequisite course that the student has taken). Up to two of the courses also may apply toward general arts and sciences requirements.

To graduate, a student must achieve a 2.5 GPA in courses within the school.

Students in the A.Q. Miller School of Journalism and Mass Communications can pursue the JMC major (print and electronic journalism, advertising, and public relations) or the RTV major (radio-television).

A curriculum guide for majors is available in the K-State Union Bookstore.

## Print journalism

JMC 235	Mass Communication in Society	3
JMC 275	News and Feature Writing	3
JMC 300	Editing and Design	3
JMC 500	Advanced News and Feature Writing	3
JMC 540	Advanced Editing and Design	3
JMC 565	Law of Mass Communications	3
JMC 595	Mass Communication Research	3

Select one of the following:

JMC 600	Public Affairs Reporting	3
JMC 535	Photojournalism	3

Select one of the following:

JMC 650	Newspaper Management	3
JMC 660	History of Journalism	3
JMC 685	Ethics in Mass Communications	3
JMC 730	Seminar in Future of the Media	3

JMC RTV electives		9
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**Electronic journalism**

JMC 235	Mass Communication in Society	3
JMC 275	News and Feature Writing	3
JMC 500	Advanced News and Feature Writing	3
JMC 505	Electronic News Reporting	3
JMC 585	Advanced Electronic News Reporting	3
JMC 565	Law of Mass Communications	3
JMC 595	Mass Communication Research	3

Select one of the following:

RTV 340	Audio II	3
RTV 350	Video II	3
JMC 600	Public Affairs Reporting	3
JMC 550	Journalism Internship	3

Select one of the following:

JMC 685	Ethics in Mass Communications	3
RTV 660	History of Telecommunication	3
RTV 685	Electronic Media Management	3
JMC 730	Seminar in Future of the Media	3

JMC/RTV electives		9
		<u>36</u>

**Advertising**

JMC 235	Mass Communication in Society	3
JMC 320	Principles of Advertising	3
JMC 355	Advertising Writing	3
JMC 545	Advertising Media Planning	3
JMC 555	Advertising Techniques	3
JMC 565	Law of Mass Communications	3
JMC 595	Mass Communication Research	3
JMC 640	Advertising Campaigns	3

Select one of the following:

JMC 520	Newspaper Advertising Sales	3
RTV 525	Electronic Media Advertising Sales	3

JMC/RTV electives		9
		<u>36</u>

**Public relations**

JMC 235	Mass Communication in Society	3
JMC 275	News and Feature Writing	3
JMC 300	Editing and Design	3
JMC 325	Fundamentals of Public Relations	3
JMC 500	Advanced News and Feature Writing	3
JMC 565	Law of Mass Communications	3
JMC 595	Mass Communication Research	3
JMC 635	Public Relations Techniques	3
JMC 645	Public Relations Campaigns	3
JMC 550	Public Relations Internship	1-3

JMC/RTV electives		6-8
		<u>36</u>

**Radio-television**

JMC 235	Mass Communication in Society	3
RTV 237	Writing for the Electronic Media	3
RTV 240	Audio I	3
RTV 250	Video I	3
RTV 490	Senior Seminar	3
JMC 595	Mass Communication Research	3

Select one of the following:

RTV 340	Audio II	3
RTV 350	Video II	3

Select one of the following:

RTV 525	Electronic Media Advertising Sales	3
RTV 630	Electronic Media Programming	3
RTV 685	Electronic Media Management	3

Select one of the following:

RTV 660	History of Telecommunication	3
JMC 565	Law of Mass Communications	3
JMC 612	Women and the Media	3
JMC 685	Ethics in Mass Communications	3
JMC 670	International Communications	3

or

Any 700-level course in the school		3
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JMC 550	Radio-TV Internship	1-3
JMC/RTV electives		6-8
		<u>36</u>

**Journalism education**

Students may satisfy requirements to teach journalism in public schools by either of the following programs: B.A. or B.S. in the College of Arts and Sciences and teacher certification; B.S. in the College of Education with journalism concentration. Under the first option students qualify for teacher certification by completing specified courses in the College of Education. See the College of Education section of this catalog for details.

**Credit through quiz-out**

Any student may apply to test out of professional practice courses in journalism and mass communications by presenting to the JMC director a portfolio or tapes or other suitable evidence of performance that would allow assessment of course-related experience. After review of the material, the director may refer the application to the appropriate instructor who will determine the number of credit hours, if any, and the method of examination or evaluation to be employed to determine whether credit shall be given. Such credit shall be granted on a Credit/No Credit basis, and the student may specify whether such credit is to be presented for graduation. No more than 12 semester hours may be earned through quiz-out and at least 24 of the student's journalism credit hours must be K-State resident hours.

**Transfer students**

Students transferring to the undergraduate program in journalism and mass communications may transfer a maximum of 12 semester hours in the major. Courses in journalism and mass communications above the 12-hour maximum may not be accepted as electives outside the major and will not be accepted as part of the graduation requirement. No journalism and mass communications course will transfer to K-State without a grade of C or better.

The JMC program will not honor an accumulation of credits in journalism and mass communications courses which consist of laboratory work only. JMC will review the work presented by transfer students and may accept a maximum of 3 credit hours for all such work, equivalent to courses such as Publications Practice.

No transfer credit will be given for Editing and Design, Advanced News and Feature Writing, or Law of Mass Communications unless such work was taken at a college or university accredited in journalism by the Accrediting Council on Education for Journalism and Mass Communications.

**Journalism and mass communications courses**

**Undergraduate credit**

**JMC 235. Mass Communication in Society.** (3) I, II. A historical, social, legal, economic, and technological study of mass communication and its role and impact in society. Open to majors and nonmajors.

**JMC 275. News and Feature Writing.** (3) I, II, S. Instruction in information gathering and writing techniques for the various media. Pr.: JMC 235, a 2.5 GPA upon completion of 30 or more hours, and ability to type 30 words a minute.

**JMC 300. Editing and Design.** (3) I, II. Survey of graphic arts principles; fundamentals of the editing process; relationship of the graphic arts principles to the elements of newspaper design and the total editing function. Pr.: JMC 275 with grade of C or better and a 2.5 GPA upon completion of 30 or more hours.

**JMC 310. Photography I.** (3) I, II, S. Basic camera and laboratory techniques of photography.

**JMC 320. Principles of Advertising.** (3) An examination of the advertising field and its relationship to marketing and journalism. Open to majors and nonmajors.

**JMC 325. Fundamentals of Public Relations.** (3) Contemporary persuasive social science principles, processes, and issues involved in the management of communications between an organization and its publics. Open to majors and nonmajors.

**JMC 330. Desktop Publishing.** (1-2) Intercession only. Introduction to computer applications used in the practice of mass communications.

**JMC 350. Topics in Mass Communications.** (1-3) Selected topics in the study of mass communication practices and principles. May be repeated for credit when topic varies.

**JMC 355. Advertising Writing.** (3) Fundamentals of writing for the various media to solve advertising problems. Setting communication goals within the context of writing to persuade and inform mass audiences. Pr.: JMC 235 and 320, and a 2.5 GPA upon completion of 30 or more hours.

**JMC 360. Publications Practice.** (1-4) Practical work in newspaper and yearbook production, and photography on student publications under supervision of an instructor. Three hours lab a week for each hour of credit. Pr.: Consent of instructor.

**JMC 399. Honors Seminar in Mass Communications.** (3) Pr.: Honors students only; consent of supervising instructor.

**JMC 499. Seminar Honors Thesis.** (2) Pr.: Honors students only; consent of supervising instructor.

**Undergraduate and graduate credit in minor field**

**JMC 500. Advanced News and Feature Writing.** (3) Intensive course emphasizing reportorial principles and practices. Students serve as reporters for the *Kansas State Collegian*, writing for an audience of 20,000 readers daily. Pr.: JMC 300 with grade of C or better.

**JMC 505. Electronic News Reporting.** (3) Practical experience in gathering, writing, editing, producing, and presenting news for the electronic media, and study of related issues. Pr.: JMC 500 with grade of C or better.

**JMC 510. Yearbook Editing and Management.** (2) Planning, editing, layout, writing, and financing a publication.

**JMC 520. Newspaper Advertising Sales.** (3) Basics of retail advertising applied to newspapers including sales, design, copy writing, production, budgeting, and legal and ethical issues. Pr.: JMC 320 with grade of C or better.

**JMC 530. The Ethnic Media in America.** (3) Consideration of the growth, development, and current status of the ethnic media in the United States. Pr.: Junior standing.

**JMC 535. Photojournalism.** (1-3) I. The materials, principles, and processes of photography directed toward visual reporting in newspapers, magazines, and other media. Content and credit vary. Potential topics include documentary picture story, essay, and sequence; spot news, feature, and sports photography; combining words and pictures effectively; marketing techniques; legal restrictions. Lectures, demonstrations, and laboratory. Pr.: JMC 275 and 310 with grades of C or better. May be repeated for a maximum of 4 semester hours.

**JMC 540. Advanced Editing and Design.** (3) Advanced study of the editing processes with emphasis on handling the story, writing headlines, use of all elements for packaging the news, and creative use of the editing tools. Students work on the *Kansas State Collegian* about six hours each week. Pr.: JMC 500 with grade of C or better.

**JMC 545. Advertising Media Planning.** (3) I, II. The selecting, scheduling, selling, and buying of the various advertising media. Pr.: JMC 355 with grade of C or better.

**JMC 550. Mass Communications Internship.** (1-3) The student works in a professional capacity under proper professional and faculty supervision with reports from student and supervisor required. Pr.: Twelve specified semester hours of JMC courses and consent of instructor.

**JMC 555. Advertising Techniques.** (3) The planning, creation, and production of advertising messages for the various mass communication media. Pr.: JMC 355 with grade of C or better.

**JMC 560. Non-Traditional Press.** (3) A study of the changing journalistic attitudes toward objectivity in the 1960s and since. Examination of the resulting resurgence and development of alternative, minority, underground, and counterculture media. Techniques, style, impact, use, and consequences to the media and society of the new journalism will be analyzed.

**JMC 565. Law of Mass Communications.** (3) A study of legal issues relating to mass communications. Emphasis on defamation, privacy, copyright, administrative controls, and other areas related to the mass media. Pr.: Senior standing.

**JMC 585. Advanced Electronic News Reporting.** (3) Reporting of issues of local importance, information-gathering techniques, in-depth writing, and electronic media news production methods. Pr.: JMC 505 with grade of C or better.

**JMC 595. Mass Communication Research.** (3) Formulation of mass communication research and design. Appropriate methods of data collection and data analysis. Pr.: JMC 235 and completion of a mathematics or statistics course.

## Undergraduate and graduate credit

**JMC 600. Public Affairs Reporting.** (3) Investigative reporting of local, state, and national affairs. Pr.: JMC 500 with grade of C or better.

**JMC 605. Supervision of School Publications.** (3) A methods course for those planning to teach secondary or junior college journalism courses and advise high school or junior college publications.

**JMC 610. Interpretation of Contemporary Affairs.** (3) Critical questions of the day and interpretive articles and editorials which document and analyze the news. Pr.: JMC 500. May be repeated once for credit with written permission of instructor and department head required.

**JMC 612. Women and the Media.** (3) Women as portrayed by and employed by the media. Pr.: Junior standing and one course in JMC or women's studies.

**JMC 615. Magazine Article Writing.** (3) Preparation of feature stories and articles; techniques of market analysis, and marketing of articles written in course. Pr.: JMC 500.

**JMC 620. Magazine Production.** (3) The practical application of theory to writing, editing, graphic reproduction, layout, and management of magazines. Pr.: JMC 500.

**JMC 630. Public Relations Case Studies.** (3) Study of historic and contemporary public relations situations using a case-method approach. Attention is directed at strategic planning and implementation by public relations managers. Students establish criteria on what constitutes a public relations program and theories and norms for the selection of objectives and strategies under varying conditions. Pr.: JMC 325 with grade of C or better.

**JMC 635. Public Relations Techniques.** (3) Information gathering, writing, and production applications of persuasive public relations principles in print and electronic media. Pr.: JMC 300 and 325 with grades of C or better.

**JMC 640. Advertising Campaigns.** (3) The managerial development and execution of consumer, industrial, and institutional advertising campaigns. Pr.: JMC 545, 555, and 595 with grades of C or better; senior standing.

**JMC 645. Public Relations Campaigns.** (3) Advanced study of an organization's public relations needs. Includes researching the situation, analyzing audiences, and preparing strategic plans for approved clients. Pr.: JMC 595 and 635 with grades of C or better, and completion of at least one course in social science methods or data analysis.

**JMC 650. Newspaper Management.** (3) The management of newspapers dealing with organization, ownership, promotion, research, production, equipment, markets, personnel, legal aspects, advertising, buying and selling of newspaper properties, business practices, and news policy. Pr.: JMC 540 or conc. enrollment.

**JMC 660. History of Journalism.** (3) A review of the growth and development of the press in the United States, with attention to the interrelationships of the press and social, economic, and political forces. Pr.: Junior standing.

**JMC 670. International Communications.** (3) Comparative study of world press systems and the role of communications in national development.

**JMC 680. Readings in Mass Communications.** (1-3) Investigation of the literature of mass communications. Pr.: Minimum of 9 hours of completed course work in JMC, senior or graduate standing, and consent of supervisory instructor.

**JMC 685. Ethics of Mass Communications.** (3) A consideration of influences and controls that define the role of the mass communicator in American society. Pr.: Senior standing.

**JMC 690. Problems in Mass Communications.** (1-4) Pr.: Background of courses needed for problem undertaken.

**JMC 700. Propaganda and Mass Communications.** (3) History, theory, development, and impact of propaganda as a controversial mass communication strategy that influences public opinion. Pr.: Senior or graduate standing.

**JMC 730. Seminar in the Future of the Media.** (3) A study of philosophical and technological advances in mass communications with emphasis on projected patterns of future growth and development. Pr.: Senior or graduate standing.

**JMC 740. Colloquium in Mass Communications.** (1-3) Discussion of selected topics in mass communications research and practice. May be repeated once for credit when topic varies. Pr.: Senior or graduate standing.

**JMC 765. Communication Theory.** (3) An examination of major communication theories as they relate

to individual, interpersonal, group, and mass communications.

**JMC 770. Professional Journalism Practicum.** (1-4) For advanced students. Supervised practical work in professional journalism and mass communications. Includes laboratory investigation, field work, and internships. Pr.: JMC 300 or 505 and consent of supervising instructor.

**JMC 780. Research Methods in Mass Communications.** (3) Survey of research methods used in the study of the mass media.

## Radio and television courses

### Undergraduate credit

**RTV 237. Writing for the Electronic Media.** (3) I, II, S. Study of forms and the preparation of written material for news, commercial announcements, promotion, etc., for the electronic media, and of the regulations concerning advertising copy. Pr.: JMC 235 with a grade of C or better and a 2.5 GPA upon completion of 30 or more hours.

**RTV 240. Audio I.** (3) I, II. Basic instruction in audio for radio and TV, emphasizing laboratory experiences. Pr.: RTV 237 or JMC 275 with grade of C or better.

**RTV 250. Video I.** (3) I, II. Basic instruction in video production for broadcast TV, cable, and industrial video, emphasizing laboratory experiences as well as lectures. Pr.: RTV 237 with grade of C or better.

**RTV 300. Radio-Television and Society.** (3) I, II. Influence of electronic media in today's culture. Examination of the dynamics of telecommunications including production techniques. Open to majors and nonmajors.

**RTV 320. Fundamentals of Radio-Television Performance.** (3) I, II. Training in nondramatic radio and television performance, including news, commercials, and interviews. Emphasis on laboratory experience. Pr.: RTV 240 with grade of C or better, SPCH 106 or 105.

**RTV 340. Audio II.** (3) II. Theory and practice of radio remotes, automation, and multichannel recording and editing in the production of commercials, dramatic narrative, and documentary programs. Pr.: RTV 240 with grade of C or better.

**RTV 350. Video II.** (3) I. Advanced techniques in television production. Lectures and group projects. Emphasis on organizing video production from the viewpoint of producers and directors. Pr.: RTV 250 with grade of C or better.

**RTV 355. KSDB Audition.** (0) I, II. Production of music, news, and/or sports audio tapes to be evaluated by faculty in preparing students for an on-air position with KSDB-FM.

**RTV 460. KSDB Participation.** (1-3) I, II, S. Supervised participation in the university's student FM radio station, emphasizing music announcing, board production, recorded production, news and sports play-by-play, and FCC operating regulations. Pr.: RTV 355.

**RTV 475. Video Participation.** (1-3) I, II. Supervised participation in program production for entertainment, news, and industrial videos. Scripted, supervised group projects. Three hours of lab participation a week required for each hour of credit. Pr.: RTV 250.

**RTV 490. Senior Seminar.** (3) II. Current issues in electronic media, including regulation, law, technology, and programming. Preparation for graduation and employment. Pr.: Senior majors only.

**RTV 525. Electronic Media Advertising Sales.** (3) I. Retail advertising applied to radio, television, and cable systems. Retail ad campaigns, media buying, selling techniques. FTC and FCC ad regulations covered. Pr.: JMC 320 or MKTG 400 with a grade of C or better.

**Undergraduate and graduate credit**

**RTV 630. Electronic Media Programming.** (3) I. The principles, planning, and development of radio-television-cable programs, schedules, and related regulation. Pr.: RTV 237 with grade of C or better.

**RTV 660. History of Telecommunication.** (3) II. History of the telecommunication industries; their effects on American life; the economic, political, and social significance of electronic media. Pr.: Junior standing.

**RTV 685. Electronic Media Management.** (3) II. Management practices of broadcast, cable, and nonbroadcast facilities including regulation and sales. Pr.: MANGT 420 or RTV 237 with grade of C or better.

## Kinesiology

Larry Noble, Head

Professors MeElroy\* and Noble;\* Associate Professor Zoerink;\* Assistant Professors Acevedo, Bouchier,\* Dzewaltowski,\* Kubitz, Layne,\* Rinehardt,\* and Satern;\* Instructor Sandrey; Emeriti: Professor Geyer; Associate Professors Lindley, Johnson, McKinney, and Wauthier; Instructor Poole.

Kinesiology is the multidisciplinary study of humans in a movement or physical activity context. The objective of the curricula is a greater understanding of human participation in such physical activities as exercise, sport, activities of daily living, and work. The body of knowledge includes physiological, biomechanical, psychological, sociological, maturational, historical, cultural, and learning aspects of human movement. Kinesiology provides an excellent knowledge base for professional preparation in teaching and coaching, sports medicine, exercise science, physical therapy, and other health-related professions.

**Kinesiology**

Students may earn a B.A. or B.S. degree in kinesiology and a B.S. dual degree with majors in nutrition and exercise sciences.

Kinesiology majors take a 22-hour core of scientific foundation courses, many of which have prerequisites in the arts and sciences general studies offerings, and an additional 15 hours of courses numbered 300 and above. The core consists of study in biomechanical, historical and philosophical, motor control, physiological, psychological, and socio-cultural aspects of physical activity. More detailed information can be obtained from the department office.

**Emphasis in fitness promotion**

This emphasis prepares students to design, implement, and administer physical fitness programs in YMCAs, private corporations, hospitals, clinics, and private athletic clubs. Included is course work in basic nutrition, nutrition and exercise, exercise

testing and prescription, adult exercise programs, and supervised field experiences.

**Emphasis in athletic training**

The athletic training program is jointly supported by the Departments of Kinesiology and Intercollegiate Athletics. Course work includes treatment of athletic injuries, rehabilitation and conditioning for athletic training, evaluation and emergency management of injuries, therapeutic modalities in athletic injuries, administration of athletic training programs, concepts of personal health, and supervised internship.

**Teaching and coaching**

Students planning careers in teaching and coaching take courses to develop skills in tumbling, swimming, individual and dual sports, and team sports beyond the scientific core. Additional course work in methods of teaching physical skills, curriculum development, and other educational issues to meet state certification requirements (including the student teaching experience) is provided through the College of Education. Students are advised to consult with advisors in the Departments of Elementary Education and Secondary Education for more detailed information.

**Dual degree in nutrition and exercise science**

The Departments of Kinesiology and Foods and Nutrition offer a dual degree. This 150-credit-hour degree provides preparation for professional careers in wellness and careers that interface the roles of nutrition and physical performance. Principles of nutrition, food science, community nutrition, clinical nutrition, concepts of personal health, and nutrition needs throughout the life cycle are included in this degree. Consult with advisors in either department for more detailed information.

**Kinesiology courses****Undergraduate credit**

**KIN 100. Adaptive Physical Education.** (1) I, II. Exercise programs adapted to the needs of the special student. May be repeated eight times.

**KIN 101. Principles of Physical Fitness.** (1) I, II, S. Physical fitness principles that contribute to overall health. Fitness self-assessment, program design principles appropriate for the development and maintenance of optimal fitness levels, and activities appropriate for the reduction of risks associated with coronary heart disease and obesity are emphasized.

**Lifetime exercise and sport activities**

**KIN 104. Swimming I.** (1) Beginning instruction for students who have no previous experience with swimming.

**KIN 105. Swimming II.** (1) For the beginning swimmer who has had some previous swimming experience.

**KIN 106. Swimming III.** (1) Pr.: KIN 105 or consent of instructor.

**KIN 107. Fitness Swimming.** (1) Pr.: KIN 106 or consent of instructor.

**KIN 113. Water Polo.** (1)

**KIN 117. Folk, Social, and Square Dance.** (1) Instruction in selected international folk dance, American heritage dance, and social dance.

**KIN 120. Basketball.** (1)

**KIN 122. Flag Football.** (1)

**KIN 123. Soccer.** (1)

**KIN 124. Softball.** (1)

**KIN 126. Volleyball I.** (1)

**KIN 127. Volleyball II.** (1) Pr.: KIN 126 or consent of instructor.

**KIN 135. Archery.** (1)

**KIN 136. Badminton.** (1)

**KIN 140. Golf.** (1)

**KIN 143. Handball.** (1)

**KIN 144. Judo I.** (1)

**KIN 145. Judo II.** (1) Pr.: KIN 144 or consent of instructor.

**KIN 148. Racquetball.** (1)

**KIN 150. Self Defense.** (1) Instruction in selected self-defense techniques derived from judo, karate, and other martial arts.

**KIN 151. Tennis I.** (1)

**KIN 152. Tennis II.** (1) Pr.: KIN 151 or consent of instructor.

**KIN 154. Tumbling and Floor Exercise.** (1)

**KIN 160. Aerobic Dancing and Exercise.** (1)

**KIN 161. Fitness and Conditioning.** (1)

**KIN 162. Jogging.** (1)

**KIN 163. Weight Training.** (1)

**KIN 172. Bicycle Touring.** (1)

**KIN 185. Orienteering.** (1)

The following courses may be taken by students majoring in kinesiology or other students meeting prerequisite requirements.

**KIN 200. Concepts of Adult Physical Fitness.** (2) A study of the facts about the effects of regular exercise on physical fitness and health.

**KIN 205. The Sporting Mind: Maximizing Performance.** (2) I. An introduction to the theory and application of cognitive skills and strategies for both athletes and coaches. Pr.: PSYCH 110.

**KIN 206. Professional Orientation.** (1) I. Orientation to kinesiology, the university, and the department.

**KIN 225. Individual and Dual Sports for Secondary Schools.** (2) I. An understanding of the processes involved in acquiring basic skills and competencies in individual and dual sports. Emphasis will be placed on skill development of sports selected from the following list: archery, badminton, bowling, fencing, golf, handball, racquetball, tennis, and wrestling. Four hours lab a week. For kinesiology majors only or with permission of instructor.

**KIN 230. Team Sports for Secondary Schools.** (2) II. An understanding of the processes involved in acquiring basic skills and competencies in team sports. Emphasis will be placed on skill development of sports selected from the following list: basketball, field hockey, flag football, soccer, softball, speedway, speedball, team handball, and volleyball. Four hours lab a week. For kinesiology majors only or with permission of instructor.

**KIN 250. Scientific Principles of Coaching.** (3) II. Physiological, psychological, and kinesiological

principles of coaching. Topics include training and conditioning, motivation, psychological factors affecting sport skill in performance, and mechanical principles underlying sport performance. Not for kinesiology majors.

**KIN 315. Treatment of Athletic Injuries.** (3) I, II. Principles and practices of treatment, taping, and care of minor athletic injuries. Pr.: KIN 250 or BIOL 240 or conc. enrollment in BIOL 240.

**KIN 320. Motor Development and Learning.** (3) I, II. Motor behavior theories, motor development, neurological and psychological basis of motor behavior, motor and skill learning, the state of the performer and the application of instructional techniques. Two hours lec. and two hours lab a week. Pr.: PSYCH 110.

**KIN 325. History and Philosophy of Physical Education.** (3) I, II. Historical and philosophical foundations of physical education and the principles of physical education. Pr.: KIN 206.

**KIN 330. Biomechanics.** (3) I, II. Mechanical and anatomical aspects of overt human movement. Kinematic and kinetic principles applied to the analysis of human movement. Two hours lec. and two hours lab a week. Pr.: BIOL 240 and PHYS 115.

**KIN 335. Physiology of Exercise.** (3) I, II. The responses of the human body to exercise, emphasizing generation of energy in skeletal muscle, dynamics of muscular contraction, oxygen transport system, body composition, and training regimens. Two hours lec. and two hours lab a week. Pr.: BIOL 240.

**KIN 340. Social and Psychological Dimensions of Physical Activity.** (3) I, II. Theories and research on the social and psychological significance of physical activity including implications for physical education and athletic programs. Pr.: SOCIO 211 and PSYCH 110.

**KIN 398. Topics in Kinesiology.** (1-3)

**KIN 399. Sophomore Honors Seminar.** (1-3) I. Selected topics in physical education, dance, and leisure studies. Open to nonmajors in the honors program.

**KIN 405. Choreographing Aerobic Dance and Exercise Routines.** (2) II. A study of choreography and methodology in teaching aerobic dance and exercise routines in various educational settings. Emphasis upon preparation and progression of routines. Selecting music, designing routines, and methods of presenting to various age groups. Pr.: KIN 330 and 335.

**KIN 430. Practicum Physical Education.** (2) I, II. Supervised students assist in lifetime sports classes. Four hours lab a week. Pr.: Junior standing.

**KIN 435. Sport and Contemporary Society.** (3) II. An analysis of sport and its role in contemporary society. Course creates a greater awareness of the social significance of sport in society and fosters the capacity to use critical thinking in the analysis of significant sport issues. Cross-listed with Sociology, see SOCIO 435. Pr.: SOCIO 211.

**KIN 463. Laboratory Practicum in Kinesiology.** (1-2) I, II, S. Supervised students assist in laboratory. Four hours lab a week. Pr.: Junior standing and appropriate background for problem undertaken.

**KIN 498. Honors Tutorial in Kinesiology.** (1-3) I, II. Individually directed research in physical education, normally as a preliminary to writing a senior honors thesis. May be repeated once to a total of three hours. Pr.: Sophomore standing, membership in the honors program of the College of Arts and Sciences, and permission of instructor.

## Undergraduate and graduate credit in minor field

**KIN 510. Measurement and Research Techniques in Kinesiology.** (3) II. Theory and techniques of measurement and research in the psychomotor domain including the use of statistical analyses. Pr.: KIN 320, 330, 335, 340, STAT 320.

**KIN 515. History of Sport.** (3) The historical development of sport (especially in Europe and North America) including the growth of competition, the rise of mass spectator sports, elitism, and the changing function of sport. History of sport as business and history of the relationship between sport and other institutions. Cross-listed with History, see HIST 515.

**KIN 550. Rehabilitation and Conditioning for Athletic Injuries.** (3) II. A study of applied rehabilitation and conditioning techniques used by athletic trainers. Pr.: KIN 315, 330.

**KIN 551. Evaluation and Emergency Management of Athletic Injuries.** (3) I. An in-depth study of evaluation techniques for athletic injuries by the athletic trainer. Pr.: KIN 315 and BIOL 240.

**KIN 555. Therapeutic Modalities in Athletic Training.** (3) II. The theory and application of the various energy systems used in the treatment of athletic injuries. Practical experiences will be emphasized. Pr.: KIN 315, PHYS 115.

**KIN 557. Administration of Athletic Training Programs.** (3) I. Application of various problems and issues affecting the athletic trainers in their roles as administrators in the areas of role delineation, budget designs, legal aspects of sport, facility design, and drug testing/drug education.

**KIN 561. Adapted Physical Education.** (3) I, II. Developmental, remedial, and corrective physical education, emphasizing adaptations designed around scientific principles to meet the needs of individuals requiring special attention. Pr.: KIN 330.

**KIN 585. Internship in Athletic Training.** (1-4) I, II. Supervised clinical application of practical skills in athletic training. Pr.: KIN 315. May be repeated for a total of 4 credit hours with additional prerequisite of KIN 330 and 335 required for last four semesters.

**KIN 598. Topics in Kinesiology.** (1-3)

**KIN 599. Independent Studies in Kinesiology.** (1-3) Selected topics in physical education. Maximum of 3 hours applicable toward a degree. Pr.: Consent of department head.

## Undergraduate and graduate credit

**KIN 625. Exercise Testing and Prescription.** (3) I. Extensive coverage of laboratory exercise evaluation (proper administration, test selection, test interpretation). Prescription of exercise programs based upon test results. Emphasis on the variety of laboratory tests used to quantify exercise capacity in normal and diseased populations. Cardiac rehabilitation programs and the use of exercise testing to identify individuals at risk. Emphasis on preparation for ASCM certification and use of exercise testing to identify individuals at risk. Two hours rec. and two hours lab a week. Pr.: KIN 335.

**KIN 635. Nutrition and Exercise.** (3) II. The interrelationships between diet, nutrition, and exercise. Topics covered include physical fitness, weight control, nutrient metabolism during exercise, and athletic performance. Pr.: KIN 335 and FN 132 or FN 502. Cross-listed with foods and nutrition; see FN 635.

**KIN 655. Adult Exercise Programs.** (3) II. The study of the implementation of fitness programs for the general public in such settings as fitness businesses, clinics, clubs, corporate programs, and adult fitness classes. Topics will include exercise for weight control, exercise and the aging adult, and the development of lifetime fitness educational programs. Pr.: KIN 335.

**KIN 700. Physical Culture in the Western World.** (3) I. A seminar on selected topics in the historical and philosophical foundations of physical culture in Western civilization.

**KIN 703. Minority Groups in Sports.** (3) The contributions by, problems of, and discrimination against minority groups in sports. Pr.: SOCIO 211, KIN 340, PSYCH 435, or HIST 539.

**KIN 718. Cinematographic and Videographic Analysis of Human Movement.** (3) On sufficient demand. Techniques and instrumentation for the analysis of overt human movement using film, videotape, and other imaging techniques. Pr.: KIN 330.

**KIN 792. Internship in Exercise Science.** (6-8) I, II, S. Supervised field experience for the exercise science major in training settings such as YMCA, YWCA, municipal recreation agency, or industrial fitness agency. May be completed with half-time assignment for 12-16 weeks or full-time assignment for 6-8 weeks. Pr.: KIN 759.

**KIN 796. Topics in Kinesiology.** (1-4) On sufficient demand.

# Mathematics

Louis Pigno,\* Head

Professors Burckel,\* Dressler,\* Greechie,\* Lee,\* Miller,\* Nicholls,\* Pigno,\* Ramm,\* Saeki,\* Shult,\* Smith,\* Strecker,\* Stromberg,\* and Surowski;\* Adjunct Professor Arhangel'skii; Associate Professors Chermak,\* Cochrane,\* Delgado,\* Herman,\* Muenzenberger,\* Parker;\* Assistant Professors Bennett,\* Li,\* Maginnis,\* Moore,\* Wu,\* Yetter,\* and Zou;\* Emeriti: Professors Dixon,\* Fuller,\* Marr,\* Stamey,\* and Young;\* Associate Professors Mossman\* and Sloat;\* Instructors Chatelain, Ratcliffe, Sitz, and Woldt.

Mathematics is the unparalleled model of an exact science, the epitome of creative art, and a language essential to understanding our modern technological world. Mathematicians solve mathematical problems and create new mathematics.

Mathematics graduates are sought both for their specialized knowledge and for their ability to think analytically. Mathematics is an excellent major for pre-professionals and for liberal arts students who desire a major that combines a flexible program with an in-depth study of fertile subject matter and analytic methodology.

## Requirements

Students may obtain either a bachelor of arts or a bachelor of science degree with a major in mathematics. For either degree, in addition to the general requirements of the university and college, mathematics majors must complete the following core courses:

MATH 220	Analytic Geometry and Calculus I	4
MATH 221	Analytic Geometry and Calculus II	4
MATH 222	Analytic Geometry and Calculus III	4
MATH 240	Elementary Differential Equations	4
CIS 200	Fundamentals of Computer Programming	3
CIS 203	Fundamentals of Computer Programming Laboratory	1
STAT 510	Introductory Probability and Statistics I	3

MATH 512	Introduction to Modern Algebra ...	3
	or	
MATH 511	Introduction to Algebraic Systems ...	3
MATH 633	Advanced Calculus I .....	3
	or	
MATH 520	Foundations of Analysis .....	3

For the B.A. degree, students must take 15 additional hours in mathematics numbered 400 or above; PHILO 510 may be substituted for 3 of these hours.

For the B.S. degree, students must take 15 additional hours in mathematics numbered 400 and above; MATH 570 may not be used to meet this requirement.

### Applied mathematics program

Students who intend to seek employment in business, government, or industry, should take Advanced Calculus I and II (MATH 633 and 634) in the junior year. In addition, the following courses are strongly recommended:

MATH 510	Discrete Mathematics .....	3
MATH 551	Applied Matrix Theory .....	3
MATH 630	Introduction to Complex Analysis ...	3
MATH 632	Elementary Partial Differential Equations .....	3
MATH 640	Ordinary Differential Equations I ...	3
MATH 641	Ordinary Differential Equations II .....	3
MATH 655	Elementary Numerical Analysis I ...	3
MATH 670	Mathematical Modeling .....	3
MATH 755	Dynamic Modeling Processes .....	3

It is recommended that students also take at least 6 hours of upper-division courses outside the mathematics department in areas such as computing and information sciences, engineering, physics, and statistics.

### Pre-graduate program

Students who intend to enter graduate school to work toward an advanced degree in either pure or applied mathematics should take Introduction to Modern Algebra and Advanced Calculus I (MATH 512 and 633) in the junior year. In addition, the following courses are strongly recommended:

MATH 515	Introduction to Linear Algebra .....	3
MATH 560	Introduction to Topology .....	3
MATH 634	Advanced Calculus II .....	3
MATH 721	Analysis I .....	3
MATH 722	Analysis II .....	3
MATH 730	Abstract Algebra I .....	3
MATH 731	Abstract Algebra II .....	3

It is recommended that students also take courses in related scientific fields, especially computer science and physics. At least one foreign language, preferably French, German, or Russian, should be studied.

### Teacher preparation program

Students who intend to become secondary school mathematics teachers may prepare for teacher certification while completing the requirements for a degree in mathematics. The following upper-division courses are designed particularly for such students:

MATH 511	Introduction to Algebraic Systems ...	3
MATH 520	Foundations of Analysis .....	3
MATH 521	The Real Number System .....	3
MATH 570	History of Mathematics .....	3
MATH 572	Foundations of Geometry .....	3

MATH 791	Topics in Mathematics for Secondary School Teachers .....	3
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For specific certification requirements for secondary education, see the College of Education section of this catalog.

Students majoring in elementary education who wish to use mathematics as an area of concentration should consider taking their 15 hours of mathematics from among the following courses:

MATH 100	College Algebra .....	3
MATH 110	Mathematics, Its Form and Impact .....	3
MATH 309	Intuitive Geometry .....	2
MATH 312	Finite Applications of Mathematics .....	3
MATH 313	Computational Number Theory ....	3
MATH 320	Topics in Mathematics for Elementary School Teachers I .....	3
MATH 321	Topics in Mathematics for Elementary School Teachers II .....	3

### Dual majors and dual degrees

Students may major in mathematics and another discipline within the College of Arts and Sciences. The degree requirements of both departments must be met.

Students may obtain a degree in mathematics and a second degree in a field in another college such as business administration or engineering. The degree requirements of both colleges must be met and a minimum of 150 hours must be completed.

### Information for nonmajors

Most colleges and departments require at least one mathematics course. Students should check with their advisors to determine which mathematics courses to take. Advisors are provided information that will aid them in using a student's ACT score to select the appropriate entry-level mathematics course. Advisors also have access to expanded mathematics course descriptions that will help them advise students.

### Mathematics courses

**MATH 010. Intermediate Algebra.** (3) I, II, S. Review of elementary algebra; topics preparatory to MATH 100. Pr.: One unit of high school algebra.

### Undergraduate credit

**MATH 100. College Algebra.** (3) I, II, S. Pr.: B or better in MATH 010, or two years of high school algebra and a score of 22 or more on Enhanced ACT mathematics, or a score of at least 17 on the mathematics placement exam.

**MATH 101. The Metric System.** (1) Intersession only, on sufficient demand. A systematic study of the metric system including historical background of various systems, structure of the metric system itself, and relation to existing systems; attention to competent use of metric terms in problem solving.

**MATH 110. Mathematics, Its Form and Impact.** (3) I, II, S. This course requires no mathematical background. It includes the development and analysis of mathematical structures; applications of the structures are used to exemplify the linguistic use of mathematics and its impact on society.

**MATH 150. Plane Trigonometry.** (3) I, II, S. Trigonometric and inverse trigonometric functions;

trigonometric identities and equations; applications involving right triangles and applications illustrating the laws of sines and cosines. Pr.: C or better in MATH 100, or two years of high school algebra and a score of 25 or more on Enhanced ACT mathematics, or a score of at least 20 on the mathematics placement exam.

**MATH 199. Freshman Mathematics Seminar.** (1) I. Topics of special interest to freshmen in mathematics, including orientation to the mathematics curriculum, possible careers in mathematics, and cultural and professional aspects of mathematics.

**MATH 205. General Calculus and Linear Algebra.** (3) I, II. Introduction to calculus and linear algebra concepts that are particularly useful to the study of economics and business administration with special emphasis on working problems. Pr.: MATH 100 with C or better grade (College Algebra in the preceding semester is recommended).

**MATH 210. Technical Calculus I.** (3) I. A condensed course in analytic geometry and differential calculus with an emphasis on applications. Pr.: MATH 150 or two years of high school algebra and one semester of high school trigonometry.

**MATH 211. Technical Calculus II.** (3) II. A continuation of MATH 210 to include integral calculus with an emphasis on application. Pr.: MATH 210.

**MATH 220. Analytic Geometry and Calculus I.** (4) I, II, S. Analytic geometry, differential and integral calculus of algebraic and trigonometric functions. Pr.: B or better in MATH 100 and C or better in MATH 150; or three years of college preparatory mathematics including trigonometry and a score of 27 or more on the Enhanced ACT mathematics examination; or a score of at least 26 on the mathematics placement exam.

**MATH 221. Analytic Geometry and Calculus II.** (4) I, II, S. Continuation of MATH 220 to include transcendental functions, techniques of integration, and infinite series. Pr.: C or better in MATH 220.

**MATH 222. Analytic Geometry and Calculus III.** (4) I, II, S. Continuation of MATH 221 to include functions of more than one variable. Pr.: C or better in MATH 221.

**MATH 240. Elementary Differential Equations.** (4) I, II, S. Elementary techniques for solving ordinary differential equations and applications to solutions of problems in science and engineering. Pr.: C or better in MATH 222.

**MATH 309. Intuitive Geometry.** (2) Intersession only. Measurement, triangles, quadrilaterals, nonmetric geometry, similarity, volumes, elementary coordinate geometry. Pr.: Consent of instructor.

**MATH 312. Finite Applications of Mathematics.** (3) II. Systems of equations, vector operations, linear algebra, and linear programming. Practice in setting up, solving, and interpreting mathematical models which arise in social sciences and business. Pr.: MATH 100.

**MATH 313. Computational Number Theory.** (3) I, II, S. Topics in number theory selected from: divisibility, primes, modular arithmetic and special types of numbers. Emphasis is on computations. Primarily for prospective elementary school teachers of mathematics. Pr.: Sophomore standing, MATH 100.

**MATH 320. Mathematics for Elementary School Teachers I.** (3) I, II. Mathematical problem solving and reasoning, development of whole number concepts and the whole number system, computation and estimation with whole numbers, number patterns and number theory, integers, fractions and rational numbers, decimals and real numbers.

**MATH 321. Mathematics for Elementary School Teachers II.** (3) I, II. Continuation of MATH 320 to include probability, statistics, geometric figures and patterns, measurement, geometric constructions,

concepts of algebra, and coordinate geometry.  
Pr.: MATH 320.

**MATH 350. Introduction to Abstract Mathematics.** (3) I, II. An introduction to techniques of proving mathematical theorems from set theory, discrete mathematics, number theory, analysis, and algebra.  
Pr.: MATH 221.

**MATH 398. Sophomore Seminar.** (3) II. Seminar in mathematics for honors students. Pr.: Membership in honors program.

**MATH 399. Seminar in Mathematics.** (Var.) On sufficient demand. Primarily for honors students.  
Pr.: Consent of instructor.

**MATH 498. Senior Honors Thesis.** (2) I, II, S. Open only to seniors in the arts and sciences honors program.

**MATH 499. Undergraduate Topics in Mathematics.** (Var.) I, II, S. Reading courses in advanced undergraduate mathematics. Pr.: Background of courses needed for topic undertaken and consent of instructor.

### Undergraduate and graduate credit in minor field

**MATH 506. Introduction to Number Theory.** (3) II. Divisibility properties of integers, prime numbers, congruences, multiplicative functions. Pr.: MATH 221.

**MATH 510. Discrete Mathematics.** (3) I, II, S. Combinatorics and graph theory. Topics selected from counting principles, permutations and combinations, the inclusion/exclusion principle, recurrence relations, trees, graph coloring, Eulerian and Hamiltonian circuits, block designs, and Ramsey Theory.  
Pr.: Sophomore standing and MATH 221.

**MATH 511. Introduction to Algebraic Systems.** (3) I. Properties of groups, rings, domains, and fields. Examples selected from subsystems of the complex numbers, elementary number theory, and solving equations. Pr.: MATH 222.

**MATH 512. Introduction to Modern Algebra.** (3) I, II. Introduction to the basic algebraic systems, viz., groups, rings, integral domains, fields, elementary number theory. Special emphasis will be given to methods of theorem proving. Pr.: MATH 222 or consent of instructor; MATH 350.

**MATH 515. Introduction to Linear Algebra.** (2–3) I. Finite dimensional vector spaces; linear transformations and their matrix representations; dual spaces, invariant subspaces; Euclidean and unitary spaces; solution spaces for systems of linear equations. Pr.: MATH 512.

**MATH 520. Foundations of Analysis.** (3) A study of sets and sequences, neighborhood, limit point, convergence, and open and closed set in the real line and in the plane, the concept of continuous function.  
Pr.: MATH 222.

**MATH 521. The Real Number System.** (3) An extensive development of number systems, with emphasis upon structure. Includes systems of natural numbers, integers, rational numbers, and real numbers.  
Pr.: MATH 221.

**MATH 551. Applied Matrix Theory.** (3) I, II. Matrix algebra, solutions to systems of linear equations, determinants, vector spaces, linear transformations, eigenvalues, linear programming, approximation techniques. Pr.: MATH 205 or 220.

**MATH 560. Introduction to Topology.** (3) An introduction to the basic topological concepts. Topological spaces, metric spaces, closure, interior, and frontier operators, subspaces, separation and countability properties, bases, subbases, convergence, continuity, homeomorphisms, compactness, connectedness, quotients and products. The course will include a brief introduction to proof techniques and set theory. Other topics in topology also may be included.  
Pr.: MATH 222.

**MATH 570. History of Mathematics.** (3) II. A survey of the development of mathematics from ancient to modern times. Cannot be used as part of the advanced mathematics needed for the B.S. degree in mathematics. Pr.: MATH 220.

**MATH 572. Foundations of Geometry.** (3) Euclidean, non-Euclidean, and finite geometries; role of axioms; practice proving theorems in a formal system; synthetic, metric, and transformation approaches to Euclidean geometry. Pr.: MATH 221.

**MATH 591. Topics in Mathematics for Teachers.** (1–3) I, II, S. Topics of importance for teachers of mathematics. May be repeated for credit. Pr.: Consent of instructor.

### Undergraduate and graduate credit

**MATH 615. Advanced Engineering Mathematics I.** (3) I. Vector calculus; higher dimensional calculus; topics in ordinary differential equations; complex analysis.  
Pr.: MATH 240 and 551.

**MATH 616. Advanced Engineering Mathematics II.** (3) II. Fourier series; Fourier and Laplace transforms; basic partial differential equations; basic calculus of variations. Pr.: MATH 240 and 615.

**MATH 630. Introduction to Complex Analysis.** (3) I, II. Complex analytic functions and power series, complex integrals. Taylor and Laurent expansions, residues, Laplace transformation, and the inversion integral. Pr.: MATH 240.

**MATH 632. Elementary Partial Differential Equations.** (3) I. Orthogonal functions, Fourier Series, boundary value problems in partial differential equations. Pr.: MATH 240.

**MATH 633. Advanced Calculus I.** (3) I. Functions of one variable: limits, continuity, differentiability, Riemann–Stieltjes integral, sequences, series, power series, improper integrals. Pr.: MATH 222 and 350.

**MATH 634. Advanced Calculus II.** (3) II. Functions of several variables: partial differentiation and implicit function theorems, curvilinear coordinates, differential geometry of curves and surfaces, vectors and vector fields, line and surface integrals, double and triple integrals, Green's Theorem, Stokes' Theorem, and Divergence Theorem. Pr.: MATH 633.

**MATH 640. Ordinary Differential Equations I.** (3) I. First order equations and applications, second order equations and oscillation theorems, series solutions and special functions. Sturm–Liouville problems, linear systems, autonomous systems and phase plane analysis, stability, Liapunov's method, periodic solutions, perturbation and asymptotic methods, existence and uniqueness theorems. Pr.: MATH 240.

**MATH 641. Ordinary Differential Equations II.** (3) II. Continuation of MATH 640. Pr.: MATH 640.

**MATH 655. Elementary Numerical Analysis I.** (3) I. Error analysis, root finding, interpolation, approximation of functions, numerical integration and differentiation, systems of linear equations. Pr.: MATH 221, a computer language, and either MATH 515 or 551.

**MATH 656. Elementary Numerical Analysis II.** (3) II. A continuation of MATH 655. Linear programming, numerical solutions of differential equations, and the use of standard packages for the solution of applied problems. Pr.: MATH 655 and 240.

**MATH 670. Mathematical Modeling.** (3) Introduction of modeling procedures. Case studies in mathematical modeling projects from physical, biological, and social sciences. Pr.: Four mathematics courses numbered 500 or above.

**MATH 689. Combinatorial Analysis.** (3) II, in alternate years. Permutations, combinations, inversion formulae, generating functions, partitions, finite geometries, difference sets, and other topics.  
Pr.: MATH 512.

**MATH 700. Set Theory and Logic.** (3) An introduction to logic, mathematical proof, and elementary set theory; elementary logic, the basic constructions of set theory, relations, partitions, functions, cartesian products, disjoint unions, orders, and a construction of the natural numbers; also ordinal and cardinal numbers, the Axiom of Choice, and transfinite induction. Special emphasis will be given to proving theorems.  
Pr.: MATH 350.

**MATH 701. Elementary Topology I.** (3) I. Introduction to axiomatic topology including a study of compactness, connectedness, local properties, separation axioms, and metrizability. Pr.: MATH 633.

**MATH 702. Elementary Topology II.** (3) II. Path connectedness, fundamental groups, covering spaces, introduction to topological and differentiable manifolds. Pr.: MATH 701.

**MATH 704. Introduction to the Theory of Groups.** (3) Introduction to abstract group theory; to include permutation groups, homomorphisms, direct products, Abelian groups, Jordan–Holder and Sylow theorem.  
Pr.: MATH 512.

**MATH 706. Theory of Numbers.** (3) II. Divisibility, congruences, multiplicative functions, number theory from an algebraic viewpoint, quadratic reciprocity, Diophantine equations, prime numbers.  
Pr.: MATH 221 and either 511 or 512.

**MATH 710. Introduction to Category Theory.** (3) Categories, duality, special morphism, functors, natural transformations, limits and colimits, adjoint situations, and applications. Pr.: MATH 701 and 730.

**MATH 711. Category Theory.** (3) Set valued functors and concrete categories, factorization structures, algebraic and topological functors, categorical completions, Abelian categories. Pr.: MATH 710.

**MATH 713. Advanced Applied Matrix Theory.** (3) A development of the concepts of eigenvalues by considering applications in differential equations and quadratic forms. A discussion of the Jordan canonical form, functions of matrices, vector and matrix norms, and various related numerical methods.  
Pr.: MATH 551 or 515.

**MATH 721. Analysis I.** (3) I, II, S. Metric spaces, limits, continuity, sequences and series, connectedness, compactness, Baire category, uniform convergence, theorems of Stone–Weierstrass and Arzela.  
Pr.: MATH 240 or graduate standing.

**MATH 722. Analysis II.** (3) II. Lebesgue and Riemann–Stieltjes integration on the real line, differentiation on the real line, elementary transcendental functions. Pr.: MATH 721.

**MATH 730. Abstract Algebra I.** (3) I. Groups, rings, fields, vector spaces and their homomorphisms. Elementary Galois theory and decomposition theorems for linear transformations on a finite dimensional vector space. Pr.: MATH 512 or consent of instructor.

**MATH 731. Abstract Algebra II.** (3) II. Continuation of MATH 730. Pr.: MATH 730 or consent of instructor.

**MATH 740. Calculus of Variations.** (3) On sufficient demand. Necessary conditions and the Euler–Lagrange equations, Hamilton–Jacobi theory, Noether's theorems, direct methods, applications to geometry and physics.  
Pr.: MATH 722 or equiv.

**MATH 755. Dynamic Modeling Processes.** (3) Topics to include equilibrium and stability, limit cycles, reaction–diffusion, and shock phenomena, Hopf bifurcation and cusp catastrophes, chaos and strange attractors, bang–bang principle. Applications from physical and biological sciences and engineering.  
Pr.: MATH 240 and 551.

**MATH 772. Elementary Differential Geometry.** (3) Curves and surfaces in Euclidean spaces, differential forms and exterior differentiation, differential invariants and frame fields, uniqueness theorems for curves and

surfaces, geodesics, introduction to Riemannian geometry, some global theorems, minimal surfaces. Pr.: MATH 240.

**MATH 791. Topics in Mathematics for Secondary School Teachers.** (3) Topics of importance in the preparation of secondary school teachers to teach modern mathematics. May be repeated for credit.

## Military Science

Lieutenant Colonel William J. Cook III,  
Head

Assistant Professors Captain West and Captain Payne; Instructors Master Sergeant Rayburn and Sergeant First Class Marvin; Supply Technician Hebert; Cadet Records Clerk Sain.

The Army Reserve Officers' Training Corps program emphasizes the leadership and management skills required for success in military or civilian careers. Students find that the student-faculty interaction improves self-confidence and overall academic performance. Army ROTC prepares students to serve as officers in the Army, Army National Guard, and Army Reserve.

The courses are open to all students. Students, both undergraduate and graduate, with two years remaining at K-State are eligible to pursue an officer's commission through Army ROTC. Military science courses are credit-awarding courses and fulfill elective credit requirements in any degree program. Cadets may pursue any curriculum offered by the university.

The military science curriculum consists of the basic course, normally completed during the freshman and sophomore years, and the advanced course, oriented toward the junior and senior years. Texts and other materials required in ROTC courses are provided without cost.

### Basic course

The basic course consists of a series of four 2-hour courses open to all students that may be counted as electives. Enrollment in basic course classes does not obligate a student to military service. Freshmen will normally enroll in MSCI 104 and 105. Sophomores will normally enroll in MSCI 204 and 205.

### Advanced course

The Army ROTC advanced course is structured to develop the leadership potential of students choosing to pursue an officer's commission. Prerequisites for the advanced course may be satisfied in a number of ways; specific questions on individual eligibility should be addressed to the department staff.

Students accepted into the advanced course agree to complete the curriculum and to accept an Active Army, Army Reserve, or Army National Guard commission, if offered. Each advanced course cadet receives a \$100-per-month allowance during the school year in return for this agreement. A six-week advanced summer camp, with pay, is an integral part of the advanced course and normally is completed between the junior and senior years. Airborne, Air Assault, and the Northern Warfare training courses are U.S. Army schools available to qualified volunteers in addition to other training opportunities.

### Basic camp

A six-week ROTC basic summer camp, with pay, is available. This allows ROTC participation by students who have not taken basic course classes. Application should be made to the Department of Military Science early in the spring semester. Students will attend ROTC Basic Camp during the summer. Satisfactory completion of the ROTC Basic Camp earns 4 hours academic credit and satisfies all prerequisites for entry into the advanced course. Attendance at the ROTC Basic Camp does not incur any military obligation.

### Discharge of duty

Federal laws provide that ROTC graduates may discharge their military obligation in one of two ways: (1) two to four years on active duty with the remainder of the statutory eight-year obligation completed with the Army Reserve or National Guard organizations; or (2) three to six months active duty for training with the remainder of an eight-year obligation completed with Army Reserve or National Guard organizations. Preferences indicated by the graduate for a particular form of service are normally respected. Members of Army National Guard and Army Reserve units may enter the Simultaneous Membership Program. This program allows cadets to serve with a National Guard or Army Reserve unit while in Army ROTC, receiving both financial assistance and valuable experience.

### Scholarships

The Army provides three- and four-year scholarships to selected high school and college students. These scholarships provide full tuition and fees, an allowance for books and supplies, and \$100 per school month. The scholarships are available on a competitive basis to all students, regardless of present enrollment in Army ROTC, who wish to receive commissions as officers. They must have two years remaining towards undergraduate or graduate programs. These scholarships, applied for during the spring semester, become

effective the following fall. In addition to the Army ROTC scholarships, the Kansas Army National Guard offers one-, two-, three-, or four-year scholarships to selected high school and college students. The Kansas Army National Guard ROTC Scholarship is for Kansas residents and pays in-state tuition only.

### Voluntary organizations

The department sponsors two voluntary organizations, a student chapter of the Association of the United States Army, KSU Battalion Honor Guard, and the ROTC Ranger Company. The AUSA chapter engages in professional and community service activities including United Way campaign support, field trips, and food drives. The Honor Guard performs both university and non-university ceremonies as well as home football and basketball games. The ROTC Ranger Company provides additional tactical training and leadership experience. It supplements ROTC classroom instruction and field training to better prepare cadets for Advanced Camp and to be Army officers.

### Recommended courses

In recognition of leadership's many facets, the department requires that students enrolled in ROTC select from a number of university courses that complement the leadership program. One course each in written communication skills, human behavior, military history, computer literacy, and math are required. Students receiving Army ROTC scholarships are required to take one semester of an Indo-European or Asiatic language. In addition to the required courses, one course each in national security policy and management is recommended. The majority of these courses may be applied as elective classes for the student's degree requirements. A list of acceptable courses is available at the Department of Military Science.

### Basic course

#### Undergraduate credit

**MSCI 100. Mountaineering and Introduction to Military Science.** (1) I, II. Basic mountaineering and introduction to Army ROTC.

**MSCI 102. Basic Riflery and Introduction to Military Science.** (1) I, II. Basic riflery and three-position match shooting, including a brief introduction to the Army ROTC program.

**MSCI 104. Military Science 1A—Basic Military Concepts.** (2) I. Rifle marksmanship, introduction of basic military concepts and the ROTC program, and a weekly leadership lab.

**MSCI 105. Military Science 1B—Introduction to Military Leadership.** (2) II. Introduction to military leadership using various leadership theories and skills, and a weekly leadership lab.

**MSCI 106. Basic Military Skills.** (1) I, II. Students will be exposed to a variety of skills practiced in the military

to include: tactics, effective communications, map reading, weapons employment, and survival.

**MSCI 107. Rappel Master Skills.** (1) I, II. Students will be exposed to all the skills needed to conduct a rappelling session from a fixed facility. Skills to be taught will include: proper knots, anchoring techniques, rappel master duties and responsibilities, and safety, equipment inspection, correct rappel procedures, and overall supervision of rappelling. Instructor permission required.

**MSCI 201. Leadership Guidance.** (1) I, II. Leadership theory, the leader, the group, needs, and motivation. Study of both military and business leadership styles.

**MSCI 204. Military Science 2A—The U.S. Army: An Overview.** (2) I. An introduction to the role of the U.S. Army, Army Reserve, and National Guard. Includes the customs and traditions of the service, the Army rank structure, branches of the Army, and military life. It includes leadership labs to introduce the student to Army drill and ceremonies, and physical fitness requirements.

**MSCI 205. Military Science 2B—Leadership and Military Skills.** (2) II. Military geography, map reading, and land navigation. Concepts of military leadership to include conducting military inspections, and a weekly leadership lab. Credit may not be received for both MSCI 202 and 205.

**MSCI 250. Military Science 2C.** (4) S. A six-week basic course summer camp taught off campus at Fort Knox, Kentucky. Camp content includes lectures, demonstrations, practical exercises in leadership, and other military-related skills. Pr.: Two years remaining on campus after completion of camp, meeting the physical standards, and permission of the professor of military science.

### Advanced course

#### Undergraduate credit

**MSCI 300. Military Science 3A—Leadership and Small Unit Tactics I.** (3) I. Small unit tactics, advanced leadership and management, methods of instruction, time management, and a weekly leadership lab. Pr.: Completion of basic course or acceptable equiv.

**MSCI 302. Military Science 3B—Leadership and Small Unit Tactics II.** (3) II. Military communications, advanced leadership and management, small unit tactics, preparation for summer camp, and a weekly leadership lab. Pr.: Completion of basic course or acceptable equiv.

**MSCI 305. Leadership Studies and Practical Applications.** (3) I, II. Study of small unit tactics, practical application of leadership skills, individual projects in preparation for Advanced Camp and a weekly leadership lab. Pr.: Completion of basic course or acceptable equiv.

**MSCI 400. Military Science 4A—Military Management I.** (3) I. Administrative and staff operations and procedures, logistics, and a weekly leadership lab. Pr.: Completion of MSCI 300 and 302.

**MSCI 402. Military Science 4B—Military Management II.** (3) II. Administrative and staff operations and procedures, military law, career planning, ethics, and a weekly leadership lab. Pr.: Completion of MSCI 300 and 302.

**MSCI 405. Management Studies and Practical Applications.** (3) I, II. Advanced study of military ethics, practical application of management skills, individual projects in preparation for commissioning and a weekly leadership lab. Pr.: Completion of two 300-level military science courses.

## Modern Languages

Bradley Shaw,\* Head

Professors Corum,\* Dehon,\* and Ossar;\* Associate Professors Alexander,\* Benson,\* Kolonosky,\* McGraw,\* Shaw,\* and Tunstall;\* Assistant Professors Garavito,\* Ihrie,\* Miller,\* and Sauter;\* Instructors Driss and Pigno.

All regular courses offered by the Department of Modern Languages may be taken by nonmajors on an A/Pass/F basis, subject to the provisions of the university policy. Language laboratories are offered only on a Credit/No-Credit basis.

Students majoring in languages should enroll for the bachelor of arts degree.

Within the modern language major, French, German, and Spanish are offered; in highly unusual cases, a major in classics or Russian may be arranged.

For a language major, 30 hours in a single language above the level of I and II must be completed. Students majoring in languages must take two survey courses in the chosen language. In French or German, the student must also take three literature courses at the 700 level. In Spanish the student must take at least one course from three of the following four groups: 751, 752, 755; 761, 764, 775; 756, 757, 763; 760, 771, 772. A minimum 2.0 GPA in courses taken as part of the major is required for graduation.

Students preparing for graduate school or for high school teaching should consider taking the corollary course in linguistics, LG 600. Six hours of history of the country of the student's major language interest are desirable.

Entering students who have had previous language experience and who plan to continue language study are required to take a language placement examination before or at the beginning of the first semester of language study. If there is any doubt as to proper placement, the head of the Department of Modern Languages should be consulted.

Students wishing to acquire retroactive credit for language proficiency gained before coming to K-State should consult with the head of the Department of Modern Languages.

### Programs abroad

The department sponsors summer study programs in Jalapa, Mexico, and cooperates with German exchange programs in Germany, Austria, and Switzerland. All inquiries should be addressed to the head of the department.

### Honors program courses

#### Undergraduate credit

**MLANG 297. Honors Introduction to the Humanities I.** (3) I. Study of selected major works of history, literature, and philosophy which have been of central importance in the Western cultural tradition. Considerable emphasis is placed on classroom discussion and writing interpretive essays. Limited to entering freshman students. Pr.: Consent of instructor. Same as ENGL 297, HIST 297, PHIL 297.

**MLANG 298. Honors Introduction to the Humanities II.** (3) II. Continuation of MLANG 297. Pr.: MLANG 297 or consent of instructor. Same as ENGL 298, HIST 298, PHIL 298.

**MLANG 399. Honors Seminar in Modern Languages.** (1-3) I, II. Reading and discussion of selected masterpieces of European literature in English translation. Open to non-language majors in the honors program.

**MLANG 499. Senior Honors Thesis.** (2) I, II, S. Open only to seniors in the arts and sciences honors program.

### Modern language courses

#### Undergraduate and graduate credit in minor field

**FREN 502. French Literature in Translation.** (3) Selected readings in English from the works of such major French authors as Flaubert, Zola, Sartre, Camus, and Ionesco. Not accepted for major credit in French.

**GRMN 503. German Literature in Translation.** (3) Selected readings in English from such major German authors as Mann, Brecht, Hesse, Grass, and Kafka. Not accepted for major credit in German.

**LATIN 501. Classical Literature in Translation.** (3) Selected readings in English from the works of such major classical authors as Homer, Euripides, Vergil, Horace, and Terence.

**MLANG 507. European Literature in Translation.** (3) Selected readings in English from the major authors of Europe and the Spanish-speaking world.

**RUSSN 504. Russian Literature in Translation: The Nineteenth Century.** (3) Survey of the principal writers of tsarist Russia with emphasis upon Turgenev, Dostoevsky, Tolstoy, and Chekhov.

**RUSSN 508. Russian Literature in Translation: The Soviet Period.** (3) The development of Russian literature since the Revolution, with emphasis upon Mayakovsky, Sholokov, Pasternak, and Solzhenitsyn.

**SPAN 505. Spanish Literature in Translation.** (3) Selected readings in English from the works of such major Spanish and Latin American authors as Garcia Lorca, Borges, Neruda, and Garcia Marquez. Not accepted for major credit in Spanish.

### Arabic courses

#### Undergraduate credit

**ARAB 181. Arabic I.** (4) Introduction to the structure of modern Arabic. Essentials of grammar, speaking, reading, and writing.

**ARAB 182. Arabic II.** (4) Continuation of Arabic I. Pr.: ARAB 181 or equiv.

**ARAB 281. Arabic III.** (4) Further development of language skills. Pr.: ARAB 182 or equiv.

**ARAB 282. Arabic IV.** (3) Continuation of Arabic III. Pr.: ARAB 281 or equiv.

#### Undergraduate and graduate credit in minor field

**ARAB 540. Special Studies in Arabic.** (Var.) Pr.: Consent of the department head and instructor involved.

**French courses**

**FREN 001. Orientation for Summer School Program in Paris.** (0)

**Undergraduate credit**

**FREN 109. French II.** Language laboratory. Strongly recommended for students taking French I. Conc. enrollment in French I required. For Credit/No Credit only. Credit given only upon receiving a passing grade for the conc. section of French I.

**FREN 110. French III.** (1) Language laboratory. Strongly recommended for students taking French II. Conc. enrollment in French II required. For Credit/No Credit only. Credit given only upon receiving a passing grade for the conc. section of French II.

**FREN 111. French I.** (4) Introduction to the structure of modern French, emphasizing the spoken language with practice in the language laboratory.

**FREN 112. French II.** (4) Continuation of French I, completion of basic presentation of the structure of French. Emphasis on spoken language, use of language lab. Pr.: FREN 111 or equiv.

**FREN 211. French III.** (4) Intensive review of the structure of the French language. Reading and discussion of French prose. Pr.: FREN 112 or equiv.

**FREN 212. Elementary French Conversation IIIA.** (2) Course not open to fluent speakers of French. Normally to be taken conc. with French III. Pr.: FREN 112 or equiv.

**FREN 213. French IV.** (3) Reading and discussion of modern French prose and review of the more difficult points of French grammar. Pr.: FREN 211 or equiv.

**FREN 214. French Conversation IVA.** (2) Continued practice in conversational French. Not open to fluent speakers of French. Normally to be taken conc. with French IV. Pr.: FREN 211 or equiv.

**FREN 502. French Literature in Translation.** (3) Selected readings in English from the works of such major French authors as Flaubert, Zola, Sartre, Camus, and Ionesco. Not accepted for major credit in French.

**FREN 510. Modern French Culture.** (2) French culture since World War II with special emphasis on social, economic, historical, and artistic developments of that period. Taught in English. Not accepted for major credit in French.

**Undergraduate and graduate credit in minor field**

**FREN 511. Masterpieces of French Literature I.** (3) The reading and discussion of major works of French literature from the Middle Ages to the end of the eighteenth century. Pr.: FREN 213 or equiv.

**FREN 512. Masterpieces of French Literature II.** (3) The reading and discussion of major works of French literature from the early nineteenth century to the present. Pr.: FREN 213 or equiv.

**FREN 513. French Composition and Grammar.** (3) Review in depth of the structure of the language. Intensive practice in written and conversational French. Pr.: FREN 213 or equiv.

**FREN 514. French Civilization.** (3) Introduction to French culture with special emphasis on social and historical developments since World War II. Pr.: 18 hours of college French or equiv.

**FREN 516. Readings in French.** (3) Practice in reading a variety of literary, journalistic, and specialized texts. Pr.: FREN 213 or equiv.

**FREN 517. Commercial French.** (3) Advanced grammar necessary for adequate oral and written expression in international business and diplomatic situations, including specialized terminology, conversation and discussion, and translation. Pr.: FREN 213.

**FREN 518. Advanced French Conversation.** (3) II. Practice in spoken French, with emphasis on idiomatic expression. Course not open to students whose primary language is French and whose competence has been demonstrated in the language at this level. Pr.: FREN 213.

**FREN 519. Special Studies in French.** (Var.) Pr.: Consent of department head and instructor involved.

**Undergraduate and graduate credit**

**FREN 709. Medieval French Literature.** (3) An introduction to literary forms, style, and thought from the eleventh century to the fifteenth century in France. Readings in modern French include *Chanson de Roland*, Chretien de Troyes, *Roman de la Rose*, etc. Pr.: 21 hours of college French or equiv.

**FREN 710. Sixteenth-Century French Literature.** (3) Reading and discussion of selected prose and poetry of the French Renaissance. Pr.: 21 hours of college French or equiv.

**FREN 711. Seventeenth-Century French Literature I.** (3) I. Various literary forms of the French baroque period. Reading of representative texts by Corneille, Pascal, Descartes, and others. Pr.: 21 hours of college French or equiv.

**FREN 712. Seventeenth-Century French Literature II.** (3) II. Various literary forms of the French classical period. Reading of representative texts by Moliere, Racine, Lafayette, La Fontaine, and others. Pr.: 21 hours of college French or equiv.

**FREN 713. Eighteenth-Century French Literature.** (3) Critical study of the literature of the Enlightenment. Pr.: 21 hours of college French or equiv.

**FREN 714. Nineteenth-Century French Literature I.** (3) A study of preromanticism and romanticism. Pr.: 21 hours of college French or equiv.

**FREN 715. Nineteenth-Century French Literature II.** (3) A study of realism, naturalism, and symbolism. Pr.: 21 hours of college French or equiv.

**FREN 716. Twentieth-Century French Literature I.** (3) The study of major themes and trends in the novel, drama, and poetry as reflected in representative works of such authors as Proust, Mauriac, Cocteau, Claudel, Valery, and others. Pr.: 21 hours of college French or equiv.

**FREN 717. Twentieth-Century French Literature II.** (3) Reading and analysis of recent innovations in literary theory and practice as found in the works of such authors as Sartre, Camus, Beckett, Ionesco, Robbe-Grillet, Sarraute, and others. Pr.: 21 hours of college French or equiv.

**FREN 718. The French Novel.** (3) The development of the novel from the seventeenth century to the present, seen through selected masterworks. Pr.: 21 hours of college French.

**FREN 719. Advanced Spoken and Written French.** (3) II. An advanced, intensive study of French prose style. Introduction to the techniques of translation from English to French. Intensive practice in oral style and diction. Pr.: 21 hours of college French.

**FREN 720. Seminar in French.** (3) A seminar with variable topics. Pr.: Senior standing or consent of the instructor.

**FREN 742. French Literature in Second Language Learning.** (3) Analysis of literary texts from French-speaking countries within their cultural context. The development of interpretive skills and application to the French curriculum will be emphasized. Pr.: 24 credits at 200 or above in French, or equivalent.

**FREN 743. French-Speaking Cultures in Second Language Learning.** (3) Emphasis on the study of French culture and applications to the French curriculum, including the development of materials. Pr.: 24 credits at 200 or above in French, or equivalent. Cross-listed with EDCI 743.

**FREN 799. Problems in Modern Languages.** (Var.)

**German courses**

**GRMN 002. Orientation for Summer School Program in Germany.** (0)

**Undergraduate credit**

**GRMN 119. German II.** (1) Language laboratory. Strongly recommended for students taking German I. Conc. enrollment in German I required. For Credit/No Credit only. Credit given only upon receiving a passing grade for the conc. section of German I.

**GRMN 120. German III.** (1) Language laboratory. Strongly recommended for students taking German II. Conc. enrollment in German II required. For Credit/No Credit only. Credit given only upon receiving a passing grade for the conc. section of German II.

**GRMN 121. German I.** (4) Introduction to the structure of modern German. Practice of the spoken language with additional experience in the language lab.

**GRMN 122. German II.** (4) Continuation and conclusion of the introduction to modern German, reading of selected prose texts. Pr.: GRMN 121 or equiv.

**GRMN 221. German III.** (4) Reading and discussion of a selection of modern German prose and review of the structure of German. Pr.: GRMN 122 or equiv.

**GRMN 222. Elementary German Conversation IIIA.** (2) Practice in beginning conversational German. Course not open to fluent speakers of German. Course normally taken conc. with German III. Pr.: GRMN 122 or equiv.

**GRMN 223. German IV.** (3) Reading and discussion of modern German prose and review of the more difficult points of German grammar. Pr.: GRMN 221 or equiv.

**GRMN 224. German Conversation IVA.** (2) Continued practice in conversational German. Course not open to fluent speakers of German. Normally taken conc. with German IV. Pr.: GRMN 221 or equiv.

**GRMN 503. German Literature in Translation.** (3) Selected readings in English from such major German authors as Mann, Brecht, Hesse, Grass, and Kafka. Not accepted for major credit in German.

**Undergraduate and graduate credit in minor field**

**GRMN 521. Introduction to German Literature I.** (3) Literary movements of the nineteenth century are introduced through the reading and discussion of texts in various forms and by representative authors. Pr.: GRMN 223 or equiv.

**GRMN 522. Introduction to German Literature II.** (3) Discussion of significant works of twentieth-century prose, poetry, and drama. Special emphasis is placed on the literature of recent decades. Pr.: GRMN 223 or equiv.

**GRMN 523. German Composition.** (3) A study of German syntax and exercises in composition. Pr.: GRMN 223 or equiv.

**GRMN 524. German for Reading Knowledge I.** (3) The grammar and syntax of German and the reading of basic material selected from modern German texts. Not for fulfillment of humanities distribution requirement.

**GRMN 525. German for Reading Knowledge II.** (3) Continued reading of material from modern German texts. Not for fulfillment of humanities distribution requirement. Pr.: GRMN 524 or equiv.

**GRMN 526. Business German.** (3) Advanced grammar necessary for adequate oral and written expression in international business and diplomatic situations, including specialized terminology, conversation and discussion, and translation. Pr.: GRMN 523.

**GRMN 527. Advanced German Conversation.** (3) Intensive practice in conversation. Course not open to

students whose primary language is German and whose competence has been demonstrated in the language at this level. Pr.: GRMN 223 or equiv.

**GRMN 529. Special Studies in German.** (Var.) Pr.: Consent of department head and instructor involved.

**GRMN 530. German Civilization.** (3) II. The political and cultural development of the German-speaking people and their role and influence in the history of the Western world. Pr.: 18 hours of college German.

### Undergraduate and graduate credit

**GRMN 721. German Classicism.** (3) I. Reading and discussion of late eighteenth-century texts, including works by Goethe, Schiller, Hoelderlin, etc. Pr.: 21 hours of college German or equiv.

**GRMN 722. German Romanticism.** (3) II. A study of representative works of German romantic literature by such authors as Schlegel, Tieck, Eichendorff, Novalis. Pr.: 21 hours of college German or equiv.

**GRMN 723. Goethe and *Faust*.** (3) I. The writings of Goethe and his masterpiece, *Faust*. Pr.: 21 hours of college German or equiv.

**GRMN 724. German Prose and Drama of the Nineteenth Century.** (3) II. A consideration of post-romantic German literature with special emphasis on the novella. Authors including Grillparzer, Keller, and Meyer are discussed. Pr.: 21 hours of college German.

**GRMN 725. Early Twentieth-Century German Literature.** (3) II. A study of the drama and lyric of naturalism, neoclassicism, neo-romanticism, and expressionism. Pr.: 21 hours of college German.

**GRMN 726. German Literature since 1945.** (3) I. A discussion of the postwar writings of the Gruppe 47, Swiss playwrights, and others. Pr.: 21 hours of college German.

**GRMN 727. The Modern German Novel.** (3) II. Theory of the German novel with examples from authors such as Mann, Hesse, Grass, and others. Pr.: 21 hours of college German.

**GRMN 728. History of the German Language.** (3) I. A study of the development of the sounds, forms, and syntax of standard German. Fulfills distribution requirements for major. Pr.: Senior standing.

**GRMN 729. Seminar in German.** (3) A seminar with variable topics, including literature of social and political protest, Austrian and Swiss literature, literature of the Middle Ages, emigre literature, etc. Pr.: Senior standing or consent of instructor.

**GRMN 731. Advanced Spoken and Written German.** (3) Intensive practice in conversation and diction, with considerable practice in the writing of essays in German. Pr.: 24 hours of college German.

**GRMN 732. Methods in German Literary Criticism.** (3) Introduction to the various theories of literary analysis. Interpretation of representative German texts. Pr.: 24 hours of college German.

**GRMN 733. The Enlightenment and Storm and Stress.** (3) A study of representative texts from various movements in German literature and culture of the eighteenth century, including *Empfindsamkeit* and *Rococo*. Such authors as Gottsched, Klopstock, Lessing, Lichtenberg, Wieland, and the young Goethe and Schiller will be discussed. Pr.: 21 hours of college German.

**GRMN 734. Literature of the German Democratic Republic.** (3) A study of the literary developments within the German Democratic Republic. The course will consider the writers' role in a socialist society and their impact upon the cultural scene. Readings will include representative works from all genres. Pr.: 21 hours of college German.

**GRMN 740. German Literature in Second-Language Learning.** (3) Analysis of literary texts from German-speaking countries within their cultural context. The development of interpretive skills and application to the German curriculum will be emphasized. Pr.: 24 credits of 200 or above in German or equiv.

**GRMN 741. German Culture in Second-Language Learning.** (3) Emphasis on the study of German culture and application to German curriculum including the development of materials. Pr.: 24 credits of 200 and above in German or equiv. Same as EDCI 772.

**GRMN 799. Problems in Modern Languages.** (Var.)

### Italian courses

#### Undergraduate credit

**ITAL 129. Italian II.** (1) Language laboratory. Strongly recommended for students taking Italian I. Conc. enrollment in Italian I required. For Credit/No Credit only. Credit given only upon receiving a passing grade for the conc. section of Italian I.

**ITAL 130. Italian III.** (1) Language laboratory. Strongly recommended for students taking Italian II. Conc. enrollment in Italian II required. For Credit/No Credit only. Credit given only upon receiving a passing grade for the conc. section of Italian II.

**ITAL 131. Italian I.** (4) Introduction to the structure of modern Italian.

**ITAL 132. Italian II.** (4) Continuation and completion of the study of modern Italian grammar, using the facilities of the language laboratory for audiolingual practice. Pr.: ITAL 131 or equiv.

**ITAL 231. Italian III.** (4) Grammar review and reading selections from Italian literature. Pr.: ITAL 132 or equiv.

**ITAL 232. Italian IV.** (3) Selective review of grammar and reading of examples of modern Italian literature. Pr.: ITAL 231 or equiv.

**ITAL 520. Special Studies in Italian.** (Var.) Pr.: Consent of department head and instructor involved.

### Latin courses

#### Undergraduate credit

**LATIN 105. Latin and Greek for Scientists.** (1) I. The course is designed specifically to provide students of the biological sciences with a background in Latin and Greek roots of scientific terms. Emphasis on prefixes, suffixes, and word derivations. No prior knowledge of either Latin or Greek is required. Course may not be applied toward the fulfillment of either language or humanities requirements for any degree.

**LATIN 141. Latin I.** (4) An introductory study of the structure of Latin.

**LATIN 142. Latin II.** (4) Continuation and completion of the study of the structure of Latin. Pr.: LATIN 141.

**LATIN 241. Latin III.** (4) Review of Latin grammar and reading of an anthology of Roman prose and poetry. Pr.: LATIN 142.

**LATIN 242. Latin IV.** (3) Continuation of the study of Latin syntax and grammar, based upon the reading of Roman prose and poetry. Pr.: LATIN 241.

**LATIN 501. Classical Literature in Translation.** (3) Selected readings in English from the works of such major classical authors as Homer, Euripides, Vergil, Horace, and Terence.

### Undergraduate and graduate credit in minor field

**LATIN 549. Special Studies in Latin.** (Var.) Pr.: Consent of the department head and instructor involved.

### Linguistics courses

#### Undergraduate and graduate credit in minor field

**LG 730. Foundations of Semiotics.** (3) II. The general theory of signs; detailed classification of signs and examination of several semiotic systems such as language, literature, culture, and society. The semiotics of communication and signification. Pr.: Senior standing.

#### Undergraduate and graduate credit

**LG 600. Principles of Linguistics.** (3) Same as LING 600 and ENGL 600.

**LG 601. General Phonetics.** (3) Same as LING 601 and ENGL 601.

**LG 602. Historical Linguistics.** (3) Same as LING 602 and ENGL 602.

**LG 603. Topics in Linguistics.** (3) Same as LING 603 and ENGL 603.

**LG 783. Phonology I.** (3) Same as LING 783 and ENGL 783.

**LG 785. Syntax I.** (3) Same as LING 785 and ENGL 785.

**LG 792. Field Methods in Linguistics.** (3) Same as LING 792.

### Portuguese courses

#### Undergraduate credit

**PORT 163. Portuguese I.** (4) I. Introduction to the structure of the Portuguese language, stressing Brazilian usage, and emphasizing oral and written skills.

**PORT 164. Portuguese II.** (4) II. Continuation of Portuguese I, completion of the basic presentation of structural and linguistic principles of the Portuguese language. Pr.: PORT 163 or equiv. course.

**PORT 266. Portuguese III.** (4) I. Intensive review of syntax and a comprehensive structural review of modern Portuguese, stressing Brazilian usage, with emphasis on composition and conversation. Pr.: PORT 164 or equiv.

**PORT 267. Portuguese IV.** (3) II. Reading and discussion of selections from contemporary prose, emphasizing Brazilian writings, and review of grammatical structures as needed. Pr.: PORT 266 or equiv.

### Undergraduate and graduate credit in minor field

**PORT 572. Special Studies in Portuguese.** (1-3) Pr.: 15 hours of Portuguese and consent of instructor.

### Russian courses

#### Undergraduate credit

**RUSSN 149. Russian II.** (1) Language laboratory. Strongly recommended for students taking Russian I. Conc. enrollment in Russian I required. For Credit/No Credit only. Credit given only upon receiving a passing grade for the conc. section of Russian I.

**RUSSN 150. Russian III.** (1) Language laboratory. Strongly recommended for students taking Russian II. Conc. enrollment in Russian II required. For Credit/No Credit only. Credit given only upon receiving a passing grade for the conc. section of Russian II.

**RUSSN 151. Russian I.** (4) I. Introduction to the structure of modern Russian. Emphasis on the sounds of Russian, the use of the Cyrillic alphabet, and oral drills with added practice in the language laboratory.

**RUSSN 152. Russian II.** (4) II. Continuation of the study of Russian grammar and oral communication. Pr.: RUSSN 151 or equiv.

**RUSSN 250. Russian Culture and Civilization.** (3) Russia's past and present in the light of principal ideologies with emphasis upon fine art, literature,

music, religion, politics, and education. Equal time will be devoted to the Tsarist and Soviet periods. Knowledge of Russian is not required. Same as HIST 250.

**RUSSN 251. Russian III.** (4) I. Completion of the study of Russian grammar. Reading of selected prose on the intermediate level. Pr.: RUSSN 152 or equiv.

**RUSSN 252. Russian IV.** (3) II. Intensive review of Russian grammar. Exercises in reading selected modern Russian texts in the original. Pr.: RUSSN 251 or equiv.

**RUSSN 504. Russian Literature in Translation: The Nineteenth Century.** (3) Survey of principal writers of Tsarist Russia with emphasis upon Turgenev, Dostoevsky, Tolstoy, and Chekhov.

**RUSSN 508. Russian Literature in Translation: The Soviet Period.** (3) The development of Russian literature since the Revolution, with emphasis upon Mayakovsky, Sholokhov, Pasternak, and Solzhenitsyn.

### Undergraduate and graduate credit in minor field

**RUSSN 551. Russian V.** (3) Reading of Russian short stories of the nineteenth and twentieth centuries, including works by Pushkin, Lermontov, Dostoevsky, and Chekhov.

**RUSSN 552. Survey of Russian Literature.** (3) A history of Russian literature from its beginnings until the present, with emphasis on the works of the nineteenth century, including those of Pushkin, Lermontov, Gogol, Turgenev, Dostoevsky, and Tolstoy.

**RUSSN 553. Russian Conversation and Composition.** (3) Discussion in Russian. Extensive practice in writing Russian compositions.

**RUSSN 559. Special Studies in Russian.** (Var.) Pr.: Consent of department head and instructor involved.

### Spanish courses

**SPAN 003. Orientation for Summer School Abroad Program in Jalapa, Mexico.** (0)

### Undergraduate credit

**SPAN 159. Spanish II.** (1) Language laboratory. Strongly recommended for students taking Spanish I. Conc. enrollment in Spanish I required. For Credit/No Credit only. Credit given only upon receiving a passing grade for the conc. section of Spanish I.

**SPAN 160. Spanish III.** (1) Language laboratory. Strongly recommended for students taking Spanish II. Conc. enrollment in Spanish II required. For Credit/No Credit only. Credit given only upon receiving a passing grade for the conc. section of Spanish II.

**SPAN 161. Spanish I.** (4) Basic introduction to the structure of the Spanish language, emphasizing oral and written drills, as well as practice in the language laboratory.

**SPAN 162. Spanish II.** (4) Continuation of Spanish I, completion of basic presentation of structural and linguistic principles of the Spanish language, and practice in the language laboratory. Pr.: SPAN 161 or equiv.

**SPAN 261. Spanish III.** (4) An intensive review of syntax and a comprehensive structural review of Spanish, with emphasis on composition and conversation. Pr.: SPAN 162 or equiv.

**SPAN 262. Elementary Spanish Conversation IIIA.** (2) Practice in beginning conversational Spanish. Emphasis on oral communication within the classroom. Course not open to fluent speakers. Should be taken conc. with Spanish III.

**SPAN 263. Spanish IV.** (3) Reading and discussion of selections from contemporary prose, and review of grammatical structures as needed. Pr.: SPAN 261 or equiv.

**SPAN 264. Elementary Spanish Conversation IVA.** (2) Continuation of Elementary Spanish Conversation IIIA. Should be taken conc. with Spanish IV.

**SPAN 505. Spanish Literature in Translation.** (3) Selected readings in English from the works of such major Spanish and Latin American authors as Garcia Lorca, Borges, Neruda, and Garcia Marquez. Not accepted for major credit in Spanish.

### Undergraduate and graduate credit in minor field

**SPAN 563. Introduction to the Literature of Spanish America.** (3) Reading and analysis of representative works of Spanish-American literature from the colonial period to the present. Pr.: SPAN 263 or equiv.

**SPAN 564. Spanish Composition and Grammar.** (3) I. The grammar and syntax of modern Spanish. Course not open to those students whose primary language is Spanish and whose competence has been demonstrated in the language at this level. Pr.: SPAN 263 or equiv.

**SPAN 565. Spanish Civilization.** (3) I. Survey of Spanish culture and civilization from its beginnings to the present; emphasis on Spanish contributions over the centuries in the humanistic field. Pr.: SPAN 263 or equiv.

**SPAN 566. Hispanic-American Civilization.** (3) II. Survey of Spanish-American culture and civilization from 1492 to the present. Pr.: SPAN 263 or equiv.

**SPAN 567. Introduction to the Literature of Spain.** (3) Reading and analysis of representative works of Spanish literature from its beginnings to the present. Pr.: SPAN 263 or equiv.

**SPAN 569. Special Studies in Spanish.** (Var.) Pr.: Consent of department head and instructor involved.

**SPAN 571. Advanced Spanish Conversation.** (3) II. Intensive practice in conversation. Course not open to those students whose primary language is Spanish and whose competence has been demonstrated in the language at this level. Pr.: SPAN 263 or equiv.

**SPAN 573. Business Spanish.** (3) Advanced grammar necessary for adequate oral and written expression in international business and diplomatic situations, including specialized terminology, conversation and discussion, and translation. Pr.: SPAN 564 or equiv.

**SPAN 574. Hispanic Readings.** (3) Practice in reading a variety of literary, journalistic, and specialized texts. Pr.: SPAN 263 or equiv.

### Undergraduate and graduate credit

**SPAN 751. Spanish-American Narrative to 1950.** (3) Development of the narrative in Spanish America from the colonial period to the mid-twentieth century. Analysis and discussion of representative authors from various regions. Pr.: 21 hours of college Spanish or equiv.

**SPAN 752. Contemporary Spanish-American Narrative.** (3) Analysis and discussion of the narrative since approximately 1950, including such outstanding writers as Borges, Cortazar, Fuentes, Garcia Marquez, and Vargas Llosa. Pr.: 21 hours of college Spanish or equiv.

**SPAN 755. Spanish-American Poetry and Drama.** (3) Analysis and discussion of Spanish-American poetry and drama, with emphasis on twentieth-century theater. Readings of selected major poets and leading playwrights from various regions of Spanish America. Pr.: 21 hours of college Spanish or equiv.

**SPAN 756. Nineteenth-Century Spanish Literature.** (3) The reading and study of nineteenth-century Spanish literature; drama, essay, novel, poetry, and short story. Such authors as Larra, Zorrilla, el Duque de Rivas, Espronceda, Tamayo y Baus, Echegaray, Becquer, and Perez Galdos will be discussed. Pr.: 21 hours of college Spanish or equiv.

**SPAN 757. Perez Galdos and the Generation of '98.** (3) Reading and analysis of works by Perez Galdos and such members of the Generation of '98 as Unamuno, Benavente, and Machado, within the historical and cultural framework of the late nineteenth and early twentieth centuries. Pr.: 21 hours of college Spanish or equiv.

**SPAN 760. Advanced Spoken and Written Spanish.** (3) Intensive review of grammatical structure and refinement of standard Spanish usage. Extensive practice in composition and conversation, and translations from English into Spanish. Pr.: 21 hours of college Spanish or equiv.

**SPAN 761. Medieval and Renaissance Literature.** (3) Reading and interpretation of the principal literary works of Medieval and Renaissance Spain, from the *jarchas* and the *Poema de Mio Cid* to the *crónicas* and *La Celestina*, studied within the historical and cultural context of each. Pr.: 21 hours of college Spanish or equiv.

**SPAN 763. Twentieth-Century Spanish Literature.** (3) The major writers and directions of twentieth-century literature in Spain. Analysis and discussion of the works of such representative authors as Unamuno, Jimenez, Guillen, Lorca, Cela, Buero Vallejo, and Delibes. Pr.: 21 hours of college Spanish.

**SPAN 764. Spanish Literature of the Golden Age.** (3) Reading and analysis of the works of such major writers as Lope de Vega, Tirso de Molina, Calderon de la Barca, Garcilaso, Fray Luis de Leon, San Juan de la Cruz, Gongora, and Quevedo, as well as selected works from the picaresque tradition. Pr.: 21 hours of college Spanish or equiv.

**SPAN 771. Introduction to Spanish Translation.** (3) Translation theory and practice as applied to Spanish. Translations from Spanish to English and English to Spanish, involving unique problems related to science, business, reporting, and literature. Pr.: 21 hours of college Spanish or equiv.

**SPAN 772. The Hispanic World Today.** (3) An investigation of selected social, political, and humanistic aspects of contemporary Hispanic culture. Pr.: 21 hours of college Spanish or equiv.

**SPAN 775. Cervantes.** (3) Reading of the works of Cervantes and discussion of the literary and cultural background of the period. Pr.: 21 hours of college Spanish or equiv.

**SPAN 777. Hispanic Cultures in Second-Language Learning.** (3) Emphasis on the study of Spanish culture and applications to the Spanish curriculum, including the development of materials. Pr.: 24 credits in Spanish at 200 or above or equiv. Same as FDCI 771.

**SPAN 778. Spanish and Spanish-American Literature in Second-Language Learning.** (3) Analysis of literary texts from Spanish-speaking countries, with emphasis on the development of interpretive skills and application to the Spanish curriculum. Pr.: 24 credits in Spanish at 200 or above or equiv.

**SPAN 779. Seminar in Spanish.** (3) A seminar with variable topics. Pr.: Senior standing or consent of the instructor.

**SPAN 799. Problems in Modern Languages.** (Var.)

### South Asian languages courses

#### Undergraduate credit

**URDU 171. Hindi/Urdu I.** (4) I. Introduction to the structure of Hindi and Urdu, two languages which are nearly identical in the grammatical structure of their everyday spoken style. Hindi is the dominant language of northern India. Urdu is the national language of Pakistan, also understood throughout the Hindi area.

**URDU 172. Hindi/Urdu II.** (4) II. Continuation of Hindi/Urdu I with introduction of the Devanagari (Hindi and Sanskrit) script. Pr.: URDU 171.

**URDU 273. Hindi/Urdu III.** (4) I. Continuation of Hindi/Urdu II with gradual transition to more formal styles of language. Pr.: URDU 172.

**URDU 274. Hindi/Urdu IV.** (4) II. Continuation of Hindi/Urdu III with readings in Hindi or Urdu literature according to needs of students. Pr.: URDU 273.

### Undergraduate and graduate credit in minor field

**URDU 575. Hindi/Urdu V.** (4) I, II, S. Individual study in Hindi or Urdu. Readings, composition, or conversational practice relevant to the student's interests and disciplinary needs. May be repeated for credit. Pr.: URDU 274.

### Undergraduate and graduate credit

**URDU 799. Problems in Modern Languages.** (Var.)

## Music

Jack Flourer,\* Head

Professors R. Edwards,\* Flourer,\* Funkhouser,\* Jackson,\* Langenkamp,\* Sloop,\* Sutton,\* and R. Walker;\* Associate Professors Fallin,\* Littrell,\* Parker,\* Polich, and Sidorfsky;\* Assistant Professors A. Cochran,\* Finek, MaeAdam, Mortenson,\* and Roysc; Instructors Cooper, J. Edwards, Houser, Rohrer, and Rushing; Adjuncts Betton, M. L. Cochran, Gibbons, and Wingfield; Emeriti: Professors Brookhart,\* Shull,\* Steinbauer,\* W. Walker,\* and White;\* Assistant Professors Caine\* and M. Walker.\*

The Department of Music is a member, with institutional accreditation, of the National Association of Schools of Music.

Curricula in music education and performance with majors in music theatre, composition, voice, piano, organ, strings, woodwind, percussion, and brass instruments are offered. Courses in music are available to any student enrolled in the university, subject to prerequisites listed in the course descriptions. Courses in performance do not require prerequisites for those not majoring in music; however, availability of instructor and fees for nonmajors are factors in securing performance instruction. This elective credit cannot be used later toward a music degree unless it meets the requirements of that course as they apply to those majoring in music. No more than two credits a semester will be granted for performance as an elective.

### Entrance requirements for new and transfer students

Preliminary placement examinations in piano, the performance major, and theory must be taken by all students majoring in music regardless of the curriculum selected. Students will be advised as to the most appropriate field of concentration and the

proper level of study as a result of examination.

Divisional hearings will determine the number of upper-level hours that will be accepted for transfer students.

### Bachelor of arts

120 hours required for graduation

The bachelor of arts with a major in music emphasizes the liberal arts tradition. The program provides enough flexibility in electives for students to meet other preprofessional requirements, and it thus may appeal to students whose professional goals do not terminate with music. The minimum requirement in music is 48 hours, including the following:

MUSIC 201	Styles II, Textures of Music	4
MUSIC 202	Styles III, The Classical Period	4
MUSIC 213	Styles IV, The Romantic Period	4
MUSIC 218	Aural Skills Proficiency	0
MUSIC 398	Musical Style of the Baroque	4
MUSIC 406	Musical Style to 1600 (Medieval and Renaissance)	4
MUSIC 407	Musical Style of the Twentieth Century	4

Recital attendance is required for seven semesters (transfer students' records will be evaluated). The major program of music leading to the degree bachelor of arts may be elected with an emphasis in the areas of music literature, composition, or performance.

The music literature area requires 8 hours of electives in music history and music literature. In addition, 8 semester hours in a single performance area are required, of which half must be from the 400 level.

The composition area calls for MUSIC 521 (three hours), 615, 616, 714, 3 semester hours in music literature, and 8 semester hours of piano, of which half must be from the 400 level.

The performance area calls for MUSIC 615 and 616 plus 16 hours of an instrument or voice, of which half must be from the 400 level.

Participation in a music organization (instrumental or choral, depending on the major performance area) is required each semester, and the piano proficiency requirement must be passed before graduation.

### Bachelor of music

129-134 hours required for graduation

A four-year program is offered with concentrations in piano, organ, voice, strings, wind or percussion instruments, music theatre, and composition.

The general education requirements for this degree are listed in the College of Arts and Sciences section of this catalog.

The basic requirements for all options are:

MUSIC 201	Styles II, Textures of Music	4
MUSIC 202	Styles III, The Classical Period	4
MUSIC 213	Styles IV, The Romantic Period	4
MUSIC 218	Aural Skills Proficiency	0
MUSIC 398	Musical Styles of the Baroque Period	4
MUSIC 406	Musical Styles to 1600 (Medieval and Renaissance)	4
MUSIC 407	Musical Styles of the Twentieth Century	4
MUSIC 473	Seminar in Comprehensive Musicianship	2
MUSIC 417	Conducting	2
Music elective		2
Junior recital		0
Senior recital		0
MUSIC 050	Recital Attendance (7 semesters)	0
MUSIC 060	Piano Proficiency	0

### Additional requirements for music theatre option:

MUSIC 255	Voice	8
MUSIC 455	Voice	11
MUSIC 285	Italian Diction	1
	<b>and</b>	
MUSIC 287	German Diction	1
	<b>or</b>	
MUSIC 465	French Diction I	1
Major performing organization		4
MUSIC 475	Opera Workshop	4
MUSIC 492	Methods and Materials of the Studio	2
MUSIC 207	Piano Class II	1
	<b>or</b>	
MUSIC 255	Piano	1
Music electives		2
THTRE 260	Stage Movement	3
THTRE 560	Advanced Stage Movement	3
THTRE 261	Fundamentals of Acting	3
THTRE 361	Intermediate Acting	3
	<b>or</b>	
THTRE 761	Advanced Acting	3
THTRE 267	Fundamentals of Stage Costuming and Design	3
THTRE 368	Fundamentals of Technical Production	3
MUSIC 650	History of the Opera	3
THTRE 211	Drama Participation	2
DANCE 165	Ballet	2
Dance electives		2
Secondary modern language		4

### Additional requirements for vocal performance:

MUSIC 255	Voice	8
MUSIC 455	Voice	14
Piano Class or Piano		4
MUSIC 474	Problems in Musical Style and Music Pedagogy	2
MUSIC 615	Canon and Fugue	2
MUSIC 616	Twentieth Century Counterpoint	2
MUSIC 492	Methods and Materials of the Studio	2
Major performing organization each semester		4
Diction		4
Vocal ensemble or Opera Theatre		4
Additional music electives		3
Primary modern language (2 additional courses)		7
Secondary modern language (I course)		4

### Additional requirements for instrumental performance:

(piano, organ, strings, wind, and percussion instruments):		
MUSIC 255		8
MUSIC 455		14
Major performing organization each semester		4
Instrumental ensemble		4
Secondary performance area		4
MUSIC 474	Problems in Musical Style and Music Pedagogy	2
MUSIC 714	Advanced Orchestration	2
Additional music electives		3
Additional non-music electives		10

**Additional requirements for composition:**

Major performance area (If piano is major area then 8 hours of a secondary performance area) . . . . .	8
MUSIC 255	
and/or 455 Piano . . . . .	8
MUSIC 474 Problems in Musical Style and Music Pedagogy . . . . .	2
MUSIC 714 Advanced Orchestration . . . . .	2
MUSIC 521 Composition . . . . .	12
MUSIC 615 Canon and Fugue . . . . .	2
MUSIC 616 Twentieth Century Counterpoint . . . . .	2
MUSIC 631 Technology of the Electronic Music Studio . . . . .	2
MUSIC 632 Digital Sound Synthesis . . . . .	2
Major performing organization each semester	
Additional music electives . . . . .	7
Additional non-music electives . . . . .	10

**Bachelor of music education**

136–139 hours required for graduation, depending on emphasis

The program of study leading to this degree is a nine-semester curriculum designed to prepare music teachers for grades K–12. With careful planning and enrollment during summer session(s) all requirements may be completed in four years. Within this curriculum there are two emphases—vocal/choral music, and instrumental music.

**Professional educational requirements**

DED 102  
EDCEP 215, 315, 525  
EDCIP 410, 455  
EDSP 323  
EDETC 318  
EDSEC 376, 477, 582

ENGL 100 and 120 (or ENGL 110 and 125), SPCH 106, and EDAF 215 are required before admittance to EDAF 315. See education requirements for admittance to teacher education.

**Music requirements for all options****Comprehensive musicianship:**

MUSIC 200, 201, 202, 213, 218, 398, 406, 407, 417, and 473

**Music education:**

MUSIC 511, 512, and 670

**Performance:**

MUSIC 060, 501 or 502, and study of the major instrument or voice and enrollment in a major choral or instrumental organization each semester except the professional semester. In addition, at least one semester in a small ensemble is required.

**Additional music requirements for instrumental emphasis****Performance:**

MUSIC 203, 204, 206, 207, and 9 semester hours chosen according to the major instrument from:  
MUSIC 232, 233, 234, 235, 427, 428, and 429

Enrollments in major organizations must include at least two semesters in a choral organization; upon the recommendation of the advisor, one additional semester of individual or class instruction in voice may be substituted.

**Additional requirements for vocal/choral emphasis****Performance:**

If voice is the major performance area, MUSIC 232, 233, 234, 235, 285, and 287 or 465; 4 hours of keyboard. If keyboard is the major performance area, MUSIC 203, 204, 210, 211, 232, 233, 234, 235, and 350 (two semesters)

Enrollments in major organizations must include at least two semesters in an instrumental organization; upon the recommendation of the advisor, one semester

of advanced instrumental techniques classes may be substituted.

Requirements in general education are stated earlier in the College of Arts and Sciences section.

**General regulations for all performance areas**

As a part of performance requirements, studio and divisional seminars and general student recitals are held regularly. Each student is required to perform at least once a semester either in a studio seminar or in a student recital. All private study for credit will culminate in a jury exam each term. Each division faculty maintains the right to advise students to discontinue performance study in that particular curriculum if the students have not demonstrated the necessary degree of progress.

For specific divisional requirements, each student should request a copy of detailed policies.

**Required recital attendance**

Attendance at a minimum of 15 recitals or concerts per semester for seven semesters is required for graduation. Transfer students' records will be evaluated.

**Fees for private music lessons**

University students enrolled in the bachelor of music, bachelor of music education, bachelor of arts in music degrees with a major in music, or bachelor of arts or bachelor of science in theatre (music theatre option) are exempt from fees for private music lessons and music practice facilities.

University students not majoring in one of these music curricula may take private music instruction (pending availability of staff and facilities) by paying fees as listed in the Fees section of this catalog.

**Comprehensive musicianship courses Undergraduate credit**

The musical styles courses are required of all undergraduate music majors and coordinate the many facets of the student's musical training. The structure of this program removes the traditional division between history and theory and integrates the student's study by stylistic periods, prefaced by a concentrated introduction to musical textures and basic technical skills. Included in each course are lectures in theory and history as well as laboratory work in performance, conducting, keyboard application, aural skills, analysis, and creative writing.

Styles courses are governed by the philosophy that all musicians need practical skills in performance, composition, and analysis; music students should recognize a coherent link between all facets of musical training (including those requirements outside the

styles courses); and all musical studies should, as closely as possible, relate to one's own time.

**MUSIC 200. Styles I, Elements of Music.** (3) I, II. The musical language and its relationship between mind and ear. Formation of interval, scale, and chord patterns; basic notational procedures.

**MUSIC 201. Styles II, Textures of Music.** (4) I, II. An introduction to musical elements and historical practice with emphasis on texture as a uniting force; stylistic procedures as applied to sound parameters by the major composers. Pr.: MUSIC 200 or tested knowledge of basic music theory.

**MUSIC 202. Styles III, The Classical Period.** (4) I, II. History and performance practices of the late eighteenth century. Diatonic chord structures and nonharmonic tones, introduction to modulation. Scoring for the piano; small forms. Pr.: MUSIC 201.

**MUSIC 213. Styles IV, The Romantic Period.** (4) I, II. Historical survey of the nineteenth century. Chromatic harmony, modulations, score reading, and large homophonic forms. Composition for piano with voice or solo instrument. Pr.: MUSIC 202.

**MUSIC 218. Aural Skills Proficiency.** (0) I, II. Required for graduation of all music majors. Pr.: MUSIC 213 or conc. enrollment.

**MUSIC 398. Musical Styles of the Baroque Period.** (4) I, II. Historical survey from 1600 to 1750; counterpoint with emphasis on invention, canon, and fugue; scoring for strings. Pr.: MUSIC 213.

**MUSIC 406. Musical Styles to 1600 (Medieval and Renaissance).** (4) I. Historical survey, modal counterpoint, early notational systems, performance practice, improvisational frameworks, development of instruments and forms. Pr.: MUSIC 213.

**MUSIC 407. Musical Style of the Twentieth Century.** (4) I. Modern music; contemporary practice and aesthetics; polytonality, serial techniques, electronic music. Pr.: MUSIC 398.

**MUSIC 473. Seminar in Comprehensive Musicianship.** (2) II, S. A study of music technology and computer applications; popular and non-Western styles. Pr.: MUSIC 213. Required for music education and performance majors.

**MUSIC 474. Problems in Musical Style and Music Pedagogy.** (2) I, II, S. Individual projects relating to a specific style or pedagogical problem of the performance major or minor. Pr.: MUSIC 213.

**Music history, literature, and theory courses****Undergraduate credit**

**MUSIC 100. Music Fundamentals.** (3) I, II, S. Elementary instruction in the theory of music.

**MUSIC 150. Music Listening Laboratory.** (1–2) I, II, S. A direct listening laboratory. Includes recorded musical works of all major periods and styles. Performances from the major university organizations, faculty artists, and special guests. Limited to nonmusic majors.

**MUSIC 220. Topics in Music.** (1–3) Offered on demand. Exploration of the musical dimensions of a particular topic or theme. Topics vary. May be repeated once.

**MUSIC 245. Introduction to American Music.** (3) I, II, S. An introduction to the functions of music in American society and the elements of music, including a survey of the development of various types and styles of music in America. For nonmusic majors only.

**MUSIC 250. Introduction to Music.** (3) I, II, S. Elements of music as represented in selected masterpieces of the standard concert repertory, designed to heighten the perception and the enjoyment of the

listener who has limited musical knowledge. For nonmusic majors only.

**MUSIC 310. History of Musical Instruments.** (2) Offered on demand, only in intersessions, through TELENET, or off-campus. The development of musical instruments in each period of Western music. Pr.: MUSIC 150 or 250.

**MUSIC 385. History of the American Popular Song.** (2) Offered on sufficient demand. The vigor and musical inventiveness of this unique American art form including the melodic, rhythmic, and harmonic aspects of the songs of Jerome Kern, Irving Berlin, George Gershwin, and others. Pr.: MUSIC 150 or MUSIC 250.

**MUSIC 390. Special Studies in Music.** (1-3) I, II, S. Pr.: Background of courses needed for studies undertaken.

**MUSIC 399. Honors Seminar.** (3) II. On sufficient demand. For selected sophomores.

**MUSIC 420. History of Jazz.** (3) On sufficient demand. Survey of jazz styles and personalities. For music majors and nonmajors. Pr.: MUSIC 150, 250, or equiv.

**MUSIC 424. Jazz in Kansas City and the Southwest.** (2-3) Offered on demand, only in intersessions, through TELENET, or off-campus. The history and development of jazz styles in Kansas City and the southwestern United States, emphasizing the influence on styles of other geographic areas. Pr.: MUSIC 150.

**MUSIC 425. Topics in Jazz.** (Var.) Offered on sufficient demand. Big bands; jazz pianists and styles; survey of combo jazz styles, etc. Pr.: MUSIC 150.

**MUSIC 470. Songwriting.** (3) Offered on sufficient demand. Composition of original small song forms including preparation of lead sheet and vocal score using guitar chord symbols. Pr.: MUSIC 100. For nonmusic majors only.

**MUSIC 498. Honors Tutorial in Music.** (1-3) I, II. Individual directed research and study of a topic in music, normally as a preliminary to writing a senior honors thesis. May be repeated once to a total of 3 hours. Pr.: Sophomore standing, membership in the honors program of the College of Arts and Sciences, and permission of the instructor.

**MUSIC 499. Senior Honors Thesis.** (2) I, II, S. Open only to seniors in the arts and sciences honors program.

## Undergraduate and graduate credit

**MUSIC 570. Musical Comedy.** (3) On sufficient demand. The history of operetta and music comedy from Offenbach to the present. Offered jointly by Departments of Music and Speech. Same as THRE 570.

**MUSIC 601. Western Music before 1750.** (2-3) II, alternate S. A survey of the development of Western music from early Greek civilization to 1750. Pr.: MUSIC 398 and 406.

**MUSIC 614. Harmony and Tonal Counterpoint.** (1) Recommended for graduate students in music who desire additional work in the harmonic aspects of 18th-century counterpoint. Concurrent enrollment in MUSIC 615 required.

**MUSIC 615. Canon and Fugue.** (2) I, S. Counterpoint in eighteenth century style. Pr.: MUSIC 398, consent of instructor.

**MUSIC 616. Twentieth-Century Counterpoint.** (2) II, S. Contrapuntal devices used by twentieth-century composers; serial techniques. Pr.: MUSIC 398, consent of instructor.

**MUSIC 620. Music Calligraphy and Score Preparation.** (2) Tools and procedures for professional preparation of music manuscript in facsimile editions. Computer applications for typesetting and music publishing. Pr.: MUSIC 201.

**MUSIC 631. Technology of the Electronic Music Studio.** (2) I, S. Instrumentation and systematic procedures as applied to the construction of electronic music. Principles of voltage-controlled systems, synchronous tape machines, and audio mixing. Individual and team projects. Pr.: MUSIC 521, consent of instructor.

**MUSIC 632. Digital Sound Synthesis.** (2) On sufficient demand. Exploration of real-time interactive systems. Theory and application pertaining to the creation of instruments and scores using additive and FM techniques. Team projects. Pr.: MUSIC 631.

**MUSIC 650. History of the Opera.** (3) On sufficient demand. A study of selected masterpieces of musical drama, with emphasis on the relationship of music and drama, and on the unique qualities of opera as a collective artwork. Pr.: MUSIC 201 or 250. Same as THRE 671.

**MUSIC 702. Style Analysis.** (2-3) On sufficient demand. Training in a comprehensive, systematic analytical approach to all style periods, and in verbalizing analytical perceptions. Pr.: MUSIC 407.

**MUSIC 704. Symphonic Literature.** (3) II. The development of orchestral music from the late Baroque to the present, with emphasis on selected symphonies of the late eighteenth and nineteenth centuries. Pr.: MUSIC 407.

**MUSIC 705. Chamber Music Literature.** (3) II, in alternate years. A selected survey of masterpieces of small ensemble music from 1750 to the present. Special emphasis on the string quartet. Pr.: MUSIC 407.

**MUSIC 706. Song Literature.** (3) II, in alternate years. Survey, by historical period and national style, of major solo vocal works. Pr.: MUSIC 407.

**MUSIC 708. Choral Literature.** (3) II, in alternate years. A study of standard choral masterpieces in both large and small forms from 1450 to the present. Pr.: MUSIC 407.

**MUSIC 711. Practical Composition and Arranging.** (2) On sufficient demand. Explanation of styles and techniques applicable to contemporary commercial music. Practical arranging for the stage band. Pr.: MUSIC 213 or consent of instructor.

**MUSIC 714. Advanced Orchestration.** (2) On sufficient demand. The study of orchestra and band scores. Exercises in orchestrating this type of music for different choirs of instruments, as well as scoring for full orchestra and symphonic band. Pr.: MUSIC 503 or consent of instructor.

**MUSIC 737. Organ Literature.** (3) I, in alternate years. A survey of significant compositions from the Renaissance to the present, with emphasis on performance practice. Pr.: MUSIC 407.

**MUSIC 738. Piano Literature.** (3) I, in alternate years. Selective survey of music for piano from 1750 to the present. Pr.: MUSIC 407.

**MUSIC 740. Studies in Music Literature.** (3) On sufficient demand. Study of the repertory of a selected musical genre or medium of performance. Pr.: MUSIC 407.

**MUSIC 766. Seminar in the Life and Works of an Individual Composer.** (3) I. Study of the career and achievements of a selected composer of major stature. Pr.: MUSIC 407.

**MUSIC 767. Topics in American Music.** (3) On sufficient demand. Studies of the various genres of American music. Pr.: MUSIC 407.

**MUSIC 799. Problems in Music.** (Var.) I, II, S. Individual guided work in a selected area. Pr.: Six hours graduate credit in music.

## Music education courses

### Undergraduate credit

**MUSIC 232. Woodwind Techniques and Materials.** (1) I. A beginning course in the fundamentals of playing

and methods for teaching woodwind instruments. For music majors only, and not open to woodwind majors.

**MUSIC 233. Brass Techniques and Materials.** (1) II A beginning course in the fundamentals of playing and methods for teaching brass instruments. For music majors only, and not open to brass majors.

**MUSIC 234. String Techniques and Materials.** (1) I. A beginning course in the fundamentals of playing and methods for teaching stringed instruments. For music majors only, and not open to string majors.

**MUSIC 235. Percussion Techniques and Materials.** (1) II. The fundamentals of playing and methods of teaching percussion instruments. For music majors only, and not open to percussion majors.

**MUSIC 405. Music for Elementary Teachers.** (3) I, II, S. The contribution of music to child development in elementary schools. A study of music literature suited to children through the development of purposive listening and the expressive phases of music including rhythmic response, singing, playing, reading, and writing. Pr.: Junior standing or consent of instructor.

**MUSIC 427. Advanced String Techniques and Materials.** (1-2) II. Playing and teaching skills beyond fundamentals and presentation of materials suitable for private and public school instruction at the secondary level. Required of all instrumental majors in music education. Pr.: MUSIC 234.

**MUSIC 428. Advanced Woodwind Techniques and Materials.** (1-2) II. Playing and teaching skills beyond fundamentals and presentation of materials suitable for private and public school instruction at the secondary level. Required of all instrumental majors in music education. Pr.: MUSIC 232.

**MUSIC 429. Advanced Brass Techniques and Materials.** (1-2) I. Playing and teaching skills beyond fundamentals and presentation of materials suitable for private and public school instruction at the secondary level. Required of all instrumental majors in music education. Pr.: MUSIC 233.

## Undergraduate and graduate credit

**MUSIC 511. Music in the Schools, K-6.** (4) II. The music curriculum in grades K-6, including a study of the musical characteristics of children and materials and techniques for teaching instrumental, vocal, and general music at this level. Pr.: Admission to teacher education and junior standing in music.

**MUSIC 512. Music Program in Junior/Senior High Schools.** (4) I. Organization and administration of the comprehensive music program in junior and senior high schools; including the study of vocal and instrumental ensemble development, as well as techniques and materials for other types of music classes. Pr.: Admission to teacher education and junior standing in music.

**MUSIC 670. Advanced Studies in Music Education.** (2) I, II, S. Advanced undergraduate studies of various topics related to the teaching of music in grades K-12. May be repeated for credit when topics vary. Pr.: MUSIC 511 or 512.

## Workshops in music

### Undergraduate credit

**MUSIC 489. Workshop in Music.** (1-2) S. Specialized interest areas for undergraduate students only. Pr.: Consent of instructor.

## Organizations and ensembles

### Undergraduate credit

**MUSIC 111. Concert Choir.** (1) I, II. Admission by audition.

**MUSIC 115. Marching Band.** (1) I, II. Admission by audition.

**MUSIC 116. Concert Band.** (1) II. Open to all interested wind and percussion performers without audition.

**MUSIC 117. Symphonic Wind Ensemble.** (1) I, II, S. A select performing organization. Admission by audition.

**MUSIC 120. Chamber Singers.** (1) I, II, S. Admission by audition.

**MUSIC 121. Collegiate Chorale.** (1) I, II, S. Open to all interested singers. Audition determines membership in other choral organizations.

**MUSIC 125. K-State Singers.** (1) I, II. Admission by audition. (Not open to music majors.)

**MUSIC 130. Symphony Orchestra.** (1) I, II, S. Admission by audition.

**MUSIC 131. Theatre Orchestra.** (1) I, II. Admission by audition.

**MUSIC 135. Men's Glee Club.** (1) I, II. Admission by audition.

**MUSIC 140. Women's Glee Club.** (1) I, II. Admission by audition.

**MUSIC 280. Lower-Division Ensemble Performance.** (1) I, II, S. Instruction is offered each semester in the following areas: brass, chamber music, concert jazz, jazz combo, strings, winds, and vocal ensemble. Admission is by audition and students may enroll in more than one ensemble simultaneously.

**MUSIC 298. Jazz Improvisation I.** (1) I, II. Fundamentals of jazz harmony with emphasis on simple chord progressions, blues scales, and some modes. Performance of improvised solos based on "standards" and original. May be repeated once for credit. Pr.: Consent of instructor.

**MUSIC 299. Jazz Improvisation II.** (1) I, II. Continuation of Jazz Improvisation I, with emphasis on more complex chord progressions, altered scales, and other modes. May be repeated once for credit. Pr.: MUSIC 298 or consent of instructor.

**MUSIC 350. Studio Accompanying.** (1) On sufficient demand. Piano student assigned to studio instructor. Accompanies lessons for at least two hours a week. Ensemble credit for pianists. Pr.: Consent of instructor.

**MUSIC 351. Recital Accompanying.** (1) On sufficient demand. Piano student assigned to a music major preparing for graduation recital. Pianist accompanies student in lessons and presents the formal public program as course requirement. Pr.: Consent of instructor.

**MUSIC 400. Concert Choir.** (1) I, II. Admission by audition.

**MUSIC 401. Concert Band.** (1) I, II, S. Open to all interested wind and percussion performers without audition.

**MUSIC 402. Symphonic Wind Ensemble.** (1) I, II. A select performing organization. Admission by audition.

**MUSIC 403. Collegiate Chorale.** (1) I, II, S. Open to all interested singers. Audition determines membership in other choral organizations.

**MUSIC 404. Symphony Orchestra.** (1) I, II, S. Admission by audition.

**MUSIC 408. Men's Glee Club.** (1) I, II. Admission by audition.

**MUSIC 409. Women's Glee Club.** (1) I, II. Admission by audition.

**MUSIC 411. Marching Band.** (1) I, II. Admission by audition.

**MUSIC 414. Theatre Orchestra.** (1) I, II. Admission by audition.

**MUSIC 415. Chamber Singers.** (1) I, II, S. Admission by audition.

**MUSIC 475. Opera Workshop.** (Var.) I, II, S. Principles and techniques of operatic and musical theatre production, with emphasis on class rehearsal

and performance of selected scenes from opera and musical drama; brief survey of the history of opera. Offered jointly by the Departments of Music and Speech. Vocal ensemble credit may be earned in this course. Same as SPCH 475.

**MUSIC 480. Upper-Division Ensemble Performance.** (1) I, II, S. Instruction is offered each semester in the following areas: brass, chamber music, concert jazz, jazz combo, strings, winds and vocal ensemble. Admission is by audition and students may enroll in more than one ensemble simultaneously.

**MUSIC 490. Collegium Musicum.** (1) I, II, S. An ensemble devoted primarily to the performance of music written before 1700. Authentic instruments used when possible. Pr.: Consent of instructor.

## Performance classes Undergraduate credit

**MUSIC 050. Recital Attendance.** (0) I, II.

**MUSIC 060. Piano Proficiency.** (0) I, II, S. Required for graduation of all music majors.

**MUSIC 203. Voice Class I.** (1) I, II. Not for voice majors.

**MUSIC 204. Voice Class II.** (1) I, II. Not for voice majors.

**MUSIC 206. Piano Class I.** (1) I, II, S. For freshmen and transfer music students with no piano background. Sections also available for nonmusic majors and nondegree students.

**MUSIC 207. Piano Class II.** (1) I, II, S. For freshmen and transfer students with some piano background, as well as those who have failed some or all of the Piano Proficiency Exam.

**MUSIC 208. Guitar Class I.** (1) I, II. Beginning-level group instruction in guitar performance.

**MUSIC 209. Guitar Class II.** (1) I, II. Intermediate-level instruction in guitar performance.

**MUSIC 210. Voice Class III.** (1) I, II. Not for voice majors.

**MUSIC 211. Voice Class IV.** (1) I, II. Not for voice majors.

**MUSIC 285. Italian Diction.** (1) I. Rules for pronouncing and translating Italian vocal texts.

**MUSIC 287. German Diction.** (1) I. Rules for pronouncing and translating German vocal texts.

**MUSIC 391. Keyboard Pedagogy.** (2) II. A systematic study of pedagogy which examines effective teaching methods and aids in the development of a philosophy of professional teaching. Pr.: Keyboard majors with conc. enrollment in MUSIC 455.

**MUSIC 417. Conducting.** (2) I. Techniques of the baton; gestures, signs, and cues as generally used in conducting choral and instrumental organizations. Includes essentials of technique and interpretation in both choral and instrumental types of ensemble performance. For music majors only. Required before admission to student teaching. Pr.: MUSIC 406.

**MUSIC 465. French Diction I.** (1) I. Rules for pronouncing and translating French vocal texts.

**MUSIC 467. French Diction II.** (1) II. Rules for pronouncing and translating French vocal texts.

**MUSIC 492. Methods and Materials for the Studio.** (2) I, II, S. Methods of teaching fundamental techniques; selection of teaching materials outlining courses of study. For undergraduate students in performance curricula. Taught in divisions according to the major. Practical application through supervised studio teaching. Pr.: MUSIC 391, or consent.

## Undergraduate and graduate credit

**MUSIC 501. Half Recital.** (0) I, II, S. Public

performance; vocal or instrumental with suggested performing time of 25 minutes.

**MUSIC 502. Full Recital.** (0) I, II, S. Public performance; vocal or instrumental with suggested performing time of 50 minutes.

## Studio performance Undergraduate credit

**MUSIC 251. Pre-Performance Study.** (Var.) I, II, S. For students who do not meet standards for regular performance study.

**MUSIC 255. Lower-Division Performance.** (Var.) I, II, S. Instruction is offered every semester in voice and each of the following instruments: baritone, bassoon, clarinet, double bass, early winds, flute, french horn, guitar, harp, harpsichord, oboe, organ, percussion, piano, saxophone, trombone, trumpet, tuba, viola, viola da gamba, violin, and violoncello. Students may enroll in more than one instrument simultaneously and may earn 1 to 4 hours per semester in each instrument.

**MUSIC 455. Upper-Division Performance.** (Var.) I, II, S. Instruction is offered every semester in voice and each of the following instruments: baritone, bassoon, clarinet, double bass, early winds, flute, french horn, guitar, harp, harpsichord, oboe, organ, percussion, piano, saxophone, trombone, trumpet, tuba, viola, viola da gamba, violin, and violoncello. Students may enroll in more than one instrument simultaneously and may earn 1 to 4 hours per semester in each instrument.

**MUSIC 521. Composition.** (Var.) I, II, S.

## Undergraduate and graduate credit

**MUSIC 641. Secondary Performance Area.** (1-2) For graduate students who wish to study an instrument (or voice) other than the major performance area. Pedagogical methods and fundamentals are stressed.

# Philosophy

James R. Hamilton, Head

Professors Reagan,\* Smith,\* and Tilghman;\* Associate Professors Exdell,\* Hamilton,\* and Scheer;\* Assistant Professors Bassett,\* O'Neil,\* and Super-son; Emeritus: Professor Miller.\*

Philosophy is the study of the intellectual foundations of virtually every area of human thought and endeavor. Over the centuries philosophers have examined, for example, the nature and justification of moral values, religious and scientific explanations of the world, the rationality of social institutions, and the nature of reasoning and argument.

The program in philosophy gives students an understanding of traditional philosophical subjects such as these. It also helps students develop critical habits of thinking and skill in understanding complex issues. Consequently, philosophy is an appropriate subject around which to organize a general education for any purpose.

The Department of Philosophy offers a variety of options within the major program to provide flexibility in organizing a course of studies with philosophy at its center.

There are five degree options: traditional philosophy, philosophy/pre-law, philosophy/pre-business, philosophy/pre-ministry, and philosophy/interdisciplinary.

### Core curriculum

All philosophy majors must take the philosophy core of five courses:

Two courses in the history of philosophy:

PHILO 300	History of Ancient Philosophy
PHILO 301	History of Modern Philosophy

One course in logic:

PHILO 110	Introduction to Formal Logic
	or
PHILO 220	Symbolic Logic I

And the following two courses:

PHILO 305	Philosophical Topics and Methods
PHILO 555	Ethical Theories

Students in the traditional philosophy option *must* take PHILO 220.

### Traditional philosophy option (B.A. only)

36 hours in philosophy

This option is for students who are interested in a traditional liberal arts course of study or who desire to do graduate study in philosophy.

Philosophy course requirements:

Core curriculum	15
Philosophy courses numbered 400 and above	9
Philosophy courses numbered 600 and above	9
Philosophy elective	3
	<hr/> 36

### Pre-law options (B.A. or B.S.)

While no one major is given preference by law school admission committees, law schools recognize the value of philosophy for refining skills in expression, comprehension, and critical thinking. According to the *Pre-Law Handbook*, "the free and spirited consideration of philosophical questions is almost the model for legal training."

The Department of Philosophy offers two degree options for students planning to study law: a double-major option, intended as a complement to a second major in another department, and a single-major option, which does not require a second major.

#### Double-major option

27 hours in philosophy plus second major

Philosophy course requirements:

Core curriculum	15
PHILO 525 Social/Political Philosophy	3
PHILO 535 Philosophy of Law	3
One applied ethics course (PHILO 492, 565, 575, 585, 590)	3
Philosophy course numbered 400 and above	3
	<hr/> 27

Additional requirements:

Completion of another major in a department in the College of Arts and Sciences.

#### Single-major option

36 hours in philosophy

Philosophy course requirements:

Core curriculum	15
PHILO 525 Social/Political Philosophy	3
PHILO 535 Philosophy of Law	3
One applied ethics course (PHILO 492, 565, 575, 585, 590)	3
Philosophy courses numbered 600 and above	9
Philosophy elective	3
	<hr/> 36

### Philosophy/Pre-business

The pre-business option is for students who plan to do further work in a college of business leading to a master's in business administration. For requirements for admission to the M.B.A. program at K-State, see the College of Business Administration section of this catalog.

Philosophy course requirements:

Core curriculum	15
PHILO 525 Social/Political Philosophy	3
	or
PHILO 535 Philosophy of Law	
PHILO 545 Philosophy of Economics	3
Philosophy course numbered at least 400	6
	<hr/> 27

Students may combine a philosophy/pre-business degree with an undergraduate degree in the College of Business Administration. Under university requirements, a student must complete a total of at least 150 hours in order to receive dual degrees.

### Philosophy/Pre-ministry (B.A. only)

This is a nonsectarian program for students who are interested in the religious ministry as a profession. Students in this program will be advised on other courses outside philosophy recommended by most American schools of theology.

Philosophy course requirements:

Core curriculum	15
PHILO 515 Philosophy of Religion	3
PHILO 635 Metaphysics	3
Philosophy courses numbered 400 and above	9
	<hr/> 30

Other requirements:

Three courses in other disciplines, as approved by the department, in which religion is studied.

### Interdisciplinary option (B.A. or B.S.)

30 hours in philosophy plus second major

This option is for students who wish to combine a major in philosophy with a major in another discipline. Each student completing a degree under this option must have a faculty advisor in the Department of Philosophy who supervises the student's program. Philosophy courses other than the core curriculum must be approved by this advisor. Students must complete an independent study course (PHILO 680 Problems in Philosophy) focusing on the relationship of philosophy to the student's other major and write a substantial research paper.

Philosophy course requirements:

Core curriculum	15
PHILO 680 Problems in Philosophy	3
Philosophy courses numbered 400 and above	12
	<hr/> 30

Additional requirements: Completion of a second major, as appropriate: student's program must be approved by a faculty advisor in the Department of Philosophy.

### Philosophy courses

#### Undergraduate credit

##### PHILO 100. Introduction to Philosophical Problems.

(3) I, II, S. An introduction to some of the main problems of philosophy, such as the nature of morality, knowledge, mind and body, political authority, and the existence of God.

##### PHILO 105. Introduction to Critical Thinking. (3) I, II.

An introduction to the values of the Western intellectual tradition. Emphasizes the concepts of truth and reasoning and their application to science, ethics, and everyday life. Open only to freshmen and sophomores.

##### PHILO 110. Introduction to Formal Logic. (3) I, II, S.

An elementary investigation of the concept of arguments introducing the basic symbolic techniques of contemporary logic. The presentation is at a more elementary level than that of Symbolic Logic I.

##### PHILO 115. Introduction to Philosophy of Religion. (3) I, II.

Raises the philosophical problems of the meaning of religious language, the existence and nature of God, the distinction between reason and faith, between knowledge and belief, and between revelation and science.

##### PHILO 120. Introduction to the Philosophy of Art and Literature. (3) I, II.

An introduction to philosophical problems concerning the concept of art, aesthetic value, and art appreciation and criticism. For students of art, architecture, literature, music, and theater.

##### PHILO 125. Introduction to Philosophy of Science. (3) I, II, S.

Examines the nature of science and how it differs from pseudo-sciences such as astrology, and raises questions about the nature of reality and social value of science.

##### PHILO 130. Introduction to Ethics. (3) I, II, S.

Examines philosophical issues arising in and about morality. Topics may include the nature of moral judgments, moral knowledge, moral justification, and the relation of morality to religion. Topics may be approached by a study of contemporary moral problems, by reading of classical philosophical texts, or by both methods.

##### PHILO 135. Introduction to Social and Political Philosophy. (3) I, II, S.

Examines the concepts of justice, the ideal society, and the relation between the state and the individual. Classical and contemporary views on civil disobedience, the enforcement of morals, punishment, and the relation between politics and economics are discussed.

##### PHILO 140. Introduction to Philosophy of Mind. (3) I, II.

Examines problems about the relation between mind and body, the existence of a "soul," the concepts of "insanity" and "the unconscious," parapsychology, and major schools of modern psychology such as behaviorism, Freudianism, and existentialist psychiatry.

##### PHILO 145. Introduction to Philosophical Classics. (3) I, II.

An introduction to philosophy through the careful reading of selected works of a major influence in the history of philosophy.

##### PHILO 150. Introduction to the Philosophy of Feminism. (3) I, II.

Philosophical issues pertaining to sexual equality, masculinity, femininity, and parenting, as well as contemporary topics such as pornography, prostitution, sexual harassment, and rape.

##### PHILO 215. Honors Introduction to Philosophy. (3) I, II.

An introduction to the main problems in philosophy. For students in the honors program.

##### PHILO 220. Symbolic Logic I. (3) I, II.

A systematic introduction to modern logic. Truth-functions, truth tables, and calculus of propositions, classes, and relations.

**PHILO 297. Honors Introduction to the Humanities I.** (3) I. Study of selected major works of history, literature, and philosophy which have been of central importance in the Western cultural tradition. Considerable emphasis is placed on classroom discussion and writing interpretive essays. Limited to entering freshman students. Pr.: Consent of instructor. Same as ENGL 297, HIST 297, MLANG 297.

**PHILO 298. Honors Introduction to the Humanities II.** (3) II. Continuation of PHILO 297. Pr.: PHILO 297 or consent of instructor. Same as ENGL 298, HIST 298, MLANG 298.

**PHILO 300. History of Ancient Philosophy.** (3) I. The development of philosophical ideas in the West through the medieval period, with special emphasis on ancient Greek philosophy.

**PHILO 301. History of Modern Philosophy.** (3) II. The development of philosophical ideas from the Renaissance to the nineteenth century.

**PHILO 305. Philosophical Topics and Methods. I, II.** This course is intended to provide philosophy majors, relatively early in their course of studies, with the special knowledge and skills needed to do philosophical research. It will acquaint students with library resources, the mechanics of paper writing, the major branches of philosophy, important philosophical vocabulary, the techniques of close reading, and techniques of argument. Pr.: One course in philosophy.

**PHILO 397. Experimental Studies in Philosophy.** (1-6) I, II. Experimental and interdisciplinary studies in philosophy. Topics selected in consultation with instructor. Pr.: Permission of instructor.

**PHILO 399. Honors Seminar in Philosophy.** (3) I. 1979.

**PHILO 492. Computers and Society.** (1-2) II. A study of ethical issues raised by the impact of computers and associated technologies on society, including such topics as ethics of computer use, computer fraud, protection of privacy; legal, moral, and public policy-making responsibilities of computer professionals. Pr.: Junior standing plus conc. enrollment in CIS 492; CIS 520.

**PHILO 499. Senior Honors Thesis.** (2) I, II, S. Open only to honor students in the arts and sciences honors program.

### Undergraduate and graduate credit in minor field

**PHILO 510. Symbolic Logic II.** (3) On sufficient demand. An advanced study of logical systems and problems in logical theory. Pr.: PHILO 220 or 110.

**PHILO 515. Philosophy of Religion.** (3) II, in alternate years. A course designed to examine philosophically the basic concepts of religion, e.g., truth and faith, God and atheism, reason and revelation, morality and religion, evil, man, sin, salvation, eschatology. Pr.: One course in philosophy or consent of instructor.

**PHILO 525. Social-Political Philosophy.** (3) I or II. A combined systematic and historical examination of social and political philosophy from antiquity to the present. Pr.: One course in philosophy or consent of instructor.

**PHILO 535. Philosophy of Law.** (3) I or II. A study of problems about the nature of legal reasoning, relationship between law and morality, and the justification of legal punishment. Pr.: One course in philosophy or junior standing.

**PHILO 545. Philosophy of Economics.** (3) I, II. An examination of the moral and conceptual foundations of modern economic systems. Considers such topics as the relations between "economics rationality" and the quality of life, the just distribution of wealth, the nature of property rights, and the value of technology in society. Pr.: One course in philosophy or junior standing.

**PHILO 555. Ethical Theories.** (3) I. A systematic survey of the major literature of moral philosophy, e.g., Plato, Aristotle, Hobbes, Hume, Kant, Mill, Moore, Prichard. Pr.: One course in philosophy.

**PHILO 565. Medical Ethics.** (3) I, II. A detailed examination of selected moral issues which confront the medical professional and of the main points of the Hippocratic Oath. Topics frequently dealt with include: experimentation on human subjects, informed consent, abortion, euthanasia, conflict of interest, confidentiality of patients' records and conversations. Pr.: Junior standing.

**PHILO 575. Philosophy in Literature.** (3) I or II. An examination of philosophical ideas encountered in selected writings of the world's great poets, novelists, essayists. Pr.: One course in philosophy and one in literature.

**PHILO 580. Existentialism.** (3) I or II. A study of prominent thinkers in the existentialist tradition. Pr.: One course in philosophy or permission of instructor.

**PHILO 585. Engineering Ethics.** (3) I or II. An examination of the principles of ethics as applied to cases arising in the practice of the various branches of engineering. Pr.: PHILO 130 or junior standing.

**PHILO 590. Business Ethics.** (3) I or II. An examination of the principles of ethics as applied to situations and practices in modern American business. Pr.: PHILO 130 or junior standing.

### Undergraduate and graduate credit

**PHILO 600. Studies in Ancient Philosophy.** (3) I. A detailed study of a selected philosopher or movement in the history of Greek and Roman philosophy. Pr.: PHILO 300.

**PHILO 605. Studies in Seventeenth and Eighteenth Century Philosophy.** (3) II. A detailed study of a selected philosopher, school, or problem drawn from the history of philosophy in the seventeenth and eighteenth centuries. Pr.: PHILO 301.

**PHILO 610. Recent European Philosophy.** (3) I or II. An examination of important issues and movements in twentieth century European philosophy. Emphasis upon existentialism and phenomenology. Pr.: One course in philosophy.

**PHILO 620. The Development of Analytical Philosophy.** (3) I or II. The history of analytical philosophy in the first four decades of the twentieth century. A study of the work of Moore, Russell, the early Wittgenstein, and the logical positivists. Pr.: One course in philosophy.

**PHILO 625. The Philosophy of Language.** (3) I or II, in alternate years. Philosophical problems concerning the nature of language and such concepts as meaning and truth. Pr.: PHILO 110 or 220.

**PHILO 630. Recent British-American Philosophy.** (3) I or II. A detailed study of selected philosophical writings of current interest in Great Britain and the United States. Pr.: One course in philosophy.

**PHILO 635. Metaphysics.** (3) I or II, in alternate years. A critical examination of theories about things and their qualities, causality, space, and time. Both traditional and contemporary sources may be used, but emphasis will be placed on the latter. Pr.: One course in philosophy.

**PHILO 640. Epistemology.** (3) I or II, in alternate years. An examination of philosophical problems about the nature of our knowledge of the world. Pr.: One course in philosophy.

**PHILO 645. The Philosophy of Science.** (3) I or II, in alternate years. Philosophical problems concerning science, its methods, laws, and theories. Pr.: One course in philosophy.

**PHILO 650. Philosophy of the Social Sciences.** (3) I or II, in alternate years. An examination of the possibility

of a science of human beings and of specific issues in the social sciences such as models and measurement, reduction, functional analysis, ideal types, and axiomatization. For students in sociology, anthropology, political science, psychology, geography, and history. Pr.: One course in philosophy or consent of instructor.

**PHILO 655. The Philosophy of Mind.** (3) I, in alternate years. The philosophy of psychology. An examination of philosophical problems about such psychological concepts as mind, consciousness, thinking, emotion, and dreaming. Pr.: One course in philosophy or consent of instructor.

**PHILO 660. Advanced Ethics.** (3) I or II. Detailed examination of selected topics in contemporary ethical theory. Pr.: PHILO 555 or consent of instructor.

**PHILO 665. Philosophy of Feminism.** (3) I or II. An in-depth analysis of important recent feminist contributions to social and political philosophy, epistemology, aesthetics, and ethics. Topics such as power, work, love, reproductive freedom, and education will be considered. Pr.: One course in philosophy.

**PHILO 670. Aesthetics.** (3) On sufficient demand. A study of selected topics in aesthetics and the philosophy of art. Pr.: PHILO 120 or consent of instructor.

**PHILO 680. Problems in Philosophy.** (Var.) I, II, S. Independent study for qualified students. Pr.: Background of courses required for problem undertaken.

**PHILO 701. Topics in Metalogic.** (3) On sufficient demand. Selected topics in the analysis of first-order theories and the foundations of mathematics. Pr.: PHILO 510 or MATH 511.

## Physics

James C. Legg,\* Head

Professors Bhalla,\* Cocke,\* Folland,\* Gray,\* Legg,\* Lin,\* Manney,\* Rahman,\* Richard,\* Sorensen,\* Weaver,\* and Zollman;\* Associate Professors Hagmann\* and O'Shea;\* Assistant Professors Ben-Itzhak,\* Chakrabarti,\* DePaola,\* Giese,\* Jiang,\* Law,\* and Wysin;\* Assistant Research Professors Carnes and Stockli; Emeriti: Professors Cardwell,\* Curnutte,\* Dale,\* Dragsdorf,\* Ellsworth,\* and Williams;\* Associate Professor Crawford;\* Instructor Green.

Physics is a quantitative science based on observation and experiment. Students of physics learn, often by performing experiments themselves, how a body of experimental data suggests an experimental law. Then they see how this experimental law can be generalized and tested by further experiment. However, it is as the originator of the next step in the method of science that physics emerges as the foundation of our technological age. The collection of experimental laws is studied and when properly generalized and tested is unified into a fundamental physical principle.

A major in physics equips a liberal arts student with a broad education that is uniquely adapted to our time. The physics curriculum provides a broad science background suitable for the creative application of science and mathematics to

interdisciplinary problems. Although physics does not exclude the intuitive mind, the emphasis on mathematics tends to favor more analytically talented individuals.

Students may obtain either a bachelor of arts or a bachelor of science degree with a major in physics. In addition to the general requirements for the bachelor of arts or bachelor of science degree a physics major must complete the following core courses:

PHYS 100	Undergraduate Physics Seminar . . .	1
PHYS 213	Engineering Physics I . . . . .	5
PHYS 214	Engineering Physics II . . . . .	5
PHYS 506	Physics Laboratory . . . . .	3
PHYS 522	Mechanics I . . . . .	3
PHYS 532	Electricity and Magnetism I . . . . .	3
PHYS 551	Introduction to Modern Physics . . . .	3
PHYS 636	Physical Measurements Instrumentation . . . . .	4
CHM 210	Chemistry I . . . . .	4
CHM 230	Chemistry II . . . . .	4
MATH 220	Analytic Geometry and Calculus I . .	4
MATH 221	Analytic Geometry and Calculus II . . . . .	4
MATH 222	Analytic Geometry and Calculus III . . . . .	4
MATH 240	Elementary Differential Equations . . . . .	4
Science electives . . . . .		9

The 9 hours of science electives may be selected with approval of the physics department undergraduate advisor from courses, 400 level or higher, in the Departments of Chemistry, Computing and Information Sciences, Geology, Mathematics, Physics, Statistics, the Division of Biology, the College of Engineering, and other departments as appropriate to a student's program. The courses selected to satisfy the science elective requirement should contribute to the student's educational goals and must be approved by the Department of Physics.

### Transfer students

The flexibility of the physics curriculum permits individual advisement, on the basis of studies completed, for students who transfer into the curriculum from other majors, community colleges, or other universities.

A five-year dual degree program in physics and mechanical engineering is available and similar dual degree programs can be arranged with physics and electrical engineering, nuclear engineering, or business administration. Interested students should inquire about these programs at the Department of Physics.

### J. R. Macdonald Laboratory

K-State in cooperation with the U.S. Department of Energy, operates a major facility for the production and the acceleration of atomic ions. There are several accelerators, including a 6 MV tandem Van de Graaff, associated with this facility. The laboratory has recently built a superconducting LINAC booster accelerator which

gives energies of over 100 MeV for some ions. A liquid He production plant has been installed to provide up to 500 watts of cryogenic cooling for the LINAC.

A new type of ion source called CRYEBIS has been developed and is producing high-charge, low-energy ions. At the present time it is the only ion source in the U.S. capable of producing bare argon ions. A network of MICRO-VAX work stations is available for the accumulation and analysis of data.

### Physics courses

**PHYS 017. Colloquium in Physics.** (0) I, II. Weekly lectures on topics of current interest in physics by faculty and visiting scientists.

### Undergraduate credit

**PHYS 100. Undergraduate Physics Seminar.** (1) I. Topics of special interest to freshmen majoring in physics. Subjects discussed include possible careers in physics, current research at K-State, and selected developments illustrating the methodology of physics.

**PHYS 101. The Physical World I.** (3) I, II, S. The courses The Physical World I and II are designed to present an overview of the physical sciences for students who have little or no previous physical science. The Physical World I is principally physics and atomic theory. The observations and phenomena are simple and basic. Three hours lec. a week. Open only to freshmen, sophomores, and first-semester transfer students. Not available for credit to students who have credit in PHYS 106.

**PHYS 102. The Physical World II.** (3) I, II. Continuation of PHYS 101. The Physical World II presents an overview of astronomy, geology, chemistry, and molecular biology. Three hours lec. a week. Not open to seniors. Pr.: PHYS 101.

**PHYS 103. The Physical World I Laboratory.** (1) I, II, S. Two hours lab a week. Pr. or conc.: PHYS 101.

**PHYS 104. The Physical World II Laboratory.** (1) II. Two hours lab a week. Pr. or conc.: PHYS 102.

**PHYS 106. Concepts of Physics.** (4) I. An introductory course in physics which emphasizes the topics of physics normally presented to elementary school children. A qualitative approach with integrated laboratory, this course is recommended for students preparing for careers as elementary school teachers. Not available for credit to students who have completed PHYS 101.

**PHYS 107. Physical Science Colloquium.** (1-2) Offered by TELENET. Topics in physical science chosen to illustrate current research of scientists and methods used to study the physical universe. At each offering of this course a syllabus will be available giving the topics to be studied and the details of administration of the course. May be repeated once. Not open to physics majors.

**PHYS 113. General Physics I.** (4) I, II, S. A basic development of the principles of mechanics, heat, fluids, oscillations, waves, and sound. Emphasis is on conceptual development and numerical problem solving. Two hours lec., one hour rec., one hour quiz, and two hours lab a week. Pr.: MATH 150 or one and one-half units of high school algebra and one unit high school trigonometry.

**PHYS 114. General Physics II.** (4) I, II, S. The continued treatment of the fundamentals of electricity and magnetism, light and optics, atomic and nuclear physics. These concepts are used to understand D.C. and A.C. circuits, motors, and generators. Emphasis is placed on conceptual development and problem solving. Two hours lec., one hour rec., one hour quiz, and two hours lab a week. Pr.: PHYS 113.

**PHYS 115. Descriptive Physics.** (4) I, II. A one-semester course in physics covering mechanics, electricity, heat, light, sound, and atomic theory. It presents a survey of the major fields of physics with a concentration on how physicists work to understand and describe physical phenomena. Three hours lec., one hour quiz, and two hours lab a week. Pr.: High school algebra.

**PHYS 191. Descriptive Astronomy.** (3) I, II. A qualitative study of the sun and planets, stars and galaxies; a survey of what is known about the universe and how it is known.

**PHYS 213. Engineering Physics I.** (5) I, II. Mechanics and heat; for students of science and engineering. Two hours lec., two hours rec., one hour quiz, and two hours lab a week. Pr. or conc.: MATH 221.

**PHYS 214. Engineering Physics II.** (5) I, II. Sound, electricity, magnetism, light, and modern physics; for students of science and engineering. Two hours lec., two hours rec., one hour quiz, and two hours lab a week. Pr.: PHYS 213, MATH 221.

**PHYS 300. Physics in Relation to Other Disciplines.** (1-3) On sufficient demand. Variable content, offered only by prearrangement with the physics department and with the instructor. A brief syllabus will be available for each offering of PHYS 300 outlining the objectives and organization of the course for the semester in which offered. Pr.: Consent of instructor.

**PHYS 301. Physics Honors Seminar.** (1-3) On sufficient demand. Open only to students in the arts and sciences honors program. Other students may be enrolled with permission of the instructor.

**PHYS 400. Independent Study in Physics.** (1-3) I, II, S. Independent theoretical or experimental investigation of a topic for physics majors or for a senior honors thesis. May be repeated for credit up to a maximum of 6 hours. Pr.: Junior standing and consent of instructor.

**PHYS 451. Principles of Contemporary Physics.** (3) II. A nonmathematical introduction to twentieth century physics: relativity, quantum mechanics, the physics of solids, and fundamental particles. Not open to physics majors. Credit is not granted for both PHYS 451 and PHYS 452. Pr.: PHYS 101 or equiv.

**PHYS 452. Contemporary Physics: Problems and Principles.** (4) II. An introduction to twentieth century physics; relativity, quantum mechanics, the physics of solids, and fundamental particles. The lectures are in common with PHYS 451. Three hours lec. and one hour rec. each week. The recitation will consider the quantitative aspects of the subject matter. Not open to physics majors. Credit is not granted for both PHYS 451 and PHYS 452. Pr.: One year of college physics (PHYS 113 and 114 or equiv.), college algebra, and trigonometry.

**PHYS 460. Undergraduate Topics in Physics.** (1-6) Special topics in physics not completely treated in other courses. On sufficient demand. Pr.: PHYS 114 or equiv.

**PHYS 495. Astronomy.** (3) Topics in modern astronomy. Use of a telescope for observational astronomy will be emphasized. Two hours lec. and two hours independent observational astronomy a week. Pr.: PHYS 191.

### Undergraduate and graduate credit in minor field

**PHYS 506. Physics Laboratory.** (3) I. This course gives the advanced undergraduate student an opportunity to perform experiments of historical and current significance and to develop knowledge of and skill in making measurements with precise mechanical, optical, electrical, and thermal instruments. Various data analysis techniques are considered. One hour rec. and six hours lab each week. Pr.: PHYS 551.

**PHYS 515. Physics for Science Teachers.** (1-4) Study of current topics in physics, with laboratory experience and demonstration of the processes or phenomena under

consideration. Topics and activities will be directed toward providing teachers with material for demonstrations and student experiments or projects. Examples of topics are: solar power, laser applications, holography, and subnuclear particles, relativity, or the historical development of some physical concept. May be repeated for a maximum of 6 hours credit. Pr.: One year of college physics.

**PHYS 522. Mechanics I.** (3) I. Principles of statics and dynamics of particles and rigid bodies by the methods of the calculus. Pr.: PHYS 214; MATH 240 or conc. enrollment.

**PHYS 523. Mechanics I Recitation.** (2) I. Discussion section for problems presented in PHYS 522. Pr.: Students must be concurrently enrolled in PHYS 522.

**PHYS 532. Electricity and Magnetism I.** (3) II. A study of electric and magnetic fields using the calculus. The development and uses of Maxwell's equations. Pr.: PHYS 214; MATH 240 or conc. enrollment.

**PHYS 551. Introduction to Modern Physics.** (3) II. An introduction to atomic, solid state, and nuclear phenomena, the development of the quantum theory, and relativity. Pr.: PHYS 214; MATH 240 or conc. enrollment.

**PHYS 553. Introduction to the Physics of Lasers.** (3) I. A study of the physics of lasers. Survey of current laser systems. Technological applications. Pr.: PHYS 214.

### Undergraduate and graduate credit

**PHYS 611. Introduction to Quantum Mechanics.** (3) I. An introduction to quantum mechanics: wave mechanics, one-dimensional solutions, perturbation theory, time-dependent perturbation theory, the one electron atom. Pr.: PHYS 522, 551; MATH 240.

**PHYS 616. Advanced Physics Laboratory.** (1-3) II. A laboratory course that gives the advanced physics student an opportunity to perform experiments using modern data acquisition equipment and tools such as are used in current physics research. Pr.: PHYS 506 or equiv.

**PHYS 621. Mechanics II.** (3) II. Continuation of PHYS 522. Pr.: PHYS 522.

**PHYS 631. Electricity and Magnetism II.** (3) I. Continuation of PHYS 532. Pr.: PHYS 532.

**PHYS 635. Plasma Physics.** (3) I, in alternate years. Fundamental properties of plasmas; motion of ions and electrons in electromagnetic fields; plasmas as magnetohydrodynamic fluids; plasma waves; diffusion phenomena in plasmas; electric resistivity of plasmas; equilibrium and plasma stability; kinetic theory of plasmas. Three hours rec. a week. See NE 635. Pr.: PHYS 532; or EECE 557 and PHYS 621.

**PHYS 636. Physical Measurements Instrumentation.** (4) II. A laboratory-oriented course to acquaint students with electronic circuits, their interfacing with measuring instruments, and their use in making physical measurements. Two hours lec. and six hours lab a week. Pr.: PHYS 214.

**PHYS 651. Introduction to Optics.** (3) I, in alternate years. Introduction to modern concepts in optics: electromagnetic waves, propagation of light through media, geometric optics of lenses and mirrors, interference, coherence, Fraunhofer and Fresnel diffraction. Three hours lec. a week. Pr.: PHYS 532 or EECE 557.

**PHYS 671. Thermodynamics and Statistical Physics.** (3) II, in alternate years. Pr.: PHYS 522; MATH 240.

**PHYS 681. Semiconductor Physics.** (3) I. Introduction to the properties of semiconducting materials; electron and hole transport; models of semiconductor devices. Pr.: PHYS 532 or EECE 557.

**PHYS 691. Astrophysics.** (3) A quantitative study of the sun and stars; structure and evolution; intrinsic properties; solar activity; galaxies; chemical evolution. Pr.: PHYS 522, 532.

**PHYS 707. Topics in Physics.** (Var.) I, II, S. Special topics courses. Topics and credits announced for the semester in which offered. May be given in conjunction with lecture series by visiting scientists. Pr.: Graduate standing or senior standing and consent of instructor.

**PHYS 742. Nuclear Physics.** (3) II, in alternate years. Modern theories of nuclear physics. Pr.: PHYS 611.

## Political Science

William L. Richter,\* Head

Professors Hajda,\* L. Richter,\* W. Richter,\* Sulciman,\* Tummala,\* and Williams;\* Associate Professors Franke,\* Linford,\* Michie,\* and Unckis;\* Assistant Professors Ambrosius\* and Johnson. Emeritus: Associate Professor Gustafson.\*

The major in political science acquaints students with political aspects of society and encourages them to develop a critical and imaginative perspective on public issues. The program in political science also provides a foundation for a liberal education and continuing involvement in political activity and public affairs. At the same time, scientific training in analysis of political problems develops skills for a variety of careers in public service, business, teaching, research, and administration. Qualified students should consider training in political science at the graduate level.

A political science major should complete a broad liberal arts program that includes study in related social sciences and provides familiarity with computer applications, statistics, and mathematics as basic tools describing and explaining political phenomena.

### Advisory and special services

#### Departmental faculty

Several members of the department have backgrounds in nonacademic careers—including national and international government service, business, party politics, and journalism—besides professional training in political science. Students contemplating careers in these and other fields are encouraged to talk with departmental advisors.

#### Pre-law program

A pre-law program may be pursued through a major in political science. A pre-law advisor helps the student select an appropriate course of study leading to a career in law, and offers individual assistance in selecting a law school. The pre-law advisor is Professor Orma Linford, 219C Kedzie Hall.

#### Specialized curricula

The department takes part in several interdepartmental programs. More

extensive information on several of these may be found elsewhere in this catalog.

### South Asian studies

The department participates in the South Asian studies program. A secondary major is available in South Asian studies. For more information, see Professor Aruna Michie, 219B Kedzie Hall.

### Latin American studies

Courses on Latin America are offered in several departments, including language studies in Spanish. A secondary major in Latin American studies is also available. For information, see Professor Marcial Antonio Riquelme, 304C Fairchild Hall.

### International studies

Students interested in the multidisciplinary study of the relations among nations, or in the study of world regions other than South Asia or Latin America, may wish to pursue a secondary major in international studies. For information, see Professor William Richter, 204A Kedzie Hall.

### Armed forces and society

Political science and several other departments offer coordinated course work in military phenomena and security processes, ranging from the technology of war and military policy-making to the problems of civilian-military relations in peacetime and arms control. Some of the relevant courses are in history, geography, psychology, sociology, economics, and nuclear engineering. For information, see Professor Alden Williams, 217 Kedzie Hall.

### International trade studies

The department participates in the international trade studies program. Students interested in international trade may benefit from courses and programs on this subject in several arts and sciences and business departments. Interested students should contact Professor Joseph Hajda, 220A Kedzie Hall.

### Gerontology

The Center on Aging coordinates programs and courses on social, cultural, economic, political, and other aspects of aging and the elderly. Interested students may pursue a secondary major in gerontology. For information see Professor James Franke, 219A Kedzie Hall.

### Requirements for the major

A major consists of a minimum of 33 credit hours in political science distributed as follows: POLSC 301 Introduction to Political Thought, POLSC 325 United States Politics, POLSC 333 World Politics, POLSC 344 Introduction to Comparative Politics, and at least one 500 level course or above in each of the following four areas of political science: American government and politics; comparative government and politics; international relations; and

political thought. Only 3 hours of the major are allowed to be readings, problems, internships, or similar courses that do not involve scheduled meetings of the class.

### Information for dual majors and nonmajors

The political science program is often advantageously combined with another major. Those seeking dual majors should coordinate their program in consultation with advisors in each area.

## Political science courses

### Undergraduate credit

**POLSC 107. Political Science Colloquium.** (2) I, II, S. Offered by TELENET. Topics in political science chosen to illustrate current research of political scientists and approaches to the study of politics. Each time the course is offered, a syllabus will outline the topics to be studied and the way the course will be administered. May be repeated once. Not open to political science majors.

**POLSC 110. Introduction to Political Science.** (3) I, II, S. Introduction to politics, public policy, and governmental processes. Distribution and use of political power, political thought, public opinion, groups, parties, institutions, public law, careers in politics, and related topics.

**POLSC 111. Introduction to Political Science, Honors.** (4) Introduction to politics, public policy, and governmental processes. Distribution and use of political power, political thought, public opinion, groups, parties, institutions, public law, careers in politics, and related topics. Pr.: Membership in arts and sciences honors program.

**POLSC 301. Introduction to Political Thought.** (3) I, II. A broad overview of political thought, including consideration of major themes and leading writers in Western political philosophy, some non-Western political thought, modern ideologies, and empirical theory. Pr.: Sophomore standing.

**POLSC 321. Kansas Politics and Government.** (3) An introduction to the political institutions of, the political behavior in and surrounding, and the public policies flowing from governmental units in the state of Kansas.

**POLSC 325. United States Politics.** (3) I, II, S. The national government with emphasis on constitutional principles, basic structure, functions, and the political process.

**POLSC 326. United States Politics, Honors.** (4) II. The national government with emphasis on constitutional principles, basic structure, functions, and the political process.

**POLSC 333. World Politics.** (3) I, II. Introduction to the study of politics among nations, including a survey of major contemporary problems of world politics and focusing on the international struggle for power and order.

**POLSC 344. Introduction to Comparative Politics.** (3) I. Comparative analysis of politics in both "developed" and "developing" countries. Though some attention will be given to abstract and theoretical concepts, the emphasis will be on the actual political process in the countries selected for study.

**POLSC 350. Current Political Issues.** (2) I, II. Each week a different political science faculty member explains and analyzes current developments in state, national, and international affairs, using the news media as text material. Not for major credit. May be repeated once.

**POLSC 355. Contemporary Issues.** (3) Study and analysis of selected political topics of immediate relevancy and concern. May be repeated once.

**POLSC 366. Practical Politics.** (3) II. Strategies and techniques of running for office, organizing a campaign,

mobilizing community resources, direct action lobbying and related practical aspects of local level citizen politics.

**POLSC 377. Introduction to Public Policy.** (3) I. The process of public policy formation and analysis with emphasis on theories of decision-making, the relationship between decisions taken, values maximized, and the social impact of these decisions. Pr.: POLSC 110 or 325 or another social science course.

**POLSC 399. Honors Seminar in Political Science.** (1-3)

**POLSC 400. Political Inquiry and Analysis.** (3) Underlying principles and techniques used in the conduct of political science research. Pr.: Introductory social science course or consent of instructor.

**POLSC 401. Topics in Politics.** (1-3) Different subjects in politics are selected for intensive study. May be repeated for a total of 6 hours with advisor's approval.

**POLSC 499. Senior Honors Thesis.** (2) I, II, S. Open only to seniors in the arts and sciences honors program.

## American government and politics Undergraduate and graduate credit

**POLSC 502. Television and Public Policy.** (3) I. Television as a political institution, emphasizing TV structure, contents, and effects for political thought and public policy; comparative analysis of television with other mass media and nonmedia influences on political behavior. Pr.: POLSC 110 or 325, and sophomore standing, or appropriate vocational experience with consent of instructor.

**POLSC 507. Introduction to Public Administration.** (3) I. The basic concepts of public administration, with emphasis on orientation for citizen understanding; the place of administration and the role of the administrator in the American political process; the organization and activities of government in carrying out public policy; administrative functions, organization, accountability, finance, and personnel. Pr.: POLSC 110 or 325 or ECON 110.

**POLSC 508. The Mass Media and Political Campaigns.** (3) I. Examines the role of the mass media in the electoral process. Dynamics of voter decision making and the impact of the media on voter attitudes and choices. Pr.: POLSC 325.

**POLSC 519. National Security Policy and Process.** (3) I. Formation and management of contemporary U.S. security establishment and policies with emphasis on arms control, competition for resources, civilian-military relations, and interaction among Congress, the president, and the bureaucracy. Pr.: POLSC 325.

**POLSC 520. State and Local Government.** (3) II. The American system of federalism with emphasis on the government and politics of the American states and their subdivisions. Pr.: POLSC 110 or 325 or sophomore standing.

**POLSC 603. Political Parties and Elections.** (3) I. Origins, structure, and function of political parties. Dynamics of the two-party system. Roles of third parties. Analysis of election results and voting behavior. Pr.: POLSC 110, 325, or junior standing.

**POLSC 604. Interest Groups and Public Opinion.** (3) II. Group theory and politics. Structure, internal politics, and techniques of interest groups and their impact on public policy. Formation and measurement of public opinion. Pr.: POLSC 110 or 325 or junior standing.

**POLSC 605. The American Presidency.** (3) The presidency as an institution, its evolution, congressional relationships, executive organization. Pr.: POLSC 110, 325, or junior standing.

**POLSC 606. Gender and Politics.** (3) II. Analysis of the role of sex in political behavior, including sexual differences in voting and political participation, legal and cultural restrictions on women's rights and political

activity, and women's liberation and other sex-based political movements. Pr.: SOCIO 545, XXX 105, POLSC 325.

**POLSC 607. Administrative Law.** (3) II. Legal analysis of the rule-making, adjudicatory, and enforcement functions of administrative agencies, with emphasis on constitutional framework, judicial review, requirements of procedural fairness, and rights of public employees. Pr.: One course in political science, U.S. history, or legal or political philosophy.

**POLSC 611. The Legislative Process.** (3) II. Legislative decision-making in modern democracy with emphasis on the United States, the concept of representation, and political behavior of participants in the legislative process. Pr.: POLSC 110, 325, or junior standing.

**POLSC 613. Defendant's Rights.** (3) II. Constitutional provisions of due process in criminal cases; statutory protections and judicial rules; analysis of U.S. Supreme Court opinions concerning the rights of persons accused of crimes at all stages in the criminal process. Pr.: One course in political science, U.S. history, or legal or political philosophy.

**POLSC 614. Constitutional Law I.** (3) I. Principles of the American political system as prescribed by the Constitution and interpreted by Supreme Court decisions, with emphasis on the institutions and powers of the national government. Pr.: One course in political science, U.S. history, or legal or political philosophy.

**POLSC 615. Constitutional Law II.** (3) II. The Constitution as a limitation on governmental power, with emphasis on Supreme Court decisions defining fundamental liberties, property rights, and the requirement of substantive due process. Pr.: One course in political science, U.S. history, or legal or political philosophy.

**POLSC 616. Discrimination and the Law.** (3) II. Equal protection under the law, as provided by the Constitution, statutes, regulations, and judicial decisions, with special attention to discrimination on the basis of race and sex. Pr.: One course in political science, U.S. history, or legal or political philosophy.

**POLSC 618. Urban Politics.** (3) I. Fundamental problems of political power and decision making in urban-suburban governmental settings. Pr.: POLSC 110, 325, or junior standing.

**POLSC 708. Public Personnel Administration.** (3) I. Policy aspects of public personnel administrations at all levels of government with specific attention given to personnel issues unique to the public sector. Court decisions on the rights of public employees, public unionism, civil service systems, and public service ethics in a democracy. Pr.: POLSC 325 or 507, or ECON 110 and junior standing.

**POLSC 709. The Politics of Intergovernmental Relations.** (3) I. An analysis of the dynamics of the federal system. Interactions among local, state, and federal governments will be examined with emphasis upon governmental policy and program management. Pr.: POLSC 507 or 520 or SOCIO 531.

**POLSC 710. Policy Analysis and Evaluation.** (3) II. The relationship between public policy and the distribution of values, goods, and services in society, including a study of policy evaluation. Students analyze policies in an area of choice; e.g., agriculture, business, health, income, trade. Pr.: POLSC 325 or 507 or junior standing.

**POLSC 717. The Administrative Process.** (3) Public administration treated as a process of organization and methods management with emphasis on conditions, elements, and problems common to all levels and functions of bureaucracy.

**POLSC 735. Public Organizational Theory.** (3) I. Theories on the structure and mission of public organizations. A focus on the role of administrative leadership in applying theory to solve organization problems. Pr.: POLSC 325 or 507 or GENBA 420 or ECON 110 and junior standing.

**POLSC 737. Public Budgeting Techniques.** (3) I. Budgeting as part of our political system and as a fiscal process that assists in planning and program management. Overview of various budgetary approaches and their managerial benefits. Pr.: POLSC 507 or MANGT 420.

## Comparative government and politics courses

### Undergraduate and graduate credit

**POLSC 504. Political Sociology.** (3) II, in even years. An introduction to the principles of political sociology. Processes of political socialization, participation within and outside established organizational channels, recruitment of elites, communication and influence, power, decision making, and policy outputs. Data are presented from a cross-national perspective. Pr.: SOCIO 211; POLSC 110. Same as SOCIO 504.

**POLSC 505. Introduction to the Civilization of South Asia I.** (3) I. An interdisciplinary survey of the development of civilization in India, Pakistan, Sri Lanka, Bangladesh, and Afghanistan, including consideration of the geographical and demographic context, dominant philosophical and social concepts, social and political institutions, literature and historical movements. Same as HIST 505, ECON 505, SOCIO 505, ANTH 505.

**POLSC 506. Introduction to the Civilization of South Asia II.** (3) II. Interdisciplinary survey of recent and contemporary civilization in India, Pakistan, Sri Lanka, Bangladesh, and Afghanistan, including recent history, current economy, religion, culture, languages and literature, geography, social and political structures and ideas. Same as ECON 506, HIST 506, SOCIO 506, ANTH 506.

**POLSC 511. Contemporary Chinese Politics.** (3) Principal components of Communist Chinese ideology, conditions determining organizational structure, composition of present leadership, role of social forces, impact of external relations on other Asian nations and on the major world powers.

**POLSC 545. The Politics of Developing Nations.** (3) II. Comparative analysis of politics in emergent states with emphasis on processes of modernization and nation building. Pr.: POLSC 110 or 344 or sophomore standing.

**POLSC 602. Class, Power, and Public Policy.** (3) I. Public policy and socioeconomic equality. Wealth and income distribution, social insurance programs, and ethnic relations. Conditions and institutions conducive to equality with emphasis on elites and power. Pr.: POLSC 377 or 507 or junior standing.

**POLSC 619. Comparative Agriculture Politics and Policy.** (3) I. Comparative examination of agricultural politics and policy with emphasis on decision making processes and the socio-political impacts of agricultural policy. Pr.: POLSC 110 or 344.

**POLSC 621. European Politics.** (3) I. Comparative analysis of British democracy, totalitarianism, and contemporary continental European political systems. Pr.: POLSC 110 or 344 or junior standing.

**POLSC 622. Latin American Politics.** (3) I. Comparative analysis of selected political systems of Latin America emphasizing political inputs, political organization, and political outputs. Special consideration is given to problems of political change. Pr.: POLSC 110 or 344 or junior standing.

**POLSC 623. South Asian Politics.** (3) Analysis of selected political systems of South Asia. Pr.: POLSC 344, 505, or junior standing.

**POLSC 624. Middle Eastern Politics.** (3) II. Comparative analysis of selected political systems in the Middle East including nationalism and the conflict of differing ideologies. Pr.: POLSC 110, 344, or junior standing.

**POLSC 625. Southeast Asian Politics.** (3) Comparative analysis of selected political systems in Southeast Asia including consideration of problems of nationalism and political development. Pr.: POLSC 110, 344, or junior standing.

**POLSC 626. African Politics.** (3) Comparative analysis of selected political systems of sub-Saharan Africa, including consideration of problems of nationalism and political development. Pr.: POLSC 110, 344, or junior standing.

**POLSC 627. Eastern and Central European Politics.** (3) II. Examination of contemporary politics and policy in the countries of Eastern and Central Europe. Pr.: POLSC 110, 344.

**POLSC 628. Comparative Security Establishments.** (3) I. Politics of conceiving, organizing, using, and reconciling military and related security forces as societal functions in the United States, selected other politics, and international organizations. Pr.: POLSC 333, 344, 541, or junior standing.

**POLSC 629. Development Policy and Administration.** (3) I. Comparative examination of development policy, politics, and administration. Pr.: POLSC 110, 344, 377, 507.

**POLSC 707. Comparative Administrative Systems.** (3) I. This is a comparative analysis of public administration concepts and the morphology of administrative systems. Included are U.S., British, and French models and attempts by Third World countries to adapt these to their local cultures. Pr.: POLSC 344, or 507, or graduate standing, or consent of instructor.

## International relations courses

### Undergraduate and graduate credit

**POLSC 541. International Relations.** (3) II. Analysis of the nature of international relations with emphasis on contemporary theories explaining the international behavior of states. Pr.: POLSC 333.

**POLSC 543. American Foreign Policy.** (3) II. Examination of American external relations since 1945 and evaluation of processes involved in the formulation and conduct of contemporary foreign policy of the United States. Pr.: POLSC 325 or 333.

**POLSC 642. International Conflict.** (3) II. The nature of political conflicts in the world and the "types" of such conflicts. Emphasis is on determining the "causes" of the various conflict types as well as providing the student with a better understanding of the conflict process from political dispute through the escalation stages to war. Pr.: POLSC 333 and junior standing.

**POLSC 645. International Politics of Europe.** (3) II. Relationships among post-World War II European constitutional development, national politics, foreign policies, and European communities, with attention to European considerations in global international politics. Pr.: POLSC 333, 344, or junior standing.

**POLSC 647. International Law.** (3) Theories of international law, and general problems, such as: recognition, responsibility, war crimes, sources, evidence, codification, and settlement of disputes. Pr.: POLSC 333, 541, or junior standing.

**POLSC 649. International Defense Strategies.** (3) I. Contemporary international strategies and defense policies with emphasis on nuclear, conventional, and guerrilla war, arms control and disarmament, diplomatic and political roles of the military. Pr.: POLSC 333, 541, or junior standing.

**POLSC 651. International Organization.** (3) Structure, functions, values, and effectiveness of international organizations with emphasis on the United Nations, Common Market, and other regional arrangements. Pr.: POLSC 333, 541, or junior standing.

**POLSC 652. International Politics of South Asia.** (3) Consideration of regional problems of South Asia and international roles and foreign policies of South Asian states. Pr.: POLSC 344 or junior standing.

**POLSC 653. International Politics of the Middle East.** (3) I. Consideration of the Arab-Israeli conflict, inter-Arab relations, foreign policies of Middle Eastern states, and the impact of the major foreign powers on the area. Pr.: POLSC 333, 344, or junior standing.

**POLSC 754. The Professional Diplomat and Foreign Policy Formulation.** (3) Present-day foreign policy formulation in the United States government, including especially the role therein of the professional diplomat and foreign affairs specialist.

## Political thought courses

### Undergraduate and graduate credit

**POLSC 661. Political Thought: Classical to Sixteenth Century.** (3) I. Systematic study of ideas about law, politics, and government of great philosophers of Western civilization from Greek antiquity to the sixteenth century. Pr.: POLSC 110, 301, or junior standing.

**POLSC 663. Political Thought: Since the Sixteenth Century.** (3) I. Study of the development of Western political thought from the sixteenth century to the twentieth century. Pr.: POLSC 110, 301, or 325.

**POLSC 667. American Political Thought.** (3) I. Political ideas underlying the American union, including the doctrine of rights, the nature of union, liberty, property, and democracy. Pr.: POLSC 110, 301, or junior standing.

**POLSC 671. Modern Political Thought.** (3) Study of contemporary political ideas and social thought. Pr.: POLSC 110, 301, or junior standing.

**POLSC 675. Religion and Politics.** (3) II. The history, theory, and development of church-state relationships in the United States. A theoretic and legal analysis of the relationship. Pr.: POLSC 110, 301, or junior standing.

**POLSC 676. Psychological Bases of Politics.** (3) Interrelations between personality and political behavior. Implications for the stability of democratic political systems. Authoritarianism, the organization of opinion, and analysis of dictatorship and totalitarianism. Pr.: Two social science courses or consent of the instructor.

**POLSC 711. Administrative Ethics.** (3) I. Ethical issues, approaches, and strategies in public service. Pr.: POLSC 325 or 507 or graduate standing, or consent of instructor.

## Methods, seminars, readings, and problems courses

### Undergraduate and graduate credit

**POLSC 555. Senior Honors Seminar.** (3) Open to senior majors who have attained a 3.0 grade point average in political science.

**POLSC 601. Computer and Quantitative Analysis in Political Science.** (3) Advanced data management, data analysis, and computing skills involved in conducting political science and public policy research. Pr.: STAT 330 or equiv.; CIS 110 or equiv.; and POLSC 301, or 325, or 333, or 344, or 400.

**POLSC 700. Research Methods in Political Science.** (3) I. Principles of research design, measurement of political phenomena, methods for collecting and analyzing political data. Pr.: POLSC 301, 325, 333, or 344.

**POLSC 784. Internship in Government, Public Administration, and Politics.** (1-3, Credit/No Credit only.) I, II, S. Supervised field work at the international, national, state, and local levels of government or with political parties or other politically oriented voluntary organizations. May be repeated once. Pr.: Consent of instructor and a minimum of two courses in political science, at least one of which must be relevant to the internship area.

**POLSC 785. Readings in Political Science.** (1-3) I, II, S. Students will undertake directed reading and discussion of a selected topic in political science.

**POLSC 790. Problems in Political Science.** (1-3) I, II, S. Students will complete a research project and prepare an original paper under the supervision of a faculty member. Pr.: Consent of the instructor.

**POLSC 791. Topics in Political Science.** (3) I, II. Extensive exploration of a specific problem in political thought, American government, comparative politics, international relations, and public administration. May be repeated for a total of 6 hours in two subfields. Since topics will cover different areas in political science, prerequisites will be determined by the department as appropriate when the course is offered.

**POLSC 799. Pro-Seminar in Political Science.** (3) I, II. Study and analysis in various areas of the discipline with emphasis on critical evaluation of political conflicts and issues. Pr.: Junior or senior standing or consent of instructor.

## Psychology

Frank E. Saal,\* Head

Professors Barnett,\* Cowan,\* Downey,\* Frieman,\* Griffitt,\* Harris,\* Mitchell,\* Rappoport,\* Saal,\* Shanteau,\* Thompson,\* and Uhlarik,\* Associate Professors Kiefer\* and Knight,\* Assistant Professors Cozzarelli and Fullagar,\* Emeriti: Professors Perkins,\* Phares,\* Rohles,\* and Samelson.\*

The psychology program is a versatile program composed of a core for all students. Beyond this common core, students may choose from several paths, depending upon their specific interests and goals.

The psychology curriculum is arranged with several functions in mind: to give students, as a part of a liberal education, some familiarity with the principles, methods, and findings of psychology; to provide knowledge and skills requisite for advanced study at the graduate level; to offer valuable background for students preparing to work in professions such as medicine, law, theology, business, teaching, engineering, industry, and organizations; and to provide academic work that will prepare the students to pursue careers in psychology.

### Core courses

The undergraduate major requires STAT 330 and the following course work:

PSYCH 100*	Freshman Seminar	1
PSYCH 110	General Psychology	3
PSYCH 200	Junior Seminar in Psychology	1
PSYCH 350	Experimental Methods in Psychology	5

Select two courses from:

PSYCH 460	Cognitive Psychology	3
PSYCH 470	Psychobiology	3
PSYCH 475	Principles of Learning	3
PSYCH 480	Fundamentals of Perception and Sensation	3

Select one course from:

PSYCH 605	Foundations of Social Behavior	3
or		
PSYCH 620	Psychology of Personality	3
Psychology electives (chosen with advisor consultation)		
		12

\*Although not required, this course is strongly recommended for first-semester freshmen.

### General education option

For students interested mainly in a liberal education, the core program will be sufficient. In consultation with the advisor, students may wish to choose several other psychology courses beyond the 33-hour requirement. Additional courses in the arts, sciences, or humanities should be chosen in line with the student's prevailing interests. For example, students interested in industrial relations should take relevant courses in economics, business administration, and sociology. There is great latitude for the student in this option. Beyond the 33 required hours, additional course work is entirely a discretionary matter.

Students interested in teaching or guidance counseling in schools should prepare for teacher certification with a major in psychology. Such students must consult with advisors in the College of Education.

### Graduate option

Pursuing an advanced degree in psychology requires, in addition to a strong grade point average and solid aptitude scores, a broad and basic education in psychology. Chances for successful application to graduate school will be enhanced through demonstration of a rigorous grounding in psychology.

Undergraduates who anticipate pursuing a Ph.D. in psychology should take the following courses (the core of 33 hours is contained within the following recommendations):

STAT 330	Elementary Statistics for the Social Sciences	3
MATH 501	Introduction to Mathematics in the Behavioral Sciences	3
CIS 200	Fundamentals of Computer Programming	2
CIS 201	FORTRAN Language Laboratory	2
PSYCH 110	General Psychology	3
PSYCH 350	Experimental Methods in Psychology	5
PSYCH 460	Cognitive Psychology	3
PSYCH 470	Psychobiology	3
PSYCH 475	Principles of Learning	3
PSYCH 480	Fundamentals of Perception and Sensation	3
PSYCH 505	Abnormal Psychology	3
PSYCH 605	Foundations of Social Behavior	3
PSYCH 620	Psychology of Personality	3
PSYCH 775	History of Current Trends	3

Depending upon their more specialized goals, students may wish also to take PSYCH 560, 564, 580, 585, or others. Students oriented toward physiological psychology will want to ensure that they also have appropriate background in

biology, chemistry, and other areas. These matters should be worked out in consultation with an advisor. It is also strongly recommended that students gain research experience by working on projects under faculty supervision.

### Psychological technician option

A growing field for those with B.A. or B.S. degrees in psychology is that of the psychological technician. Such a person usually works in an applied setting and carries out duties that are supportive of the Ph.D. psychologist.

Technicians are playing an increasing role in both clinical-institutional and industrial/organizational settings. The academic requirements and, in particular, the field experience requirements will provide a background in human relations that employers in business, industry, and government should find attractive.

Because the psychological technician option is geared toward specific employment, the recommended courses are larger in number and there is more structure in this option.

The core of 33 hours is required for both the clinical and industrial emphases.

#### Clinical emphasis

In addition, the following courses are required for the clinical emphasis:

PSYCH 559	Psychological Testing	3
PSYCH 505	Abnormal Psychology	3
PSYCH 585	Basic Concepts in Clinical Psychology	3
PSYCH 586	Laboratory in Clinical Concepts	2
PSYCH 587	Field Placement	1-6

Four courses relevant to the mental health field.

#### Industrial emphasis

For the industrial emphasis the following additional courses are required:

PSYCH 559	Psychological Testing	3
PSYCH 560	Industrial Psychology	3
PSYCH 561	Laboratory in Industrial Psychology I	2
PSYCH 562	Laboratory in Industrial Psychology II	2
PSYCH 564	Psychology of Organizations	3
PSYCH 587	Field Placement	1-6
MANGT 530	Industrial and Labor Relations	3

One computer science course with laboratory.

One additional relevant course from business administration or elsewhere.

Other recommended courses for both the clinical and industrial emphases will depend on student interests and will be worked out in consultation with a psychological technician advisor. An integral part of both emphases is supervised field experience in an applied setting. Arrangements for such experience will be worked out individually with each student regarding the exact number of hours for PSYCH 587 Field Placement, and the location (hospital, business or industry, government agency, research laboratory, other).

## Psychology courses Undergraduate credit

**PSYCH 100. Freshman Seminar.** (1) I. An orientation and introduction to the field of psychology for freshman psychology majors only. Additional emphasis on the means by which psychological principles can be used to adapt to college life.

**PSYCH 110. General Psychology.** (3) I, II, S. An introductory survey of the general content areas of psychology, including methods, data, and principles.

**PSYCH 115. General Psychology (Honors).** (4) I, II. An introductory survey of the general content areas of psychology, including methods, data, and principles.

**PSYCH 200. Junior Seminar in Psychology.** (1) I. Discussion of professional, research, and educational methods and objectives in psychology. Acquaints psychology majors with psychology as a profession, and with the various options available to them at various levels of training. Should be taken during first semester of junior year. Pr.: Junior standing.

**PSYCH 202. Drugs and Behavior.** (2) I, S. Effects of drugs on human performance, cognition, and physiological processes will be discussed and the empirical evidence surveyed and critically evaluated in relation to both use and abuse of drugs in society. Pr.: PSYCH 110.

**PSYCH 280. Psychology of Childhood and Adolescence.** (3) I, II. Survey of behavioral development from birth through adolescence. Pr.: PSYCH 110.

**PSYCH 290. Innovative Studies in Psychology.** (1-6) I, II. Topics selected in consultation with the instructor. To be used for interdisciplinary and innovative approaches to psychological topics. Pr.: Consent of instructor.

**PSYCH 350. Experimental Methods in Psychology.** (5) I, II. Laboratory investigation of learning, motivation, social-personality processes, and perception and sensation. Includes three hours rec. and four hours lab a week. Pr.: PSYCH 110.

**PSYCH 399. Honors Seminar in Psychology.** (3) II. Selected topics. Open to nonmajors in the honors program.

**PSYCH 400. Practicum in Teaching Psychology.** (1-4) I, II. Supervised experience in presentation of psychological concepts in various classes. May be taken only with approval of the instructor of a general psychology class under whose supervision the student will obtain this experience. Pr.: Nine hours of psychology including PSYCH 110; junior standing; consent of instructor.

**PSYCH 425. Problem Solving and Decision Making.** (3) II. Provides both the psychological background and practical aids to help solve problems in everyday decision making. Skills to be covered include creativity, methods of problem solving, memory aids, decision-making tools, avoiding biases of judgment, etc. Pr.: PSYCH 110.

**PSYCH 450. Applications of Memory.** (3) II. Examination of the applications of memory in such diverse areas as courtroom testimony, expert performance, mnemonic procedures, and advertising. Relevant theories and research in each area are examined. Pr.: PSYCH 110.

**PSYCH 460. Cognitive Psychology.** (3) I, II. A survey of the manner in which people extract and use relevant information from their environment as a basis for behavior. Topics may include memory storage and retrieval, attention, imagery, mnemonic devices, decision making, and other cognitive processes. Pr.: PSYCH 350.

**PSYCH 470. Psychobiology.** (3) I, II. Behavior from a biological point of view. Topics include: behavioral neuroscience techniques, sensory coding, food and water intake, sexual behavior, sleep and waking, memory, and learning. Pr.: BIOL 198, PSYCH 110.

**PSYCH 475. Principles of Learning.** (3) I, II. Introduction to the principles of learning and their relevance to the understanding of the behavior of animals and humans. Pr.: PSYCH 350.

**PSYCH 480. Fundamentals of Perception and Sensation.** (3) I, II. Empirical and theoretical approaches to phenomena of sensation and perception. Pr.: PSYCH 350.

**PSYCH 490. Honors Tutorial in Psychology.** (1-3) I, II. Individual directed research and study of a topic in psychology, normally as a preliminary to writing a senior honors thesis. May be repeated once to a total of 3 hours. Pr.: Sophomore standing, membership in the honors program of the College of Arts and Sciences, and permission of instructor.

**PSYCH 499. Senior Honors Thesis.** (2) I, II, S. Open only to seniors in the arts and sciences honors program.

## Undergraduate and graduate credit in minor field

**PSYCH 505. Abnormal Psychology.** (3) I, II, S. An introductory study of behavior pathologies, with emphasis on their etiology and treatment. Pr.: Junior standing; PSYCH 110.

**PSYCH 510. Introduction to Behavior Modification.** (3) II. Study of the principles of behavior modification and applications to human behavior. Emphasis on the learning principles and research in behavior modification. Pr.: PSYCH 505.

**PSYCH 518. Introduction to Health Psychology.** (3) II. Psychosocial factors relevant to general health maintenance, recovery from disease or injury, and the achievement of health. Topics include stress-management techniques, personality characteristics associated with disease, cognitive-emotional effects of diet and exercise, and theories of pain and pain management. Concepts of prevention and behavioral medicine are also included. Pr.: PSYCH 110.

**PSYCH 520. Life Span Personality Development.** (3) I, II, S. Theories and research in the development of personality from infancy through old age. Origins of personality in heredity and early experience, socialization practices, life crises and choices at various stages throughout life, and problems of aging. Pr.: PSYCH 110; sophomore standing.

**PSYCH 530. Psychology of Mass Communications.** (3) II. The psychological effects of mass communication on behavior and thought, including advertising, stereotyping of women and minorities, effects on children, violence and sex in the media, effects of news on behavior, and the promotion of prosocial behavior through the media. Pr.: PSYCH 110.

**PSYCH 535. Social Psychology.** (3) I, II. Psychology of the individual in society. Survey of empirical studies and theoretical models of social perception, attitudes, and social behavior (e.g., attribution, ethnic and gender prejudice, conformity). Relationship of these topics to personal and media influence, social mores, and social systems is also included. Pr.: PSYCH 110.

**PSYCH 540. Psychology of Women.** (3) II. Investigation of psychological processes of women. A developmental sequence with emphasis on major life events for women. Female physiology, early socialization into sex roles, friendship, achievement motivation, sexuality, marriage, childbearing, work, and mental health. Pr.: PSYCH 110.

**PSYCH 543. Women's Mental Health Issues.** (3) II. Investigates prevalent women's mental health issues such as incidence of depression/anxiety, eating disorders, sexuality, relationship concerns. Also covers the efficacy of traditional treatment modalities and newer therapies that target women's unique mental health needs such as feminist or nonsexist therapies. Pr.: PSYCH 505.

**PSYCH 545. Consumer Psychology.** (3) I. Survey of psychological principles and facts in perception, learning, attitude formation, personality, etc., as they

apply to behavior of consumers. Pr.: PSYCH 110 and junior standing.

**PSYCH 550. Group Dynamics.** (3) II. Interaction in small groups: interpersonal sensitivity, communication, decision making, development of group structure and norms. May be organized as laboratory "process" group and require some flexibility in scheduling. Pr.: Six hours in psychology.

**PSYCH 558. Varieties of Consciousness.** (3) I, S. Traditional and contemporary approaches of both Western science and Eastern metaphysics to study of ordinary mind consciousness, unusual states of awareness, and efforts to expand the powers of mind. Topics include sleep, dreaming, biofeedback, meditation, psychoactive drugs, brain area dominance, and other factors influencing relationships. Pr.: PSYCH 110.

**PSYCH 559. Psychological Testing.** (3) II. Principles of psychological testing in industrial, clinical/counseling, and research environments. Topics include technical issues such as reliability, validity, norming, selection, placement, discrimination, etc. Also covers procedures for selecting, administering, and interpreting psychological tests. Pr.: PSYCH 110.

**PSYCH 560. Industrial Psychology.** (3) I, S. Survey of human behavior and psychological principles in an industrial/personnel context. Topics include: recruiting, selecting, and training personnel; evaluating their job performance; conducting job analyses; and implementing compensation strategies. Pr.: PSYCH 110.

**PSYCH 561. Laboratory in Industrial Psychology I.** (2) I. Supervised experience in personnel psychology including classifications, analysis, and evaluation of jobs. Pr.: PSYCH 560 or conc. enrollment.

**PSYCH 562. Laboratory in Industrial Psychology II.** (2) II. Additional supervised experience in personnel psychology including interviewing, EEOC regulations, training, and performance appraisal. Pr.: PSYCH 561.

**PSYCH 563. Gender Issues in the Workplace.** (3) I. Psychological experiences of women and men in the world of work, with emphasis on traditional and nontraditional sex-role behavior, sexual discrimination and harassment, and relevant socialization experiences. Pr.: PSYCH 110.

**PSYCH 564. Psychology of Organizations.** (3) II. Relationships between individuals, groups, and organizations. How organizational factors contribute to individual behavior, and how individuals affect groups and organizational functioning. Emphasis is on such traditional topics as work motivation, job satisfaction and other attitudes, leadership, communication, socialization, and organization and job design. Pr.: PSYCH 110.

**PSYCH 580. Psychology of Sexual Behavior.** (3) I, II. Study of psychological determinants and consequences of human sexual behavior; roles of personality, attitudinal and emotional factors will be emphasized. Pr.: PSYCH 110, sophomore standing.

**PSYCH 585. Basic Concepts in Clinical Psychology.** (3) I. Critical analysis of the profession. Review of theoretical and empirical bases of such areas as intelligence and its measurement, personality and diagnosis, psychotherapy, and other modes of behavioral change. Pr.: PSYCH 110, 505, and 3 additional hours of psychology.

**PSYCH 586. Laboratory in Clinical Concepts.** (2) I. May be taken only in conjunction with PSYCH 585. Supervised practice in, demonstration of, and orientation to selected psychological techniques and practices. Pr.: Conc. enrollment in PSYCH 585.

**PSYCH 587. Field Placement.** (1-6) I, II, S. Supervised field experience in an agency or institutional setting in the application of psychological techniques to individuals, groups, or organizations. Regular supervision emphasizes relationship between theory and application and the evaluation of outcomes. Pr.: PSYCH 585 and

586, or 560; 561 and 562 and consent of psychological technician training committee.

**PSYCH 599. Problems in Psychology.** (Var.) I, II, S. Investigation of selected problems. Pr.: PSYCH 110 and consent of instructor.

### Undergraduate and graduate credit

**PSYCH 605. Foundations of Social Behavior.** (3) II. Analysis of fundamental psychosocial processes underlying selected problems in contemporary society (e.g., effects on personality and interpersonal relations of changing sex roles, technological innovations, and historical events). Pr.: PSYCH 535 and either PSYCH 460, 475, or 480.

**PSYCH 620. Psychology of Personality.** (3) I. Discussion of different approaches to the study of personality. Pr.: PSYCH 350.

**PSYCH 625. Engineering Psychology.** (3) I. The role of behavioral factors in the design and operation of machines and equipment. Pr.: PSYCH 110, STAT 330, or 707.

**PSYCH 630. Human Neuropsychology.** (3) II. Study of brain-behavior relationships in humans. Brief review of human neuroanatomy followed by a major emphasis on brain function in learning, memory, language, and other cognitive behaviors. Also includes an examination of behavioral alterations following brain damage. Pr.: BIOL 198 and PSYCH 110, or consent of instructor.

**PSYCH 650. Psychology of Language.** (3) I. Experimental study of language, including sentence comprehension and memory, language acquisition and development, speech perception, and effects of context, perception, reasoning, and linguistic structure on processing of language. Pr.: PSYCH 110 and junior standing.

**PSYCH 715. Psychology of Aging.** (3) II. The psychological aspects of human aging. An analysis of the contributions of experimental, developmental, and personality-social psychology to the study of aging. The psychopathology of aging and psychological intervention strategies are also covered. Pr.: PSYCH 110 or DAS 315 and junior standing.

**PSYCH 775. History of Current Trends.** (3) II. A review of the contributions of individuals and intellectual movements to the development of modern psychology. A survey of theoretical systems currently of influence. Pr.: PSYCH 110 and 9 additional hours of psychology; senior standing.

**PSYCH 790. Topics in Psychology.** (Var.) I, II, S. Pr.: PSYCH 110 and consent of instructor.

**PSYCH 799. Problems in Psychology.** (Var.) I, II, S. Pr.: PSYCH 110 and consent of instructor.

## Sociology, Anthropology, and Social Work

Martin S. Ottenheimer,\* Head

Professors Adamchak,\* Finnegan,\* Kaiser,\* O'Brien,\* H. Ottenheimer,\* Peters,\* and Timberlake;\* Associate Professors Benson,\* Camp,\* Dushkin,\* Frey,\* Orbach,\* Riquelme,\* and Roncek;\* Assistant Professors Adams,\* Bloomquist,\* Brede,\* Denning, Gibbons,\* Goe,\* Harper, Huff-Corzine,\* Humphreys, Miley,\* Miller,\* Prins,\* and Verschelden.

The Department of Sociology, Anthropology, and Social Work offers three separate undergraduate majors: sociology; anthropology; and social work. The sociology major has two options, sociology, and society and criminal justice. The student may enroll in a B.S. or B.A. program in any of these major areas.

*Anthropology is listed alphabetically within this college section.*

### Sociology

Sociology is the study of society and of social relationships. Some of the principal areas considered are social and community organization, the development and interaction of individuals in society, major social institutions, social problems and deviant behavior, population growth and distribution, and social change and development.

Sociology is a desirable background, as either a sole or a combined major, for further professional training in law, city planning, public administration, hospital administration, and medicine, as well as for advanced graduate work in sociology or other social sciences.

Students who major in sociology should refer to the general requirements for the B.A. or B.S. degree earlier in the College of Arts and Sciences section. Sociology students who desire to teach in secondary schools should prepare for teacher certification with a major in sociology (see the College of Education section of this catalog).

Students enrolled in sociology will be required to complete 6 hours of tool and related courses, 16 hours of required core sociology requirements, and 15 hours of sociology electives at the 500 level or above.

#### Tool and related courses

CIS 110	Introduction to Personal Computing (or demonstration of equivalent competencies) . . . . .	3
STAT 330	Elementary Statistics for the Social Sciences . . . . .	3

#### Sociology core requirements

SOCIO 211	Introduction to Sociology . . . . .	3
SOCIO 511	Comparative Social Theories . . . . .	3
SOCIO 520	Methods of Social Research I . . . . .	4
SOCIO 540	Social Organization . . . . .	3
SOCIO 550	Introduction to Social Interaction . . . . .	3

#### Sociology electives

Sociology electives at the 500 level or above . . . . .	15
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### Society and criminal justice

The society and criminal justice option provides students with a broad knowledge of the workings of all agencies and organizations that make up the criminal justice system. The option is primarily for students who anticipate careers in the criminal justice system, including law enforcement, correctional institutions, court services, probation, and parole.

Students will take core courses in sociology that acquaint them with the nature and extent of crime in society, police missions and crime control, the function of law, court organization and process, prison and its alternatives, and parole and subsequent re-entry into society. Students will also take relevant course work in other social and behavioral sciences.

A semester-length supervised internship is also required, providing students with direct personal experiences in working with offenders in various agencies within the criminal justice system.

Students who pursue the society and criminal justice option should refer to the general requirements for the B.A. or B.S. degree in the College of Arts and Sciences section. Students are required to complete 15 hours of tool and related courses, 34 hours of core sociology courses, and 13 hours of supervised internship and professional seminar courses.

#### Tool and related courses (15 hours)

STAT 330	Elementary Statistics for the Social Sciences . . . . .	3
PSYCH 110	General Psychology . . . . .	3
POLSC 325	U.S. Politics . . . . .	3
Psychology elective . . . . .		3
Political science elective . . . . .		3

#### Major courses

SOCIO 211	Introduction to Sociology . . . . .	3
SOCIO 361	Sociology of Criminal Justice . . . . .	3
SOCIO 362	Police and Society . . . . .	3
SOCIO 511	Comparative Social Theories . . . . .	3
SOCIO 520	Methods of Social Research I . . . . .	4
SOCIO 522	Sociological Field Methods . . . . .	3
SOCIO 532	Community Organization and Leadership . . . . .	3
SOCIO 550	Introduction to Social Interaction . . . . .	3
SOCIO 560	Juvenile Delinquency . . . . .	3
SOCIO 561	Criminology . . . . .	3
SOCIO 661	Corrections . . . . .	3

#### Professional field experience

SOCIO 567	Pre-Internship Orientation . . . . .	1
SOCIO 568	Society and Criminal Justice Internship . . . . .	9
SOCIO 569	Society and Criminal Justice Professional Seminar . . . . .	3

### Social work

Social work is concerned with the interaction between people and their social environments. Social workers help people deal with other people, cope with the many social and environmental forces that affect and control daily life, and help solve problems which inhibit growth and development.

The undergraduate social work program is accredited by the Commission on Accreditation of the Council on Social Work Education to educate entry-level, generalist social work practitioners. The social work major is of particular value to students who intend to pursue a career in social work upon graduation.

The bachelor's degree in social work is recognized as a beginning-level professional

degree. Students graduating from the social work program are eligible for licensure as bachelor degree social workers in Kansas and numerous other states. No other bachelor's degree is recognized, or necessary, for such eligibility. Students who wish to pursue graduate studies in social work will be eligible for advanced standing in many master of social work programs throughout the United States.

The intervention tasks performed by social workers are derived from a common base of knowledge, values, and skills. Thus, social workers are uniquely qualified to provide resources, services, and opportunities to individuals, groups, families, organizations, and communities. Students are required to complete a field practice placement during their senior year to integrate classroom material with practice experience in a professional setting.

Students wishing to declare a major in social work may enroll directly in curriculum SOCWK. This is a provisional admission to the social work program. Students must complete SOCWK 010 and SOCWK 260 before formal evaluation and admission to the program can occur.

Formal evaluation occurs prior to admission to SOCWK 560 Social Work Practice I, taken during the junior year. At that time each student completes a personal statement and undergoes a formal review of academic and classroom performance by the program admissions committee. Students must have a 2.3 overall GPA and a 2.75 GPA in the core courses. Students successfully passing this review may enter the first course in the practice sequence, SOCWK 560.

Failure to meet the standards of the program will result in dismissal from the social work major. A student may be allowed to remain in the major on conditional or probationary status, but he or she must meet the standards of the program to complete the major.

For complete details on the admissions requirements and procedure, see the program admissions policy in the student handbook. Appeals of program faculty decisions may be made through established departmental procedures.

A student earning a B.A. or B.S. in social work must complete 120 hours including SOCWK 010 Orientation to the Social Work Major; SOCWK 260 Introduction to Social Work; 43 hours of major courses; and 22 hours of tool and related courses.

<b>Human behavior and the social environment content</b>	
SOCIO 211	Introduction to Sociology . . . . . 3
SOCIO 511	Comparative Social Theory . . . . . 3
SOCIO 532	Community Organization and Leadership . . . . . 3

ANTH 200	Introduction to Cultural Anthropology . . . . . 3
PSYCH 110	General Psychology . . . . . 3
SOCWK 567	Human Behavior and the Social Environment . . . . . 3
POLSC 110	Introduction to Political Science . . . 3
<b>or</b>	
POLSC 301	Introduction to Political Thought . . 3
ECON 110	Economics I . . . . . 3
BIOL 198	Principles of Biology . . . . . 4

<b>Social work practice content</b>	
SOCWK 560	Social Work Practice I . . . . . 3
SOCWK 561	Social Work Practice II . . . . . 3
SOCWK 568	Social Work Practice III . . . . . 2

<b>Research content</b>	
STAT 330	Elementary Statistics for the Social Sciences . . . . . 3
SOCWK 579	Methods of Social Work Research . . 4
SOCWK 550	Field Practicum Research Preparation . . . . . 1

<b>Social policy content</b>	
SOCWK 510	Social Welfare as a Social Institution . . . . . 3
SOCWK 565	Program and Policy Formulation and Analysis . . . . . 3

<b>Field practicum</b>	
SOCWK 562	Field Experience . . . . . 12

<b>Professional social work seminar</b>	
SOCWK 564	Social Work Professional Seminar . . 3

## Sociology courses

### Undergraduate credit

**SOCIO 211. Introduction to Sociology.** (3) I, II, S. Development, structure, and functioning of human groups; social and cultural patterns; and the principal social processes.

**SOCIO 214. Introduction to Sociology, Honors.** (4) I, II. Development, structure, and functioning of human groups; societal and cultural patterns; the nature of sociological inquiry. Lecture, discussion, and independent study.

**SOCIO 301. Topics in Sociology.** (Var.) I, II, S. Supervised independent and/or interdisciplinary study projects. Pr.: SOCIO 211 and consent of instructor.

**SOCIO 360. Social Problems.** (3) I, II. Analysis of social problems such as drug use, crime, juvenile delinquency, mental illness, unemployment, and family instability. Pr.: SOCIO 211.

**SOCIO 361. Sociology of the Criminal Justice System.** (3) II. General introduction to the field, examining all agencies and organizations that collectively make up the criminal justice system. Pr.: SOCIO 211.

**SOCIO 362. Police and Society.** (3) I. Examines in detail the policing function in society and the role police play in the criminal justice process. Pr.: SOCIO 211.

**SOCIO 399. Honors Seminar in Sociology.** (1–3) I. On sufficient demand. Readings and discussion of selected topics. Open to nonmajors in the honors program.

**SOCIO 435. Sport and Contemporary Society.** (3) II. An analysis of sport and its role in contemporary society. Course creates a greater awareness of the social significance of sport in society and fosters the capacity to use critical thinking in the analysis of significant sport issues. Same as KIN 435. Pr.: SOCIO 211.

**SOCIO 499. Senior Honors Thesis.** (2) On sufficient demand. Open only to seniors in the arts and sciences honors program.

### Undergraduate and graduate credit in minor field

**SOCIO 500. Sociological Perspectives on Contemporary Issues.** (Var.) I, II, S. Analysis of a selected topic of contemporary interest. Topics vary from semester to semester and might include: impact of public policy on

rural life; white collar crime; student-athlete education; social change in the Third World. Pr.: SOCIO 211.

**SOCIO 501. Proficiency Development.** (1–3) Integrative review of sociological concepts and skills under faculty supervision. For single students or groups of students. Not applicable to major field requirements. Not repeatable. For undergraduate credit only. Pr.: Consent of instructor and superior performance in relevant course.

**SOCIO 504. Political Sociology.** (3) II, in even years. An introduction to the principles of political sociology. Processes of political socialization, participation within and outside established organizational channels, recruitment of elites, communication and influence, power, decision making, and policy outputs. Data are presented from a cross-national perspective. Same as POLSC 504. Pr.: SOCIO 211, POLSC 110.

**SOCIO 505. Introduction to the Civilizations of South Asia I.** (3) I. Interdisciplinary survey of the development of civilizations in India, Pakistan, Sri Lanka, Bangladesh, and Afghanistan; geographical and demographic context; philosophical and social concepts; social and political institutions; literature; and historical movements. Same as HIST 505, ECON 505, POLSC 505, ANTH 505, GEOG 505. Pr.: SOCIO 211.

**SOCIO 506. Introduction to the Civilizations of South Asia II.** (3) II. Interdisciplinary survey of recent and contemporary civilizations in India, Pakistan, Sri Lanka, Bangladesh, and Afghanistan, including literature, geography, social and political structure, ideas. Same as HIST 506, ECON 506, POLSC 506, ANTH 506, GEOG 506. Pr.: SOCIO 211.

**SOCIO 510. Social Welfare as a Social Institution.** (3) I, II. The development and present status of social welfare in meeting changing human needs and the requirements in other parts of our social system; the analysis of present-day philosophy and functions of social welfare. Same as SOCWK 510. Pr.: SOCIO 211.

**SOCIO 511. Comparative Social Theories.** (3) I, II. Investigations of a range of current sociological theories concerning the socialization process, group behavior, and social organization. Pr.: SOCIO 211.

**SOCIO 520. Methods of Social Research I.** (4) I, II. Treatment of the logic and procedures involved in the formulation of a research problem and the difficulties encountered in conducting research. Examines problems of explanation and prediction, the process of inquiry, elements of the scientific method, the design of research, and analysis in the social sciences. Pr.: SOCIO 211, STAT 330 or equiv. To include 1 credit hour of lab and field research experience.

**SOCIO 522. Sociological Field Methods.** (3) I, II. Introduction to field/qualitative methods. Includes collection and analysis of data using techniques such as interviewing, observation, and unobtrusive measures. Taking field notes, report writing, and ethical issues are also stressed. Pr.: SOCIO 520.

**SOCIO 531. Urban Sociology.** (3) II. Growth, development, and structure of the city as determined by geographical, ecological, and social factors; relation of rural and urban communities; problems of the city and various approaches to their solution. Pr.: SOCIO 211.

**SOCIO 532. Community Organization and Leadership.** (3) I, II. The analysis of community organization and change in American communities, with special emphasis on nonmetropolitan places. Issues include the analysis of internal community organizational ties, the interaction between the local community and its external environment, and the exploration of various methods affecting community development and social change within communities. Pr.: SOCIO 211 and 520 or 519, or equiv., or graduate standing.

**SOCIO 533. Rural Society.** (3) I. A survey of U.S. rural society, including change in agricultural structure, rural demographic shifts, growth of the rural service sector, rural class structure, decline and transformation of rural communities, and linkages to urban society.

Examination of selected rural institutions such as education and religion. Pr.: SOCIO 211 or consent of instructor.

**SOCIO 535. Population Dynamics.** (3) II, in odd years. World population trends and their implications for economic development, public policy, and social and cultural change. The interaction of fertility, mortality, and migration with the size, distribution, and structure of populations in nations and world regions. Pr.: SOCIO 211.

**SOCIO 536. Environmental Sociology.** (3) II, in even years. The interrelations among human societies, social institutions, and the biophysical environment. Emphasis on the reciprocal links among technological change, economic structure, and the ecological basis of human societies. Pr.: SOCIO 211.

**SOCIO 540. Social Organization.** (3) II. Principles and processes of the organization and structure of human societies. Analysis of social groups and institutions and theories of social structure. Pr.: SOCIO 211.

**SOCIO 541. Wealth, Power, and Privilege.** (3) II. Distribution of resources and rewards in American society. Various explanations of the causes, persistence, and effects of inequality in American life. Discussion of social mobility and current issues. Pr.: SOCIO 211.

**SOCIO 542. The Social Organization of the Future.** (3) On sufficient demand. Examination of alternative social arrangements presented in speculative and science fiction. Consideration of fictional extrapolations of social, scientific, and technological trends in terms of specific institutions. Analysis of possible social and interpersonal structures imaginatively conceived. Pr.: SOCIO 211.

**SOCIO 545. The Sociology of Women.** (3) II. The positions of women in the United States and cross-culturally are studied in order to understand what women and girls do and how that is perceived and responded to by different groups. Pr.: SOCIO 211.

**SOCIO 546. Bureaucracy in Modern Societies.** (3) I. The nature and types of bureaucratic organizations in modern societies. Selected aspects of their internal structure, such as peer group and hierarchical relations in organizations, processes of communication, management, and impersonal mechanisms of control. Pr.: SOCIO 211.

**SOCIO 550. Introduction to Social Interaction.** (3) I. A survey of theories of social interaction and social psychology with special attention to research on principles of interpersonal relations in social situations, group formation, maintenance, and change. Pr.: SOCIO 211.

**SOCIO 560. Juvenile Delinquency.** (3) I, II, S. Nature, extent, and causes of delinquency; characteristics of delinquents; means of prevention and treatment. Pr.: SOCIO 211.

**SOCIO 561. Criminology.** (3) I, II. Theoretical foundations of research on the nature, extent, and causes of crime; programs for prevention and treatment. Pr.: SOCIO 361 or 511.

**SOCIO 565. Program and Policy Formulation and Analysis.** (3) I, II. Examination of policies and programs developed to cope with various social problems. Emphasis will be on analysis of existing programs and policies and the formulation of alternative policies. Attention will be given to policy change through legislative action. Same as SOCWK 565. Pr.: SOCIO 260, 510.

**SOCIO 567. Pre-Internship Orientation.** (1) I, II. Society and criminal justice option major's take this course in the semester prior to enrollment in SOCIO 568 Society and Criminal Justice Internship. Students, in consultation with faculty internship coordinator, select internship sites and undergo agency orientation. Pr.: SOCIO 522 and senior standing. Society and criminal justice option majors only.

**SOCIO 568. Society and Criminal Justice Internship.** (9) I, II, S. Supervised field experience in various agencies within the criminal justice system. To be taken concurrently with SOCIO 569. Pr.: SOCIO 567 and 522. Society and criminal justice option students only.

**SOCIO 569. Society and Criminal Justice Professional Seminar.** (3) I, II, S. Integrates field experience and everyday practices in working with offenders in the criminal justice system with sociological theory. To be taken concurrently with SOCIO 568. Pr.: SOCIO 567 and 522. Society and criminal justice option students only.

**SOCIO 570. Race and Ethnic Relations in the U.S.A.** (3) I, II. This survey of racial and ethnic relations focuses on discrimination and conflict now as well as on background factors of the past to enlarge understanding of dominant and minority groups. Pr.: SOCIO 211.

### Undergraduate and graduate credit

**SOCIO 618. Religion in Culture.** (3) II, in odd years. The nature of religion and its manifestations in different cultural systems. Same as ANTH 618. Pr.: ANTH 200 or SOCIO 211.

**SOCIO 633. Gender, Power, and Development.** (3) II, in even years. Examination of various models of development and their impact on roles of women and men in various cultures. Emphasis upon Africa, Asia, and Latin America. Comparisons of public, service, and economic sectors, including agriculture, marketing, and industry. Examination of policy issues. Pr.: SOCIO 211 or ANTH 200 and 3 additional hours in sociology or cultural anthropology. Same as ANTH 633.

**SOCIO 640. Sociology of the Family.** (3) I. Origin and development of marriage customs and systems of family organizations; the preparation for family life under present conditions. Pr.: SOCIO 211.

**SOCIO 643. Sociology of Religion.** (3) I. On sufficient demand. The role of religion as an institution in American society. An assessment of the functions of religion and an exploration of contemporary trends and movements, including information on traditional denominations and emerging sects and cults. Pr.: SOCIO 211.

**SOCIO 647. Sociology of Work.** (3) II. The social nature of work and related phenomena; occupational structures; career lines; adjustment and interpersonal relations at work; significance of work in the life cycle. Pr.: SOCIO 211.

**SOCIO 661. Corrections.** (3) I, II. The historical development and current status of the correctional system. Major institutional components: jails, prisons, probation, parole and other forms of community corrections. Modern issues such as offender and victim rights and electronic monitoring. Pr.: SOCIO 561.

**SOCIO 665. Women and Crime.** (3) I, in odd years. Nature, extent, and causes of crime among women; victimization of women including domestic assault, rape and incest; women who work in the criminal justice system. Pr.: SOCIO 361 or junior standing.

**SOCIO 701. Problems in Sociology.** (Var.) I, II, S. Pr.: SOCIO 211 and junior standing.

**SOCIO 709. Development of Social Thought.** (3) On sufficient demand. Development of social thought from ancient civilization to the middle of the nineteenth century; approaches to the study of society; ideas on human origins and human nature, character and results of associative life, social trends, and social betterment. Pr.: SOCIO 211.

**SOCIO 710. Systematic Analysis of Social Theory.** (3) I. Examination of sociological theory with reference to the nature of scientific explanation and the function of scientific theory. Critical study and analysis of selected social theory and major social theorists with the objective of clarifying the conceptual and logical structure of underlying theoretical models and their assumptions about man and society. Pr.: SOCIO 511 or equiv.

**SOCIO 724. Qualitative Methodology.** (3) On sufficient demand. Collection, analysis, and presentation of sociological data using such methods as participant observation, ethnomethodology, community analysis, documentary research and historiography, case study, and life history. Emphasis upon formulation of problems and the execution of research. Pr.: SOCIO 520 and STAT 330 or equiv.

**SOCIO 725. Intermediate Methods of Social Research.** (3) II. Current sociological research techniques, strategies of research design, construction of research instruments, logic of sociological inquiry, conceptualization, problem formation, and preparation of research proposals. Pr.: SOCIO 520 and STAT 330.

**SOCIO 730. Social Demography.** (3) I. The study of human population, including the social, economic, political, ecological, and cultural determinants and consequences of changes in fertility, mortality, and migration. Pr.: Nine hours of sociology or equiv. Pr.: SOCIO 211.

**SOCIO 732. Community Change.** (3) II. A variable content course which in any given semester will deal with one of the following topics: nonmetropolitan communities, metropolitan communities, or applied community change. May be repeated once. Pr.: SOCIO 532 or equiv.

**SOCIO 734. Sociology of Agricultural Development.** (3) I, in odd years. Comparative rural systems in developing countries; emphasis on land tenure, peasant movements, relationship of agriculture to rest of society, and influence of developed countries on the agriculture of developing countries. Pr.: SOCIO 211.

**SOCIO 735. Human Ecology.** (3) II, in even years. The interrelationships among population, technology, environment, and social organization. An examination of the origins and development of human ecology in sociology, and recent attempts to redefine the area. Special emphasis on current theoretical and research efforts. Pr.: SOCIO 211 and consent of instructor.

**SOCIO 736. Applied Agricultural and Rural Change.** (3) I, in even years. Examination of agricultural and rural development projects and programs and how they fit into national and regional social and cultural systems in developing countries. Emphasis on locally and regionally based development strategies. Examination of the role of international agencies in understanding shifts in dominant approaches to applied rural change. Pr.: SOCIO 211 or ANTH 200. Same as ANTH 736.

**SOCIO 737. Methods in Human Ecology.** (3) Techniques for accessing, manipulating, and creating aggregate, ecological data from private and public sources including the U.S. Census through address matching or location identification, aggregation, and calculation of ecological potentials. Prepares students for doing basic and applied research in human ecology, sociology, and other related fields. Pr.: SOCIO 520 or equiv.

**SOCIO 740. Comparative Social Systems.** (3) I, in even years. Compares social systems in different regions of the world. Examines models of comparative and historical sociology. Provides students with a background for conducting and evaluating comparative research. Treats such issues as socioeconomic development, group relations, and age and sex roles from a cross-cultural perspective. Pr.: SOCIO 211 or ANTH 200 and a 500-level course in social or cultural change and development.

**SOCIO 741. Social Differentiation and Stratification.** (3) I, in odd years. Analysis of societal organization based on age, sex, residence, occupation, community, class, caste, and race. Pr.: SOCIO 211.

**SOCIO 742. Society and Change in South Asia.** (3) II, in even years. Examines recent studies of family and community, population, mobility, urbanization, and modernization in the India-Pakistan region, with focus on social change. Pr.: SOCIO 211 or ANTH 200 and either a 500-level course in South Asian studies or one in social change and development.

**SOCIO 744. Social Gerontology: An Introduction to the Sociology of Aging.** (3) II. Analysis of the phenomenon of human aging in its individual, social, and cultural aspects with special attention to the problems of aging populations in Western societies. Pr.: SOCIO 211.

**SOCIO 750. Social Control.** (3) Analysis of social and institution processes and mechanisms of social control: socialization, role allocation, systems of social sanctioning, growth and dynamics of institutional systems of social control emphasizing its character at the institutional and societal level of analysis. Pr.: SOCIO 211.

**SOCIO 751. Social Change.** (3) II, in odd years. Social and cultural evaluation, including diffusion and parallel development; the lag hypothesis; influential factors in, and consequences of, social change; the process of social change, contemporary theories, including directed social change. Pr.: SOCIO 211.

**SOCIO 752. Social Roles and Social Relationships.** (3) II, in odd years. Analysis of the processes of interpersonal perception, attraction, and social interaction in the formation, maintenance, and change of social relationships and social roles. Particular emphasis is placed on the importance of such processes for the formation of social groups and social interaction in a variety of social contexts. Consideration of major theoretical approaches and their empirical foundations. Pr.: SOCIO 211 and 550.

**SOCIO 767. Social Reactions to Deviance.** (3) Selected topics in the sociology of deviance, such as (1) public reactions to deviant persons and groups, (2) the nature and extent of formally organized responses to deviance, and (3) deviance considered from the perspective of deviant actors. Pr.: SOCIO 561 or graduate student standing.

### Social work courses

**SOCWK 010. Introduction to the Social Work Major.** (0) I, II. Information for new social work majors on the requirements, content, and objectives of the course sequences, and on the formal admissions process; and emphasizes the importance of the liberal arts foundation as the basis for the professional content; and reviews the CSWE Curriculum Policy Statement plus the NASW Code of Ethics.

### Undergraduate credit

**SOCWK 260. Introduction to Social Work.** (3) I, II. An introduction to the profession of social work and the various fields of social service by observing, experiencing, and analyzing social work and its place in society. An opportunity for the student to test social work as a possible career choice.

**SOCWK 310. Topics in Social Work.** (1-3) I, II. Supervised independent study projects. Pr.: Consent of the instructor.

**SOCWK 499. Senior Honors Thesis.** (2) On sufficient demand. Open only to seniors in the arts and sciences honors program.

### Undergraduate and graduate credit in minor field

**SOCWK 501. Proficiency Development.** (1-3) Integrative review of social work concepts and skills under faculty supervision. For single students or groups of students. Not applicable to major field requirements. Not repeatable. Pr.: Consent of instructor and superior performance in relevant course.

**SOCWK 510. Social Welfare as a Social Institution.** (3) I, II. The development and present status of social welfare in meeting changing human needs and the requirements in other parts of our social system; the analysis of present-day philosophy and the functions of social welfare. Same as SOCIO 510. Pr.: One course in each of the following areas: sociology, economics, and political science.

**SOCWK 519. Methods of Social Work Research.** (4) I, II. Focus is on research application in area of baccalaureate social work practice. Particular attention is given to research strategies for the evaluation of social work practice, for gathering information about communities and clientele, and for examining the impact of social policies at the local level. The content examines the ethics and processes of research, including the issues of research problem identification and selection, the use of the library to support the research effort, design considerations, problems of analysis with small samples, and presentation of research findings. Includes 1 credit hour of lab and field experience. Pr.: STAT 330 and SOCWK 260. Social work majors only.

**SOCWK 543. Women's Mental Health Issues.** (3) II. Investigates prevalent women's mental health issues such as the incidence of depression/anxiety, eating disorders, sexuality, relationship concerns. Also covers the efficacy of traditional treatment modalities and newer therapies that target women's unique mental health needs, such as feminist or nonsexist therapies. Pr.: One course in women's studies, social work, psychology, or family therapy.

**SOCWK 550. Field Practicum Research Preparation.** (1) I, II. Social work majors take this course in the semester before enrollment in SOCWK 562 Field Experience. The student is expected to prepare a research proposal which describes research that will be completed in the field practicum setting. In addition, the student is expected to complete 50 hours of volunteer time in the assigned field practicum setting. Pr.: SOCWK 519 and senior standing. Social work majors only.

**SOCWK 560. Social Work Practice I.** (3) I, II. Introduction to the basic helping skills and techniques common to social work practice. The social systems perspective is used to guide the development of a problem-solving methodology with attention to information gathering, assessment, and problem identification. Values clarification and self-awareness are emphasized and the skills needed for intervention, termination, and evaluation are introduced. Pr.: SOCIO 211; PSYCH 110; ANTH 200; junior standing and permission of the instructor.

**SOCWK 561. Social Work Practice II.** (3) I, II. Continuation of SOCWK 560 with emphasis on skill development in intervention techniques, and practice evaluation from a social systems perspective. A variety of intervention strategies and techniques is presented with emphasis on the development of a social work frame of reference. Pr.: SOCWK 560, 567; senior standing and permission of the instructor.

**SOCWK 562. Field Experience.** (12) I, II. Supervised field experience in community agencies and programs as a practical application of social work knowledge and skills gained from major course work. Emphasis on direct work with clients, whether individuals, groups, or communities. Seminars make use of student's experiences to analyze social work theory and practice. Pr.: SOCWK 550, 561, 567; senior standing; social work majors only; permission of the instructor.

**SOCWK 563. The Practice of Social Work in Rural Areas.** (3) On sufficient demand. A review of characteristics and social problems of rural areas. The development of practice competency in social work roles and skills necessary for rural practice. Pr.: SOCWK 560.

**SOCWK 564. Social Work Professional Seminar.** (3) I, II. A review of various theories in the behavioral sciences which influence the practice of social work. Primary focus of the course is on the use of these theories in implementing change in various client systems. Pr.: To be taken conc. with SOCWK 562. Social work majors only.

**SOCWK 565. Program and Policy Formulation and Analysis.** (3) I, II. Examination of policies and programs developed to cope with various social problems. Emphasis will be placed on analysis of

existing programs and policies and the formulation of alternative policies. Attention will be given to policy change through organizational and legislative action. Same as SOCIO 565. Pr.: SOCWK 510; one course in each of the following areas: sociology, economics, and political science; and one course in social science research methods.

**SOCWK 566. Social Work in Aging Services.** (3) Social work practice course focusing attention on working with institutionalized and noninstitutionalized elderly. Role of the social worker is explored in the context of physical, psychological, social, and economic aspects of aging. Skills in working with elderly are emphasized through classroom and direct practice in social work or in gerontology. Pr.: Three course hours in social work or gerontology.

**SOCWK 567. Human Behavior in the Social Environment.** (3) I, II. An introduction to the relationship among biological, social, psychological, and cultural systems as they affect or are affected by human behavior as it relates to social world models of practice. Emphasis on social systems understanding of human development. Pr.: SOCWK 260, BIOL 198, PSYCH 110, SOCIO 211, and ANTH 200.

**SOCWK 568. Social Work Practice III.** (2) I, II. Continuation of social work practice sequence with focus on skills development for macro-level social work practice. Community and organization intervention strategies are presented with emphasis on the development of a social work frame of reference. Taken conc. with SOCWK 561. Pr.: SOCWK 560; senior standing; open to social work majors only.

### Undergraduate and graduate credit

**SOCWK 610. Topics in Social Work.** (1-3) Supervised independent study projects. Pr.: SOCWK 260 plus 6 hours of behavioral science foundation courses and consent of instructor.

## Speech

Harold J. Nichols,\* Head

Professors Fedder,\* Flanagan,\* Nichols,\* and Zivanovic;\* Associate Professors Anderson, Armagost,\* Burtis, Griffin,\* Hinrichs,\* Kahlich, Rainbolt,\* Schenck-Hamlin,\* Shelton,\* and Uthoff; Assistant Professors Amico, Goulden,\* Hoag, McFarland, Maullar,\* Procter,\* Quirk-Chitwood, Ross, Smit,\* and Solberg; Instructors Brown, Molineux, Salva, Schraeder-Neidenthal, and Stanfield.

The Department of Speech offers study in rhetoric/communication, linguistics, theatre, speech pathology-audiology, and dance.

The undergraduate major requires at least 21 hours in one of the four areas and 9 hours in other areas within the department. See speech secondary education requirements, College of Education, for teacher certification.

### Rhetoric and communication

Rhetoric, one of the original liberal arts, is concerned with the theory, criticism, and practice of communication. The rhetoric/communication program has two instructional goals. First, the program attempts to

improve a student's communication skills in developing messages that are clear, coherent, reasoned, and fluent. Course work in public speaking, group and interpersonal communication, and co-curricular activities in debate and forensics provide opportunities to acquire practical communication skills. Second, the program attempts to develop a student's ability to analyze communication in different social, political, and organizational settings. Course work in theory, history, and criticism focuses on the study of speech and language used to achieve practical ends. A major in rhetoric/communication would be appropriate for anyone who plans to enter a career that is communication-intensive, such as law, education, public relations, or government.

Undergraduate students in rhetoric/communication are required to take at least 27 credit hours of course work in rhetoric/communication and 9 credit hours in other divisions of the department. The 27 credits in rhetoric/communication must be distributed as follows:

<b>Rhetorical and communication theory</b> .....	<b>6</b>
SPCH 320 Theories of Human Communication .....	3
SPCH 330 Rhetoric of Western Thought .....	3
<b>Guided electives</b> .....	<b>12</b>
Choose two of the following courses in rhetoric:	
SPCH 335 Criticism of Public Argument .....	3
SPCH 430 Rhetoric of the American Presidency .....	3
SPCH 434 Rhetoric of Social Movements .....	3
SPCH 435 Political Communication .....	3
Choose two of the following courses in communication:	
SPCH 322 Interpersonal Communication .....	3
SPCH 323 Nonverbal Communication .....	3
SPCH 326 Small Group Discussion Methods ..	3
SPCH 526 Persuasion .....	3

#### Major electives

Of the additional 9 credit hours, all must be 300-level or above with at least 6 credit hours numbered 426 or above.

### Linguistics

There is general agreement that nothing is more characteristically human than the ability to use language. Linguists, however, usually do not study languages in order to become proficient in speaking, reading, or writing them. In linguistics we are interested in discovering all the principles that, in a sense, define each language, how it works, how it has changed through time and geographical distribution, as well as how children learn to speak, and how people use language.

There are relationships between linguistics and many other disciplines (see Linguistics, in the general information for the College of Arts and Sciences). Students are encouraged to explore as many of these relationships as they can as undergraduates, especially if they anticipate going on to graduate study.

### Speech pathology-audiology

The goal of the speech pathology-audiology program is to educate professional personnel who are competent to help children and adults with communicative problems of speech, hearing, and language. The undergraduate program provides the foundation for the M.A. program, which is accredited by and meets the current requirements for the Certificate of Clinical Competence of the American Speech-Language and Hearing Association and the state of Kansas Department of Education requirements for school speech-language pathologists and school audiologists. Determination of the student's program of study and the completion of all requirements for certification are the responsibility of the student and the advisor.

Students have the opportunity to participate in supervised direct clinical experience with a variety of disorders and age groups in the Kansas State University Speech and Hearing Center, the public schools, and other off-campus clinical training sites.

### Theatre and dance

The major in theatre emphasizes the education of students for professional career goals or for cultural enrichment as an avocation. The goal is to develop an awareness of the many areas of theatre and dance and their disciplines. Training is available in all areas of theatre, including scenery, costuming, theatre history and literature, acting, directing, playwriting, and dance. The three purposes of the program are to provide: a liberal arts program in theatre; preparation for advanced training; and the basic theatre skills for the bachelor's candidate. K-State is an accredited institutional member of the National Association of Schools of Theater.

A major consists of 39 hours in theatre and 9 hours in tool courses in other areas of the department. (The course used to satisfy the College of Arts and Sciences requirement of one course in public speaking may not be counted as part of these 9 hours.) The 39 hours in theatre must be distributed as follows:

#### A theatre core of 23 hours:

THTRE 162	Concepts of Theatre Production .....	1
THTRE 261	Fundamentals of Acting .....	3
THTRE 267	Fundamentals of Stage Costume Design .....	3
THTRE 268	Fundamentals of Makeup .....	1
THTRE 368	Fundamentals of Technical Production .....	3
THTRE 370	Dramatic Structure .....	3
THTRE 565	Principles of Directing .....	3
THTRE 572	History of Theatre I .....	3
THTRE 573	History of Theatre II .....	3

Twelve additional hours in theatre courses numbered 500 or above (excluding THTRE 566 and 710).

#### Four hours of production work distributed as follows:

Two hours in THTRE 211 Drama Participation; One hour in conjunction with THTRE 368 Fundamentals of

Technical Production; one hour with THTRE 267 Fundamentals of Stage Costume Design.

Two hours in THTRE 710 Practicum in Theatre, or in THTRE 566 Rehearsal Techniques, for work in a production.

There will be an oral evaluation of all production work required for the major at the end of each semester.

### Music theatre option

An option in music theatre consists of 74 credit hours distributed as follows:

#### Music courses (23 credits)

Voice .....	8
MUSIC 200 Introduction to Musical Style (Styles I) .....	3
MUSIC 201 Textures of Music (Styles II) .....	4
MUSIC 250 Introduction to Music .....	3
MUSIC 475 Opera Workshop .....	2
Piano Proficiency .....	1
Seminar in Voice .....	0
Recital attendance (4 semesters) .....	0
Diction .....	2

#### Theatre courses (37 credits)

THTRE 260	Stage Movement .....	3
THTRE 261	Fundamentals of Acting .....	3
THTRE 368	Fundamentals of Technical Production <b>with</b> .....	3
THTRE 211	Drama Participation .....	1
THTRE 267	Fundamentals of Stage Costume Design <b>with</b> .....	3
THTRE 211	Drama Participation .....	1
THTRE 370	Dramatic Structure .....	3
THTRE 161	Fundamentals of Improvisation <b>or</b> .....	3
THTRE 361	Intermediate Acting .....	3
THTRE 761	Advanced Acting .....	3
THTRE 560	Advanced Stage Movement .....	3
THTRE 561	Vocal Expression .....	3
THTRE 570	The Musical Comedy .....	3
THTRE 671	History of Opera .....	3
THTRE 572	History of Theatre I .....	3
THTRE 710	Practicum .....	2

#### Tool courses (9 credits)

SPCH 330	Rhetoric in Western Thought .....	3
LING 280	Introduction to the Study of Language .....	3
SPPAT 400	Manual Communication .....	3

#### Dance courses (5 credits)

Any sequence /combination of ballet, jazz, or modern.

### Concentration in dance

A concentration in dance requires the following:

#### Core

DANCE 205	Dance as an Art Form .....	3
DANCE 222	Movement Improvisation I .....	1
DANCE 295	Dance Composition I .....	3
DANCE 321	Variations and Partnering .....	1
DANCE 380	Musical Stage Dance .....	2
DANCE 405	Applied Movement Fundamentals ..	3
DANCE 495	Dance Composition II .....	3
DANCE 502	Performance Production (minimum of 3 semesters) .....	1-2
DANCE 504	Performance Aesthetics .....	3
DANCE 505	Methods and Materials of Teaching Dance .....	2
DANCE 506	Dance Education Fieldwork .....	1
DANCE 510	Senior Project .....	2
KIN 376	First Aid and CPR .....	1
MUSIC 250	Introduction to Music .....	3
THTRE 661	Professional Development .....	1
THTRE 261	Fundamentals of Acting .....	3
THTRE 211	Drama Participation (with THTRE 267 and 368) .....	2
THTRE 267	Fundamentals of Stage Costume Design .....	3

THTRE 368	Fundamentals of Technical Production . . . . .	3
		42-45
<b>Elective</b>		
Choose one		
ART 100	Design I . . . . .	2
ART 190	Drawing I . . . . .	2
HIST 459	History of Dance in Its Cultural Setting . . . . .	3
KIN 455	Movement Exploration and Creative Dance for Children . . . . .	3
		44-48

#### Dance technique

Proficiency must be demonstrated by successful completion with a minimum grade of B of Level III in one technique and Level II in another. Enrollment in a minimum of one technique course is required each semester.

Dance courses are listed after theatre courses.

#### Quiz-out

Students may earn 3 hours of credit for Public Speaking I by completing the quiz-out option with a grade of C or better. Students electing this option *must* (a) enroll in quiz-out as specified in the current schedule of classes; and (b) attend a *mandatory* informational meeting at the beginning of that semester.

#### Rhetoric and communication courses

**SPCH 035. Special Studies in Intensive English.** (3-6) I, II. Equivalent to enrollment in one or two segments (structure, writing, reading, or speaking and listening) of Intermediate Intensive English I or II. Placement by the English Language Program according to the student's needs and ability level.

**SPCH 040. Intermediate Intensive English I.** (15) I, II. Intensive study of basic English sentence structure, writing, reading, speaking, and listening for native speakers of other languages. Pr.: TOEFL score of 400 or above.

**SPCH 050. Intermediate English II.** (15) I, II. Continued intensive study of English structure, writing, reading, speaking, and listening. Placement by the English Language Program.

**SPCH 065. Spoken English for International Students.** (3) I, II. Intensive practice in spoken American English for increased fluency and overall comprehensibility.

**SPCH 070. Advanced English as a Second Language.** (6) I, II. A support course required of international students whose performance on the English screening test indicates that they would still benefit from half-time instruction in English. Three specialized sections are offered: for undergraduates, for graduate students in technical fields, and for graduate students in non-technical fields. Placement by the English Language Program or on the recommendation of an advisor.

**SPCH 080. Speech Seminar.** (0) Special topics and lectures for speech majors. Required of all majors each semester.

**SPCH 090. Teaching Public Speaking I and IA.** (0) Seminar for graduate teaching assistants in strategies, techniques, and materials for the introductory public speaking course; includes current practices and research in communication education. Enrollment limited to graduate teaching assistants in the Department of Speech.

#### Undergraduate credit

**SPCH 105. Public Speaking IA.** (2) I, II, S. Alternate to SPCH 106. Principles and practice of message preparation, audience analysis, presentational skills, and speech criticism. Primarily granted for students

whose curricula require a 2-credit hour course. Credit not granted for both SPCH 105 and 106.

**SPCH 106. Public Speaking I.** (3) I, II, S. Principles and practice of message preparation, audience analysis, presentational skills, and speech criticism permitting greater practice in oral presentation. Credit not granted for both SPCH 105 and 106.

**SPCH 107. Public Speaking for International Students.** (3) I, II. Speaking, reading, and writing for international students whose linguistic ability in American English is below that of the native American student; emphasis on aural-oral approach to structural patterns of spoken English. Pr.: Satisfactory score on the Speech Proficiency Examination for International Students.

**SPCH 109. Public Speaking IA, Honors.** (3) Honors speech preparation and delivery; a survey of topics basic to rhetoric, communication, and linguistics. For arts and sciences honors students.

**SPCH 210. Forensics Participation.** (1-2) I, II. Intercollegiate debate or individual events. Four hours maximum credit. Pr.: Consent of director of the activity.

**SPCH 319. Intercollegiate Forensics.** (3) I. Current practices and theories for competitive intercollegiate individual events forensics activities. Focus is on applying principles of prepared speech, limited preparation speech, and oral interpretation events in competition. Pr.: Consent of director of the activity. May not be taken concurrently with SPCH 210.

**SPCH 311. Business and Professional Speaking.** (3) I, II. Principles and practice of speaking in an organizational setting. Areas of emphasis will be oral reports, interviewing, interpersonal communication, and conducting meetings.

**SPCH 320. Theories of Human Communication.** (3) I. Survey of basic theories of human communication focusing on sending, receiving, and responding to messages face-to-face. Pr.: SPCH 105 or 106.

**SPCH 321. Public Speaking II.** (3) I, II. Advanced principles and practice of speech composition, audience adaptation, and delivery. Pr.: SPCH 105 or SPCH 106.

**SPCH 322. Interpersonal Communication.** (3) I, II, S. Examination of the dynamics of face-to-face interpersonal interaction. Focus is on applying principles of relational communication.

**SPCH 323. Nonverbal Communication.** (3) II. Analysis of nonverbal communication in human interaction; theory and research in kinesics, proxemics, and paralinguistics. Pr.: SPCH 105 or 106.

**SPCH 325. Argumentation and Debate.** (3) I, II. Basic theories of argumentation with emphasis on their application in academic debate. Pr.: SPCH 105 or 106.

**SPCH 326. Small Group Discussion Methods.** (3) I, II, S. Basic concepts of small-group decision making. Projects emphasize participation in and analysis of communication in the small group. Pr.: SPCH 105 or 106.

**SPCH 328. Professional Interviewing.** (3) Investigation of interviewing as it occurs in a variety of situations, including journalistic, diagnostic, persuasive, and managerial. Emphasis on developing practical skills in planning, managing interviews, and interpreting data in the professional context. Pr.: SPCH 105 or 106.

**SPCH 330. Rhetoric in Western Thought.** (3) I. An introduction to the figures, concepts, and trends in the development of rhetorical theory from classical to modern times. Pr.: SPCH 105 or 106.

**SPCH 335. Criticism of Public Argument.** (3) I, II. Study and application of principles of argumentation pertaining to public policy disputes, including the nature of inference, validity tests, linguistic strategies, value systems, and argument criticism. Particular issues of foreign and domestic policy are examined as representative of recurring forms of argument.

**SPCH 398. Sophomore Honors Seminar.** (3) II. Open only to qualified students in the arts and sciences honors program.

**SPCH 421. Technical Speaking.** (3) I, II. Intensive study of the principles and practice of communication for engineers. Emphasis is on presentational speaking and group decision making. Pr.: Enrollment in College of Engineering with junior or senior standing.

**SPCH 426. Coaching and Directing Speech Activities.** (3) I. Current practices in coaching curricular and extra-curricular speech activities with practical experience in the problems and procedures of directing a forensic program. Pr.: Six hours of general speech or theatre courses that are 200 level or above, SPCH 325, and THTRE 263.

**SPCH 430. Freedom of Speech.** (3) II. A study of communication and legal principles pertaining to freedom of expression, and an examination of their implications for competing interests such as public order, national security, morality, civil rights, and fairness.

**SPCH 432. The Rhetoric of the American Presidency.** (3) I, II. An examination of the American presidency from a rhetorical perspective, emphasizing the symbolic resources and duties of the office and those who hold it. Special attention paid to the public discourse of recent presidents during moments of national crisis. Pr.: SPCH 105 or 106.

**SPCH 434. Rhetoric and Social Movements.** (3) II. A study of the scope and functions of persuasive communication in contemporary social movements. Pr.: SPCH 105 or 106.

**SPCH 435. Political Communication.** (3) II. A study of political discourse. Attention is directed to theory that encompasses political discourse as it affects political behavior. Pr.: SPCH 105 or 106.

**SPCH 460. Rhetoric of the Sixties.** (3) I. Rhetorical interpretation of the social and political forces dominating the decade and an examination of the forms of persuasion which these forces brought to life. Emphasizes political leadership, pressures for social change, foreign policy, and transformation of the rhetorical environment. Pr.: SPCH 105 or 106.

**SPCH 498. Honors Tutorial in Speech.** (1-3) I, II. Individual directed research and study of a topic in speech, normally as a preliminary to writing a senior honors thesis. May be repeated once to a total of 3 hours. Pr.: Sophomore standing, membership in the honors program of the College of Arts and Sciences, and permission of the instructor.

#### Undergraduate and graduate credit in minor field

**SPCH 520. Analysis of Experimental Research Literature in Speech.** (3) A study of the literature employing the experimental method in general speech, speech pathology and audiology, and theatre. Pr.: Six hours in speech.

**SPCH 525. Argumentation Theory.** (3) II. An advanced study of prominent argumentation theorists including Chaim Perelman and Stephen Toulmin, with an in-depth examination of special topics concerning the philosophy, theory, and practice of argumentation. Pr.: SPCH 125.

**SPCH 526. Persuasion.** (3) II. The study of communication as persuasion; examination of contemporary approaches to persuasion.

#### Undergraduate and graduate credit

**SPCH 630. Special Topics in Rhetoric and Communication.** (3) II. Intensive study of selected topics in communication and rhetoric. Repeatable with change in topic. Pr.: Junior standing and consent of instructor.

**SPCH 720. Perspectives on Communication.** (3) Analysis of current perspectives on the communication process. Materials cover assumptions, principles,

implications, and selected research within each perspective. Pr.: SPCH 320.

**SPCH 721. Language and Social Interaction.** (3) II. Study of the epistemological, social, and behavioral functions of language in communication. Examination of the processes by which language functions to construct one's worldview and guide individual action. Pr.: SPCH 320 or LING 280 or ANTH 220; junior standing.

**SPCH 725. History of American Public Address.** (3) Study of American speakers, from the time of Jonathan Edwards to the present, including their training, speeches, and effectiveness. Pr.: Junior standing and consent of instructor.

**SPCH 726. Seminar in Persuasion.** (3) II, in odd years. Survey and analysis of advanced theory and experimental studies in persuasion. Pr.: Junior standing.

**SPCH 730. Classical Rhetorical Theory.** (3) Study of rhetorical theory and criticism from early Greek to Roman times. Pr.: SPCH 330 or graduate standing.

**SPCH 732. Contemporary Rhetorical Theory.** (3) II. Study of major European and American contributors to rhetorical theory in the twentieth century. Pr.: SPCH 730.

**SPCH 733. Rhetorical Criticism.** (3) II. Study of traditional and contemporary approaches to the analysis of public discourse. Pr.: SPCH 330.

**SPCH 799. Problems in Speech.** (Var.) Open to students in any speech area. Pr.: Junior standing and consent of instructor.

## Linguistics courses

### Undergraduate credit

**LING 280. Introduction to the Study of Language.** (3) I, II. Survey of the scientific study of language. Contributions of linguistics to an understanding of the nature of language. Presupposes no previous knowledge of linguistics.

**LING 594. Comanche Texts.** (3) I or II, in alternate years. General introduction to Comanche grammatical and discourse systems and study of oral narratives: published and unpublished texts including coyote stories, adventure stories, personal recollections, etc. Some attention to pronunciation, but major emphasis on the development of a basic reading ability and understanding of the world portrayed in the narratives. Same as LG 594.

**LING 595. Archeological Decipherment.** (3) I or II, in alternate years. The art and science of four famous cases of decipherment: Mesopotamian cuneiform, Egyptian hieroglyphics, Cretan-Mycenaean Linear B, and on-going work on the Maya script. Characteristics of successful decipherments and resultant increases in knowledge about the history of writing and the richness of various cultures of the past. Same as LG 595.

### Undergraduate and graduate credit

**LING 600. Principles of Linguistics.** (3) The scientific study of language, with examples from English, Spanish, French, German, and others. Overview of language origins, phonetics, phonology, syntax, semantics, language acquisition, dialects, language change, and writing systems. Same as ENGL 600 and LG 600.

**LING 601. General Phonetics.** (3) I or II, in alternate years. Description and classification of speech sounds according to point and manner of articulation. Transcription in the International Phonetic Association Alphabet. Includes sounds of English, French, Spanish, German, and others. Same as ENGL 601 and LG 601.

**LING 602. Historical Linguistics.** (3) I or II, in alternate years. Internal and comparative reconstruction of earlier forms of languages. Genetic relationships in language families, and various typological considerations. Includes French, Spanish, and others. Same as ENGL 602 and LG 602.

**LING 603. Topics in Linguistics.** (1-3) I or II, in alternate years. Seminar on a special topic in linguistics: decipherment of ancient writing systems, linguistics applied to the teaching of English or other languages, discourse analysis (especially of spoken texts), etc. Topic to be announced for semester in which offered. Repeatable for credit on a different topic. Same as ENGL 603 and LG 603.

**LING 783. Phonology I.** (3) Basic concepts of the theory of language sound systems with particular reference to English but including reference to other languages as well. Pr.: SPCH or ENGL 681 and SPCH, ENGL, or MLANG 780. Same as ENGL 783 and LG 783.

**LING 785. Syntax I.** (3) Basic concepts of syntactic theory, with particular reference to English but including reference to the grammatical systems of other languages as well. Pr.: ENGL 530 or SPCH, ENGL, or LG 780. Same as ENGL 785 and LG 785.

**LING 792. Field Methods in Linguistics.** (3) On sufficient demand. Techniques of collecting and analyzing linguistic data in the field. Work with language consultants in class, on languages such as Swahili. Pr.: Consent of the instructor. Same as LG 792 and ANTH 792.

**LING 796. Theories of Grammar.** (3) I, S. Comparative examination of the assumptions, aims, and procedures of four types of English grammar—the normative grammar of Robert Lowth, the historical grammar of Otto Jespersen, the structural grammar of Leonard Bloomfield, and the generative-transformational grammar of Noam Chomsky—and their application. Same as ENGL 796. Pr.: Junior standing, and ENGL 530 or LING 600.

### Speech pathology–audiology courses

**SPPAT 343. Communication Sciences and Disorders.** (3) I. A survey of normal communication processes and communication disorders and an introduction to the fields of speech pathology and audiology that are responsible for the clinical management of these disorders.

**SPPAT 349. Experimental Analysis of Vocal Behavior.** (3) II. Study of behavior analysis principles which are relevant to the experimental analysis of vocal behavior. The types of vocal behavior investigated extend from uncoded utterances to complex language responses.

**SPPAT 350. Anatomy of the Speech Mechanism.** (3) II. Anatomy of the structures involved in speech production. The course will also include developmental anatomy of the head and neck, histology of the larynx, and an overview of speech physiology.

**SPPAT 351. Fundamentals of Hearing.** (3) Study of the ear and the mechanics of hearing.

**SPPAT 400. Manual Communication.** (3) I, II. Study of background information in current trends in the use of sign language. Restricted to sign language used in the United States. Includes instruction in the American Manual Alphabet and Vocabulary for about 700 signs. Primary focus will be application of beginning skills for communication with those who depend on this form of communication.

**SPPAT 442. Developmental Psycholinguistics.** (3) I. Review of research and theory of early development of language comprehension and production, involving vocalization, phonology, morphology, syntax, semantics, and pragmatics. Includes discussion of the relationship between cognition and language as well as other variables influencing language acquisition.

**SPPAT 443. Language Assessment and Intervention.** (3) II. The nature of language disorders as well as general principles of language assessment and intervention are presented. Specific language assessment and intervention methodologies for individuals 0-5 years of age are reviewed. Communication profiles associated with specific language impairment, mental retardation,

emotional disturbance, hearing impairment, and acquired aphasia are examined. Pr.: SPPAT 442.

**SPPAT 446. Disorders of Articulation and Phonology.** (3) II. Theory, research, and principles of (a) normal abnormal phonetic and phonologic development, (b) assessment of speech sound disorders, and (c) intervention for speech sound disorders. Pr.: LING 601.

**SPPAT 449. Clinical Procedures in Speech Pathology and Audiology.** (3) II. Orientation to clinical practicum. Opportunities for clinical observation of speech, language, and hearing evaluation and therapy. Study of diagnostic tools, therapy materials, equipment, and clinical procedure. Pr.: Concurrent enrollment in SPPAT 443 and 446.

**SPPAT 489. Undergraduate Topics in Speech–Language Pathology and Audiology.** (1-3) Review of current topics in speech–language pathology and/or audiology. May be repeated for a maximum of 6 hours with a change in topic. Pr.: Consent of instructor.

**SPPAT 520. Augmentative and Alternative Communication.** (2) I. This course is concerned with an introduction to augmentative and alternative communication (AAC) to provide the student with an overview of characteristics, evaluation, and management information serving permanently or temporarily nonspeaking individuals. Course emphasis will be on experience with electronic communication devices.

**SPPAT 545. Clinical Research in Speech–Language Pathology/Audiology.** (3) I. Logic and methods of clinical research with emphasis on those most frequently used in speech–language pathology and audiology. Experience formulating, doing and evaluating research. Pr.: STAT 300 or equiv.

**SPPAT 550. Speech Physiology.** (3) I. Physiology of the structures involved in speech production. This course includes methods of investigation and recent research in experimental phonetics. Pr.: SPPAT 350.

### Undergraduate and graduate credit in minor field

**SPPAT 555. Language Development.** (3) Survey of the development of speech and language skills in children. Pr.: HDFS 310 or EDEL 300.

### Undergraduate and graduate credit

**SPPAT 600. Manual Communication II.** (3) Instruction in an additional 400 to 500 signs in the SFF system. Introduction to elementary ASL techniques. Discussion of other augmentative communication systems. Research will be conducted in the use of various manual communication systems with special populations, including aphasic, language disabled, mentally handicapped, and others. Pr.: SPPAT 400 or basic sign language skills.

**SPPAT 605. Communication Disorders and Aging.** (3) An introduction to the most common communication disorders of older persons. Appropriate service delivery models and special needs of the elderly are discussed. Pr.: Consent of instructor.

**SPPAT 705. Practicum in Speech–Language Pathology.** (1-3) I, II, S. Supervised practice in the use of the methods and materials of speech–language pathology. Pr.: SPPAT 449 and consent of instructor.

**SPPAT 706. Practicum in Audiology.** (1-3) I, II, S. Supervised practice in the use of equipment, materials, and methods of audiology. Pr.: SPPAT 720 or conc. enrollment and consent of instructor.

**SPPAT 720. Audiology I.** (3) I. Fundamental topics in audiology. Included are monitoring of equipment calibration, pure tone measurements, masking, and speech testing. Laboratory practice is required. Pr.: SPPAT 351.

**SPPAT 721. Audiology I Laboratory.** (1) I, in alternate years. Effects of noise on hearing. Development, management, and control of community hearing conservation programs. Pr.: SPPAT 720.

**SPPAT 740. Hearing Conservation.** (3) I. in alternate years. Effects of noise on hearing. Development, management, and control of community hearing conservation programs. Pr.: SPPAT 720.

**SPPAT 741. Fluency Disorders.** (3) I. Research and theory concerning etiology, characteristics, assessment, and treatment of individuals with disfluency problems. Pr.: SPPAT 545.

**SPPAT 742. Language Assessment and Intervention II.** (2) II. Theory and research concerning language disorders in school-aged children are presented. Specific language assessment and intervention methodologies for this population are reviewed. Dialectal and bilingual considerations for assessment and intervention are addressed. Pr.: SPPAT 443.

**SPPAT 743. Amplification in Rehabilitation.** (3) II. Analysis of electroacoustic characteristics of hearing aids. Earmold acoustics. Selection and use of amplification. Pr.: SPPAT 720 or conc. enrollment.

**SPPAT 744. Aural Rehabilitation.** (3) II. Study of and techniques for the habilitation or rehabilitation of speech and language problems of the hearing impaired. Pr.: SPPAT 720.

**SPPAT 750. Voice and Resonance Disorders.** (3) II. Research and theory concerning etiology, characteristics, assessment, and management of individuals with laryngeal disorders and orofacial anomalies. Pr.: SPPAT 550.

**SPPAT 760. Audiology II.** (3) II. Study of differential diagnostic audiometric procedures in the classification of hearing loss. Topics include middle ear measurement procedures, site of lesion testing, and procedures applicable to the pediatric population. Pr.: SPPAT 720.

## Theatre courses

### Undergraduate credit

**THTRE 160. Introduction to Theatre.** (3) Consideration of the basic elements of theatre: aesthetics, dramatic literature, theatre technology, and producing organizations.

**THTRE 161. Fundamentals of Improvisation.** (3) Introduction to the techniques of improvisation with the emphasis upon practical participation.

**THTRE 162. Concepts of Theatre Production.** (1) I. An orientation to the various areas of theatrical production in the rehearsal and performance process. Required of all majors in their first fall semester.

**THTRE 165. Appreciation of Theatre.** (2) Direct experience with live theatre through an investigation of theatrical materials, forms, and styles, and through attendance at the University theatrical productions.

**THTRE 211. Drama Participation.** (1-2) I, II. Work in theatrical productions. Four hours maximum credit. Pr.: Consent of director of activity.

**THTRE 235. Introduction to the Art of Film.** (3) Examination of the means of creating film art. Attention to techniques employed by successful directors, writers, and producers.

**THTRE 260. Stage Movement.** (3) A study of the technique of stage movement and an investigation of the language of gesture. Students are encouraged to have had a minimum of one semester of ballet or modern dance before entering this course, or to take dance conc. with stage movement.

**THTRE 261. Fundamentals of Acting.** (3) Theory and practice of fundamental skills and techniques of acting. Major emphasis is on freeing and training the individual's imagination, intellect, body, and voice through designed exercise and performed scenes. May be repeated for a total of 6 hours credit with consent of instructor.

**THTRE 263. Oral Interpretation of Literature.** (3) Techniques of reading from the printed page, selecting portions from various forms of literature, including

narrative poetry, essay, lyric, sonnet, nonfictional prose, scenes from plays, and selected short stories.

**THTRE 267. Fundamentals of Stage Costume Design.** (3) II. Examination of the role of costume design in the theatre, including development and presentation of designs. Concurrent enrollment in at least one credit of THTRE 211 required.

**THTRE 268. Techniques of Makeup.** (1) Techniques of makeup for stage, movies, and television.

**THTRE 269. Fundamentals of Stage Lighting.** (3) Basic theory of electricity, light, and optics. Practical mechanics of stage lighting safety, instruments, and control systems.

**THTRE 275. Summer Theatre Workshop.** (0-6) S. Supervised participation in a summer theatre repertory/stock program. Limited to freshmen and sophomores. May be repeated for a maximum of 6 hours credit. Pr.: Consent of instructor.

**THTRE 361. Intermediate Acting.** (3) Emphasis upon expanding the actor's capabilities through more advanced scene work and character study. May be repeated for a total of 6 hours credit with consent of instructor. Pr.: THTRE 261 and consent of instructor.

**THTRE 368. Fundamentals of Technical Production.** (3) I. Materials and techniques used in scenery construction and theatre lighting. Conc. enrollment in at least 1 hour of THTRE 211 is required.

**THTRE 370. Dramatic Structure.** (3) Fundamentals of play analysis for directors with emphasis upon concepts of form, style, characterization, discovery, and reversal. Includes practice in analyzing plays of various forms and styles.

**THTRE 475. Opera Workshop.** (1-6) Principles and techniques of operatic and musical theatre production, with emphasis on class rehearsal and performance of selected scenes from opera and musical drama; brief survey of the history of opera. Offered jointly by the Departments of Speech and Music. Same as MUSIC 475.

### Undergraduate and graduate credit in minor field

**THTRE 560. Advanced Stage Movement.** (3) Study in the physical development of character and advanced techniques of stage movement. May be repeated for a total of 9 hours credit by qualified students. Pr.: THTRE 260 and one semester of ballet or modern dance.

**THTRE 561. Vocal Expression for Actors.** (3) Studies and application of vocal techniques for stage productions; emphasis on development of the actor's vocal mechanism. May be repeated for a total of 9 hours credit by qualified students. Pr.: Consent of instructor.

**THTRE 562. Playwriting.** (3) Theoretical study and practical application of techniques of playwriting with regard to plot, characters, and production; emphasis on the one-act form.

**THTRE 563. Storytelling.** (2) A consideration of literary materials appropriate for children in nursery schools, kindergarten, and elementary schools. Major emphasis is on training in the art of storytelling. Pr.: SPCH 105 or 106.

**THTRE 565. Principles of Directing.** (3) Principles and techniques of directing for the theatre; the historical emergence of the director; study of current theories. Pr.: THTRE 261.

**THTRE 566. Rehearsal Techniques.** (0-3) I, II. A laboratory course for students enrolled in performance and production classes. May be repeated for 6 hours. Pr.: Conc. enrollment in THTRE 765 or 783 or 779.

**THTRE 567. Advanced Costume Design.** (3) I. Studies in theory and practice of costume design for theatre, dance, and opera. Pr.: THTRE 267.

**THTRE 568. Fundamentals of Scene Design.** (3) Examination of the role of scene design in theatre, elements and objectives of design. Development, presentation, and synthesis of design images with the scripted play. Pr.: THTRE 368.

**THTRE 569. Advanced Technical Production.** (3) A lecture-lab course in advanced technical theatre problems of organization, planning, drafting and execution of scenery and lighting. Pr.: THTRE 368.

**THTRE 570. The Musical Comedy.** (3) On sufficient demand. The history of operetta and musical comedy from Offenbach to the present. Same as MUSIC 570. Pr.: MUSIC 150 or THTRE 165 or equiv.

**THTRE 572. History of Theatre I.** (3) II. A survey of the development of the theatre from ancient times to 1700. Pr.: Junior standing and consent of instructor.

**THTRE 573. History of Theatre II.** (3) I. A survey of the development of the theatre from 1700 to the present. Pr.: Junior standing or consent of instructor.

### Undergraduate and graduate credit

**THTRE 660. Professional Theatre Tour.** (2-3) Intersession, S. Supervised viewing and analysis of professional theatre productions. Travel to one or more theatre centers such as New York, London, or Los Angeles. Students are charged an additional fee to cover travel expenses. Written critical reviews of the productions are required. May be repeated once by undergraduates. Pr.: Six hours of credit in theatre.

**THTRE 661. Professional Development.** (1) I. Study of audition techniques including supervised preparation of appropriate material. Business aspects of professional theatre, including unions, contracts, and professional ethics. Pr.: 12 hours in theatre, music, and/or dance.

**THTRE 664. Creative Dramatics.** (3) The development of creative imagination and personal well-being through theatre games, improvisation, role playing, and simulation. The use of drama in recreational and educational settings. Improvisation in performing scripted drama. Pr.: Junior standing.

**THTRE 665. Theatre for Special Populations.** (3) Theory and practice of creative dramatics and theatre production for special populations; individualized reading and projects for particular populations such as the handicapped or the elderly. Pr.: Junior standing.

**THTRE 666. Stage Management.** (3) I, II. Theory and practice of stage management in the professional and nonprofessional theatre. Emphasis is on the organization of all areas of theatre knowledge needed for the running of theatrical productions. Pr.: THTRE 368.

**THTRE 667. Period Styles for the Theatre I.** (3) II. Survey of historical styles of architecture, furnishings, and clothing in relation to theatrical design and the history of the theatre from the Greeks to 1800. Pr.: THTRE 572 or conc. enrollment.

**THTRE 668. Period Styles for the Theatre 2.** (3) I. Survey of historical styles of architecture, furnishings, and clothing in relation to theatrical design and the history of the theatre from 1800 to present. Pr.: THTRE 573 or conc. enrollment.

**THTRE 671. History of Opera.** (3) A study of selected masterpieces of musical drama, with emphasis on the relationship of music and drama, and on the unique qualities of opera as a collective artwork. Pr.: MUSIC 201 or MUSIC 250 or THTRE 370. Same as MUSIC 650.

**THTRE 672. American Ethnic Theatre.** (3) Drama and stagecraft of ethnic groups in the United States, including the theatre of African, Asian, Hispanic, Jewish, and Native Americans. Pr.: Junior standing.

**THTRE 710. Practicum in Theatre.** (0-6) Supervised participation in a position of major responsibility. May be repeated for a maximum of 12 hours credit. Pr.: THTRE 160 or 261 or 368; junior standing; consent of supervising faculty member and approval of faculty members are required.

**THTRE 711. Topics in Technical Theatre.** (3) Selected topics in creative techniques and investigation for technical theatre. May be repeated for credit with change in topic. Pr.: THTRE 368 and consent of instructor.

**THTRE 712. Theatre Management.** (3) Theatre management, promotion, finance, organization; emphasis on contract negotiations and use of facilities.

**THTRE 760. Principles of Drama Therapy.** (4) Study of theory and practice in the use of drama as therapy, including assessment and treatment, individual and group practice, and psychodrama. Pr.: THTRE 664 or 665.

**THTRE 761. Advanced Acting.** (3) Studies in style, technique, and characterization. May be repeated once. Pr.: THTRE 361 and consent of instructor.

**THTRE 762. Advanced Playwriting.** (3) Further study in the writing of drama; emphasis on problems of writing full-length plays. May be repeated for a total of 9 hours credit by qualified students. Pr.: Consent of instructor. Same as ENGL 762.

**THTRE 763. Reader's Theatre.** (3) The nature, purpose, and production of oral interpretation of literature in the theatre; emphasis on monologue, lecture-recital, and play reading. May be repeated for a total of 6 hours credit by qualified students. Pr.: Consent of instructor.

**THTRE 764. Early American Theatre.** (3) Studies in the drama and stagecraft of the colonies and the United States from the beginnings to 1900. Pr.: Junior standing.

**THTRE 765. Practice in Directing.** (3) A lecture-lab course with emphasis on directing dramatic productions under performance conditions. May be repeated for a total of 9 hours credit by qualified students. Pr.: Consent of instructor.

**THTRE 777. Aesthetics of the Theatre.** (3) Principal emphasis on theoretical problems of dramatic art.

**THTRE 778. History of the Physical Stage.** (3) A survey course in the emergence and development of the theatre building as a distinct architectural form, with particular emphasis on the effect of the physical environment on the play. Pr.: THTRE 368.

**THTRE 779. Repertory Theatre.** (3) Concentrated studies in theory and practice of repertory theatre productions. Reading, demonstrations, study of play scripts; play selection and production methods; operation of and assistance in production of plays in repertory. May be repeated for a total of 12 hours credit by qualified students. Pr.: Consent of instructor.

**THTRE 780. Theatre Design Studio.** (0-3) I, II. Advanced problems in conceptualization and realization of design, including sets, costumes, lights, and technical production. Emphasis on advanced techniques in research, analysis, and production problems. May be repeated to a maximum of 6 credits. Pr.: THTRE 567 or 568 or 569.

**THTRE 782. Women in Theatre.** (3) A history of the contributions made by women in theatre as playwrights, managers, directors, and performers; contemporary women in theatre and their experiments in expressing women's consciousness.

**THTRE 783. Practice in Acting.** (3) Advanced studies in characterization with emphasis on communicating with the director. Taught in conjunction with the Practice in Directing workshop. May be repeated once. Pr.: THTRE 361 and consent of instructor.

## Dance courses

### Undergraduate credit

**DANCE 120. Modern Dance I.** (2) I, II. Introduction to principles of modern dance. Emphasis on correct body alignment, movement efficiency, and creative potential of the individual. Three hours lab a week.

**DANCE 165. Ballet I.** (2) I, II. Introduction to basics of classical ballet training. Includes terminology, body positions, movement vocabulary, and principles of body alignment.

**DANCE 171. Jazz Dance I.** (2) I, II. A basic course in jazz technique and style, focusing on isolations, rhythmic articulation, and the control and release of energy. Three hours lab a week.

**DANCE 205. Dance as an Art Form.** (3) I. Dance in its religious, social, and artistic forms. Film, slides, demonstrations, and lectures will trace the function of dance in society, the influence of society on dance, how dance relates to other art forms, and current trends in the dance world.

**DANCE 222. Movement Improvisation.** (1) On sufficient demand. Provides the opportunity to: discover personal creative sources for spontaneous movement; increase movement self-confidence in informal group settings; rediscover "play" through movement; and explore basic principles of movement improvisation—space, weight, shape, and time. Pr.: Consent of instructor.

**DANCE 250. Performance Styles.** (1) Study and practice of technique and performance of specific period/historical, character, or ethnic/specialty dance styles. May be repeated three times.

**DANCE 295. Dance Composition I.** (3) On sufficient demand. Introduction to the principles of the choreographic craft. Practical experience in development of movement phrases. Culminating presentation and critique of work.

**DANCE 321. Variations and Partnering.** (1) On sufficient demand. Directed study in the principles of partnering and repertoire performance in various styles and forms of choreography. Pr.: Consent of instructor.

**DANCE 323. Modern Dance II.** (2) I, II. May be repeated for a total of 8 hours. Only 2 of these hours may be applied toward humanities requirements. Pr.: DANCE 120 and consent of instructor.

**DANCE 324. Modern Dance III.** (2) I, II. May be repeated for a total of 8 hours. Only 2 of these hours may be applied toward humanities requirements. Pr.: DANCE 323 and consent of instructor.

**DANCE 325. Ballet II.** (2) I, II. May be repeated for a total of 8 hours. Only 2 of these hours may be applied toward humanities requirements. Pr.: DANCE 165 and consent of instructor.

**DANCE 326. Ballet III.** (2) I, II. May be repeated for a total of 8 hours. Only 2 of these hours may be applied toward humanities requirements. Pr.: DANCE 325 and consent of instructor.

**DANCE 371. Jazz Dance II.** (2) I, II. Intermediate course in jazz technique and style focusing on development of isolations, rhythmic articulation, and the control and release of energy. Performance of advanced movement sequences. May be repeated for a total of 8 hours. Only 2 of these hours may be applied toward humanities requirements. Pr.: DANCE 171.

**DANCE 372. Jazz Dance III.** (2) On sufficient demand. May be repeated for a total of 8 hours. Only 2 of the hours may be applied toward humanities requirements. Pr.: DANCE 371 or consent of instructor.

**DANCE 380. Musical Stage Dance.** (2) On sufficient demand. Technique and performance of musical stage dance. Rehearsal and performance of selected musical stage choreography. Pr.: DANCE 120, 165, or 171.

**DANCE 405. Applied Movement Fundamentals.** (3) Study, analysis, and application of movement theory for the performer. Anatomical and kinesiological principles with practical application to major movement/dance, alignment, and neuromuscular repatterning theories for the performer, creator, and educator. Two hours lecture and two hours lab a week. Pr.: BIOL 240.

**DANCE 459. History of Dance in Its Cultural Setting.** (3) II. The study of developments and changes in the style, technique, and purpose of ceremonial and theatrical dancing from the Greeks to the present. Emphasis on the interaction between this art and the total culture—social, religious, artistic, and political—in which it is performed. Pr.: Sophomore standing. Same as HIST 459.

**DANCE 495. Dance Composition II.** (3) On sufficient demand. Advanced training and directed experiences in dance composition. Development of theme, phrasing, and style with particular emphasis on group forms. Pr.: DANCE 295.

**DANCE 498. Honors Tutorial in Dance.** (1-3) I, II. Individually directed research/creative endeavor in dance, normally as a preliminary to writing a senior honors thesis. May be repeated once to a total of 3 hours. Pr.: Sophomore standing, membership in the honors program of the College of Arts and Sciences, and permission of instructor.

**DANCE 499. Senior Honors Thesis.** Open only to seniors in the arts and sciences honors program.

## Undergraduate and graduate credit in minor field

**DANCE 502. Performance Production.** (1-2) I, II. Studies in the techniques of dance production and performance. Emphasis is on practical application. May be repeated four times. Pr.: Junior standing or consent of instructor.

**DANCE 504. Performance Aesthetics.** (3) On sufficient demand. Examination of performance as art. Analysis of general aesthetic theory to performance through such issues as style, content, form, gender, and role. Oral and written experience in planning, executing, and assessing performance events. Pr.: Junior standing or consent of instructor.

**DANCE 505. Methods and Materials of Teaching Dance.** (2) On sufficient demand. An in-depth survey of the development of dance education and a practical examination of dance for its educative, artistic, disciplinary, and therapeutic values. Emphasis on role of dance education, pedagogy, and advocacy. Pr.: DANCE 205, 405, and 504 or consent of instructor.

**DANCE 506. Dance Education Fieldwork.** (1) On sufficient demand. A semester of supervised fieldwork incorporating dance as an educative tool in the classroom, in a therapeutic setting, or in an advocacy position. Application of dance education theory under faculty supervision and conference. Pr.: DANCE 505.

**DANCE 599. Independent Studies in Dance.** (1-3) Selected topics in dance. Maximum of 3 hours applicable toward degree. Pr.: Consent of department head.

**DANCE 690. Senior Honors Thesis.** Open only to seniors in the arts and sciences honors program.

## Statistics

James J. Higgins,\* Head

Professors Feyerherm,\* Higgins,\* Johnson,\* Kemp,\* Milliken,\* Nassar,\* Nelson,\* Perng,\* and Yang;\* Associate Professors Boyer,\* S. McNulty,\* and Neill. Assistant Professors Noble and Schwenke;\* Emeritus: Professor Fryer.

Statistics is a combination of classical mathematics, the theory of probability, and some new concepts related to inductive reasoning that have developed during the past 75 years.

Almost all activities of plants and animals (including people) depend to some degree on chance events, and most decisions made by people depend on sampling information—which also depends on chance events, and hence on probability. Consequently, the field of interest and activity for a statistician potentially is very broad.

Likewise, the professional activities open to a trained statistician are quite varied. The existence of modern-day computers relieves the statistician of tedious computations and elevates his professional activity to dealing with people and/or engaging in basic research.

Students who major in statistics may seek a bachelor of arts degree or a bachelor of science degree by satisfying the general requirements of that degree, and completing the following:

MATH 220	Analytic Geometry and Calculus I . . .	4
MATH 221	Analytic Geometry and Calculus II . . . . .	4
MATH 222	Analytic Geometry and Calculus III . . . . .	4
MATH 551	Applied Matrix Theory . . . . .	3
CIS 200	Fundamentals of Computer Programming . . . . .	2
CIS 203	Fundamentals of Computer Programming Lab . . . . .	1
STAT 410	Probabilistic Systems Modeling . . . .	3
STAT 510	Introductory Probability and Statistics I . . . . .	3
STAT 511	Introductory Probability and Statistics II . . . . .	3
STAT 704	Analysis of Variance and Covariance . . . . .	2
STAT 705	Regression and Correlation Analyses . . . . .	2
STAT 720	Design of Experiments . . . . .	3
IE 541	Statistical Quality Control . . . . .	3
Statistics elective (STAT 710, 716, 717, or 718)		2
ENGL 516	Written Communication for the Sciences . . . . .	3
Upper division quantitative electives . . . . .		9
(May include mathematics, computer science, or other approved courses)		

### Dual majors and dual degrees

Students may major in statistics and another discipline within the College of Arts and Sciences. The degree requirements of both departments must be met. For instance, it is possible to complete a dual statistics-mathematics degree in four years.

Students may obtain a dual degree in statistics and a field in another college such as business administration or engineering. The degree requirements of both colleges must be met and a minimum of 150 hours must be completed. Students who choose this option should complete the calculus sequence by the end of the sophomore year.

### Statistics courses

#### Undergraduate credit

**STAT 300. Sophomore Honors Seminar in Statistics.** (3) I. Selected topics. May be used to satisfy quantitative requirements for B.S. degree. Open only to students in the honors program.

**STAT 320. Elements of Statistics.** (3) I, II. A basic first course in probability and statistics; frequency distributions; averages and measures of variation; probability; simple confidence intervals and tests of significance appropriate to binomial and normal populations; correlation and regression, including confidence intervals and tests of significance for bivariate populations. Pr.: MATH 100.

**STAT 330. Elementary Statistics for the Social Sciences.** (3) I, II, S. A basic first course in probability and statistics with textbook, examples, and problems aimed toward the social sciences and humanities. Frequency distributions, averages, measures of variation, probability, confidence intervals; tests of significance appropriate to binomial, multinomial, and normal sampling; simple regression and correlation. Pr.: MATH 100. Cannot be taken for credit if credit has been received for STAT 320, 340, or 350.

**STAT 340. Biometrics I.** (3) I, II. A basic first course in probability and statistics with textbook, examples, and problems aimed toward the biological sciences. Frequency distributions, averages, measures of variation, probability, confidence intervals; tests of significance appropriate to binomial, multinomial, Poisson, and normal sampling; simple regression and correlation. Pr.: MATH 100. Cannot be taken for credit if credit has been received for STAT 320, 330, or 350.

**STAT 341. Biometrics II.** (3) II. Analysis and interpretation of biological data using analysis of variance, analysis of covariance, and multiple regression. Negative binomial distribution and its applications. Pr.: STAT 320, 330, 340, or 350.

**STAT 350. Business and Economic Statistics I.** (3) I, II, S. A basic first course in probability and statistics with textbook, examples, and problems pointed toward business administration and economics. Frequency distributions, averages, index numbers, time series, measures of variation, probability, confidence intervals, tests of significance appropriate to binomial, multinomial, Poisson, and normal sampling; simple regression and correlation. Pr.: MATH 100. Cannot be taken for credit if credit has been received for STAT 320, 330, or 340.

**STAT 351. Business and Economic Statistics II.** (3) I, II, S. Continuation of STAT 350 including study of index numbers, time series, business cycles, seasonal variation, multiple regression and correlation, forecasting; some nonparametric methods applicable in business and economic studies. Pr.: STAT 320, 330, 340, or 350.

**STAT 410. Probabilistic Systems Modeling.** (3) I, II. Basic probability; discrete and continuous random variables; Markov chains; Poisson process; birth and death process; applications for queuing theory and reliability theory; computer simulation of random phenomena. Pr.: MATH 221, CIS 300, 570, or consent of instructor.

**STAT 490. Statistics for Geology.** (1) I. First course in statistics with examples and problems aimed toward geology. Distributions, measures of means, measures of variation, confidence intervals, test of hypothesis, simple regression and correlation. Pr.: Open only to juniors and seniors in geology. Must be taken conc. with GEOL 490.

### Undergraduate and graduate credit in minor field

**STAT 510. Introductory Probability and Statistics I.** (3) I, II. Descriptive statistics, probability concepts and laws, sample spaces; random variables; binomial, uniform, normal, and Poisson; two-dimensional variates; expected values; confidence intervals; binomial parameter, median, normal mean, and variance; testing simple hypotheses using CIs and  $X^2$ ; goodness of fit. Numerous applications. Pr.: MATH 222.

**STAT 511. Introductory Probability and Statistics II.** (3) I, II. Law of Large Numbers, Chebycheff's Inequality; continuation of study of continuous variates;

uniform, exponential, gamma, and beta distribution; Central Limit Theorem; distributions from normal sampling; introduction to statistical inference. Pr.: STAT 510.

**STAT 550. Basic Elements of Statistical Theory.** (3) I. The mathematical representation of frequency distributions, their properties, and the theory of estimation and hypothesis testing. Elementary mathematical functions illustrate theory. Pr.: MATH 220.

### Undergraduate and graduate credit

**STAT 702. Statistical Methods for Social Sciences.** (3) I, II. Statistical methods applied to experimental and survey data from social sciences; test of hypotheses concerning treatment means; linear regression; product-moment, rank, and bi-serial correlations; contingency tables and chi-square tests. Pr.: MATH 100.

**STAT 703. Statistical Methods for Natural Scientists.** (3) I, II, S. Statistical concepts and methods basic to experimental research in the natural sciences; hypothetical populations; estimation of parameters; confidence intervals; parametric and nonparametric tests of hypotheses; linear regression; correlation; one-way analysis of variance; t-test; chi-square test. Pr.: Junior standing and equiv. of college algebra.

**STAT 704. Analysis of Variance and Covariance.** (2) I, II, S. Computation and interpretation for two- and three-way analyses of variance; multiple comparisons; analysis of covariance; applications including use of computers. Meets four times a week during first half of semester. Pr.: One previous statistics course.

**STAT 705. Regression and Correlation Analyses.** (2) I, II, S. Multiple regression and correlation concepts and methods; curvilinear regression; applications including use of computers. Meets four times a week during second half of semester. Pr.: One previous statistics course.

**STAT 707. Applied Linear Statistical Models.** (3) I. A unified approach to the application of linear statistical models in regression, analysis of variance and covariance, basic experimental design problems and their application in management, management sciences, and social sciences. Use of residual analysis for examining the aptness of models. Pr.: Six semester hours of statistics or STAT 702.

**STAT 708. Use of Statistical Computer Packages.** (1) Intersession only. Processing data sets using SAS (Statistical Analysis System) for analysis of variance, regression and correlation analysis, chi-square, multivariate statistical analyses, and graphic displays using both the line printer and Calcomp plotter. Pr.: STAT 704, 705, or consent of instructor.

**STAT 710. Sample Survey Methods.** (2) II, in even years. Design, conduct, and interpretation of sample surveys. Pr.: STAT 702 or 703. Meets four times a week during first half of semester.

**STAT 716. Nonparametric Statistics.** (2) II, in even years. Hypothesis testing when form of population sampled is unknown: rank, sign, chi-square, and slippage tests; Kolmogorov and Smirnov type tests; confidence intervals and bands. Meets four times a week during second half of semester. Pr.: One previous course in statistics.

**STAT 717. Categorical Data Analysis.** (2) II. Analysis of categorical data arranged in two- and higher-dimensional contingency tables using classical methods and log linear models. Various measures of association are discussed. Meets four times a week during first half of semester. Pr.: STAT 704, 705.

**STAT 720. Design of Experiments.** (3) I, S. Planning experiments so as to minimize error variance and avoid bias; Latin squares; split-plot designs; switch-back or reversal designs; incomplete block designs; efficiency. Pr.: STAT 704 and 705.

**STAT 725. Digital Statistical Analysis.** (3) II.

Techniques of programming in algorithmic languages for statistical applications. Topics include efficiency and numerical accuracy of algorithms, random number generation, Monte Carlo methods, techniques of simulation, and some basic principles of numerical analysis. Pr.: CIS 200 or equiv., STAT 704 and 705.

**STAT 730. Multivariate Statistical Methods.** (3) I.

Multivariate analysis of variance and covariance; classification and discrimination; principal components and introductory factor analysis; canonical correlation; digital computing procedures applied to data from natural and social sciences. Pr.: STAT 704, 705.

**STAT 735. Statistics in Health-Related Industries.** (2)

I, in odd years. Case studies and selected literature of applications of statistics to problems in the pharmaceutical and health-related industries are discussed. Topics include pharmacokinetic analysis, covariance analysis, crossover studies, bioequivalence. Meets four times a week during first half of semester. Pr.: STAT 704, 705, 720.

**STAT 736. Bioassay.** (2) I, in odd years. Direct assays; quantitative dose-response models; parallel line assays; slope ratio assays; experimental designs for bioassay; covariance adjustment; weighted estimates; assays based on quantal responses. Meets four times a week during second half of semester. Pr.: STAT 704, 705.

**STAT 740. Nonlinear Models.** (3) S, in even years.

Methods of estimating parameters of nonlinear models; procedures for testing hypotheses; construction of confidence intervals and regions; nonlinear analysis of covariance; quantal dose response and probabilistic choice models. Pr.: MATH 222, STAT 720.

**STAT 745. Advanced Regression Analysis.** (2) I, in even years.

Tests of linear restrictions; residual diagnostics; tests and corrections for heteroscedasticity, autocorrelated errors, errors in variables; consequences of stochastic regressors and multicollinearity; alternatives to least squares; instrumental variable estimators and systems of equations; random coefficients. Meets four times a week during first half of semester. Pr.: STAT 705.

**STAT 746. Graphical Methods for Data Analysis.** (2)

I, in even years. This is a study of visual portrayals of quantitative information. Topics include graphical display of raw data and quantities derived from the data, the use of statistical graphics to analyze data, exploratory methods, multidimensional methods, and methods for studying data in the context of statistical models. Meets four times a week during second half of semester. Pr.: STAT 704 and 705 or equiv.

**STAT 770. Theory of Statistics I.** (3) I. Probability

models, concepts of probability, random discrete variables, moments and moment generating functions, bivariate distributions, continuous random variables, sampling, Central Limit Theorem, characteristic functions. More emphasis on rigor and proofs than in STAT 510 and 511. Pr.: MATH 222.

**STAT 771. Theory of Statistics II.** (3) II. Introduction

to multivariate distributions; sampling distributions, derivation, and use; estimation of parameters, testing hypothesis; multiple regression and correlation; simple experimental designs; introduction to nonparametric statistics; discrimination. Pr.: STAT 770.

**STAT 799. Topics in Statistics.** (Var.) I, II, S.

Pr.: STAT 703 or 770 and consent of instructor.

# Business Administration

Daniel G. Short,\* Dean  
David P. Donnelly,\* Associate Dean  
Robert D. Hollinger,\* Associate Dean  
Kay C. Stewart, Assistant Dean

110 Calvin Hall  
532-7190

The main objective of the College of Business Administration is to provide a balanced program for general education and professional study in business administration and accounting.

The degree programs in business offered by the College of Business Administration are accredited by the American Assembly of Collegiate Schools of Business.

Throughout a student's academic career, the business firm is examined as a vital social, economic, and political institution. To equip the prospective executive and specialist for future professional responsibilities, the college organizes instructional activities around two themes: one, the businessperson as the manager and decision maker of operations in a particular firm; two, the businessperson as one who must analyze and adapt to the larger economic, social, and political environment of which he or she and the firm are integral parts. Both subject and instructional techniques focus on decision making and implementation of decisions through critical and creative analysis.

The College of Business Administration also sponsors numerous short courses and conferences for business and management groups.

At the undergraduate level, the College of Business Administration seeks to produce graduates with a broad education in the arts, sciences, and humanities; a solid knowledge and understanding of the functioning of the business world; sufficient knowledge and skill in a field of specialization to obtain positions in business; and the proven ability to think creatively and analytically in order to progress into positions of greater responsibility in the future.

## General Requirements

### Bachelor of science in business administration

#### Business Administration Pre-Professions

Students entering college for the first time and eligible for admission to K-State must enroll in the Business Administration Pre-

Professions Program. Students with previous academic work (either at K-State or elsewhere) requesting transfer to the College of Business Administration must have a 2.0 or higher grade point average and enroll in the BAPP curriculum. For purposes of admission, grade point averages will be based on all courses attempted at colleges or universities.

The BAPP program provides course work in communications, mathematics, social sciences, humanities, and natural sciences. The purpose of the BAPP curriculum is to help students develop the descriptive and analytical foundation of knowledge necessary for the study of business administration. Remaining "core courses" in business administration and courses in the five degree-track majors are taken after successful completion of the BAPP program.

The BAPP is expressly designed as a non-degree program; students with 90 or more credit hours will not be allowed to enroll in BAPP. Students with more than 90 hours who have consistently met the grade point requirements may be admitted into degree-track majors.

Admission to a degree-track major program in accounting, finance, general business, management, or marketing is necessary for graduation. Applicants for admission to one of the degree-track majors will be accepted upon completion of a minimum of 60 credit hours with an overall grade point average of 2.50 or above. The 60 credit hours must include the following courses or their approved equivalents:

<b>BAPP requirements</b> .....	44
ACCTG 231 Accounting for Business Operations .....	3
ACCTG 241 Accounting for Investing and Financing .....	3
CIS 110 Introduction to Personal Computing .....	3
<b>or</b>	
CIS 200 Fundamentals of Computer Programming .....	2
CIS Computer Language (200 level) ....	2
ECON 110 Principles of Macroeconomics .....	3
ECON 120 Principles of Microeconomics .....	3
ENGL 100 Expository Writing I .....	3
ENGL 120 Expository Writing II .....	3
KIN 101 Principles of Physical Fitness .....	1
MATH 100 College Algebra .....	3
MATH 205 General Calculus and Linear Algebra .....	3
<b>or</b>	
MATH 220 Analytical Geometry and Calculus I .....	4
POLSC 325 U.S. Politics .....	3
PSYCH 110 General Psychology .....	3
SOCIO 211 Introduction to Sociology .....	3
SPCH 106 Public Speaking I .....	3
STAT 350 Business and Economic Statistics I .....	3

<b>Communications electives</b> .....	3
Three hours selected from:	
ENGL 300 Expository Writing II .....	3
ENGL 301 Writing and the Law: Legislative Analysis .....	3
GENBA 391 Administrative Communications ...	3
MKTG 422 Sales Communication .....	3
MLANG All modern language courses .....	3
SPCH 311 Business and Professional Speaking .....	3
SPCH 321 Public Speaking II .....	3
SPCH 335 Criticism of Public Argument .....	3
SPCH 526 Persuasion .....	3

<b>Humanities electives</b> .....	6
Six hours selected from:	
All courses in art,* history, modern languages, music,* philosophy, dance,* theatre;* ARCH 301; English: all literature plus four (230, 231, 233, 234) humanities courses; ANTH 515 and 517; DAS 160.	

\*All courses from these areas are acceptable; however, students may take a maximum of 3 credit hours total from these four areas in participation or artistic skill development courses.

<b>Natural science electives</b> .....	7
Seven hours selected from:	
All courses in biochemistry, biology, chemistry, geology, and physics; ANTH 280, 281; DEN 420, 425; GEOG 220, 221. One laboratory course is required.	

60

The exact sequence of the courses to be taken is worked out between student and advisor. There is some flexibility in scheduling; to enroll in any course, students must have prerequisites as stated in the catalog.

Applications for a degree-track major must be made by November 15, April 1, or July 1 of the respective semester during which the student will have completed the 60-credit-hour pre-professional requirements. Decisions for admission will be made as soon as possible after the end of the semester.

### Degree requirements

Candidates for the bachelor of science in business administration must complete at least 27 credit hours of resident instruction in upper-division courses after acceptance and enrollment in a degree-granting program in the college. Exceptions may be considered for those who have consistently exceeded a 2.50 grade point average on upper-division courses applied toward the degree. See additional residency requirements earlier in this catalog.

## Program Options

### Dual degree in business administration

The dual degree programs allow students to earn the bachelor of science in business administration degree in addition to a nonbusiness degree. Because of course sequence requirements, students should begin the dual degree program in their sophomore year. Students must be enrolled in both the college offering the nonbusiness

degree and the College of Business Administration.

Any student who wishes to complete a dual degree must take a minimum of 150 credit hours and satisfy the requirements for both degrees. The business administration requirements include course work in the following areas: communications, quantitative, social sciences, economics, and business. For further information about the exact academic requirements, contact Student Services, College of Business Administration, 107 Calvin Hall.

### Associate of arts degree at Fort Riley (A.A.)

In cooperation with the Division of Continuing Education, the College of Business Administration offers an A.A. degree at Fort Riley, Kansas. This program is designed primarily for military personnel. Sixty semester hours of academic work are required to earn the degree. The requirements include work in communications; mathematics; computer science; social, behavioral, and natural sciences; humanities; economics; and business. For information about the exact academic requirements, write to Fort Riley Degree Program, Division of Continuing Education, College Court Building.

### Honors program

The College of Business Administration honors program enables students to further develop broad intellectual interests and investigate the latest issues and research related to business and industry.

Freshmen and sophomores eligible to participate in the honors program enroll in GENBA 299 Honors Colloquium; juniors and seniors enroll in GENBA 499 Honors Seminar.

One hour of unrestricted elective credit will be given upon completion of a semester program. A total of 8 credit hours may be earned. Completion of the College of Business Administration honors program requires earning a total of 3 credits in GENBA 499 honors seminar. At that time the honors program will be posted on the official transcript.

### Pre-business education

Pre-business education majors are enrolled in and advised by the College of Education. Students interested in the field are instructed to refer to the College of Education section for details.

### Pre-law

Law schools emphasize various objectives in pre-law study for the development of basic skills and insights. These objectives are: the acquisition of skills in comprehension and expression; understanding human institu-

tions; and the ability to think clearly, carefully, and independently. A pre-law student enrolled in the College of Business Administration not only achieves these important goals, but also obtains a broad business background that is desirable preparation for the study of law.

## International Trade Institute

Dr. Wayne Norvell, Director  
2323 Anderson Avenue, Suite 110  
Manhattan, Kansas 66502-2912  
532-6799

The International Trade Institute provides special resources to help meet the growing challenges of world trade. The ITI's program of research, service, and education provides an integrated and systematic approach to supporting the concern of both the academic community and area businesses on projects relevant to current international problems and opportunities.

The International Trade Institute publishes *Export Mid-America*, a full-color advertising brochure translated into six languages and distributed to more than 130 countries. *Export Mid-America* helps Mid-American firms explore new markets, identify prospective distributors and agents, and increase international recognition. The brochure not only provides leads for the advertisers, but also generates hundreds of inquiries for the ITI on other U.S. products.

The ITI offers non-degree educational programs for international students and businesspeople. Special emphasis is placed on business administration, marketing, management, and international trade. They can be tailored to focus on specific management or technical skills and to incorporate internships or other special course arrangements. Most are short courses, but the time frame can be adjusted according to the needs of the sponsoring agency.

Additional resources provided by the ITI, including a comprehensive international library that contains materials not found elsewhere in the region, are available to students, faculty, and businesses. Reference topics include trade policy, marketing, trade financing, technology licensing, trading practices, country-specific information, political and monetary risk, international economics, and import/export procedures. Along with a number of text and periodical references, the ITI research assistants will provide personalized assistance with export inquiries. The ITI staff members also work with students and

counsel those interested in international careers.

## Small Business Development Center

Frederick H. Rice, Director  
2323 Anderson Avenue, Suite 100  
Manhattan, Kansas 66502-2912  
532-5529

The Small Business Development Center is part of a nationwide program that shares the knowledge base of universities with the needs of small business owners.

The center serves a 7-county area in north central Kansas and provides free individual, confidential counseling on a range of business topics; workshops and evening classes on business start-up, marketing, recordkeeping, and computers; and information services through a library of books, magazines, audio and video tapes, and computer data search services.

Specialized services available include the Robert G. Chapman Small Business Computing Center, which utilizes state-of-the-art computer systems to teach business owners how to use computers in their businesses and supports a wide range of research projects; the Small Business Institute, which utilizes teams of seniors and graduate students to evaluate small businesses and recommend corrective strategies; and the Kansas Rural Enterprise Institute, which focuses research on the economic problems of businesses in rural areas and conducts specialized programs to foster start-up and growth of businesses throughout Kansas.

Summer internships are offered to qualifying juniors or seniors in the College of Business Administration. Students may earn 3 credit hours through a qualifying summer work program with a cooperating business.

## Accounting

Maurice E. Stark,\* Head

Professors Donnelly\* and Stark;\* Associate Professors Deines,\* Plumlee,\* Thomas,\* and Vruwink;\* Assistant Professors Ainsworth, D. Fisher, Ott,\* and Robson; Instructors S. Fisher and Lyle; Emeriti: Professors Fox and Laughlin; Associate Professor Gugler.

Accounting is often called the "language of business" because its terms and concepts are used to describe the daily events of business. The accountant measures and

reports to various users the relevant financial information necessary for decision making.

The objective of the undergraduate accounting program is to provide basic conceptual accounting and business knowledge as a foundation for accounting career development in all areas. The program requirements that accomplish these objectives are specified below.

### Requirements for major in accounting BAPP Program

(See general section of the College of Business Administration.)

<b>Business core courses</b>	25
FINAN 450 Essentials of Finance	3
MANGT 420 Management Concepts	3
MANGT 421 Production Operations Management	3
MANGT 466 Management Information Systems	4
MANGT 596 Business, Government, and Society	3
MANGT 695 Business Strategy	3
MKTG 400 Marketing	3
STAT 351 Business and Economic Statistics II	3

<b>Major field</b>	24
ACCTG 331 Accounting Processes and Controls	4
ACCTG 341 Accounting Theory and History	3
ACCTG 342 Taxation	3
ACCTG 432 Controllershship	3
ACCTG 433 Financial Reporting	4
ACCTG 441 Accounting Research	4
ACCTG 442 Auditing	3

**Economics electives (All courses numbered above 120 except 505 and 506)** 6

**Restricted electives** 9  
Humanities, natural sciences, quantitative, or social science courses below qualify for restricted electives.

**Humanities**—See BAPP requirements in this college section.

**Natural science**—See BAPP requirements in this college section.

**Quantitative**—All courses in the computing and information sciences department numbered 300 or above; MATH 221 or 222; all statistics courses numbered 500 and above.

**Social science**—All courses in anthropology, history, political science, psychology, sociology, and economics, except those used as BAPP requirements or economics electives; all courses in geography, except those listed as natural sciences.

**Unrestricted electives** 2-3  
126

### Accounting courses Undergraduate credit

**ACCTG 231. Accounting for Business Operations.** (3) I, II. An introduction to the operating activities of businesses and the roles that accounting information plays in planning, evaluating, and recording those activities. An introduction to financial statements is included. Pr.: Sophomore standing and MATH 100.

**ACCTG 241. Accounting for Investing and Financing.** (3) I, II. Extends the concepts of planning and evaluation to the business activities of acquiring, disposing, and financing productive assets. Financial statement analysis will be covered. Pr.: ACCTG 231.

**ACCTG 321. Intermediate Accounting II.** (3) I, II, S. A continuation of Intermediate Accounting I with emphasis on non-current and equity accounts. Pr.: ACCTG 311.

**ACCTG 331. Accounting Processes and Controls.** (4) I, II. The accounting information system will be shown as a means of insuring the accuracy of information and safeguarding assets. Students will interpret documents and record many transactions that typically occur in business, governmental units, and not-for-profit entities. Pr.: ACCTG 241.

**ACCTG 341. Accounting Theory and History.** (3) I, II. The theories which underlie the practice of accounting and financial reporting including a historical perspective on the evolution of the theories. Pr.: ACCTG 241.

**ACCTG 342. Taxation I.** (3) I, II, S. Fundamental concepts of income determination in federal and state income tax regulations; examination of the impact of tax regulation on business and personal financial planning and decision making. Pr.: ACCTG 241.

**ACCTG 411. Advanced Accounting.** (3) I, II. Accounting for leases, pensions, consolidations, and liquidation of partnerships. Pr.: ACCTG 321.

**ACCTG 412. Public and Governmental Accounting.** (3) I, II. Accounting for governmental units and not-for-profit organizations. Current problems in public reporting. Pr.: ACCTG 321.

**ACCTG 413. Accounting Information Systems.** (3) I, II, S. Specific exposure to information systems and concepts as they relate to accounting through study of transaction cycles, internal controls, decision support systems, knowledge-based systems, and expert systems. Accounting system analysis, design, and implementation are introduced. Pr.: ACCTG 311, 312, and MANG I 466.

**ACCTG 421. Auditing I.** (3) I, II. An introduction to the environment of auditing and the objectives and techniques of both financial and operational auditing. Pr.: ACCTG 413 or conc. enrollment.

**ACCTG 422. Taxation I.** (3) I, II, S. Fundamental concepts of income determination in federal and state income tax regulations; examination of the impact of tax regulations on business and personal financial planning and decision making. Pr.: ACCTG 221 and junior standing.

**ACCTG 431. Problems in Accounting.** (Var.) I, II, S. Pr.: Background of courses needed for the problems undertaken and consent of instructor.

**ACCTG 432. Controllershship.** (3) I, II. Identifying relevant accounting data and organizing, summarizing, and analyzing that data into information useful for planning and budgeting, decision making, controlling, and evaluating functions of management. Pr.: ACCTG 341 and MANGT 421.

**ACCTG 433. Financial Reporting.** (4) I, II. An introduction to the U.S. and international rules and regulations that govern current financial reporting to external entities by businesses, governmental units and not-for-profit entities. Pr.: ACCTG 341.

**ACCTG 441. Accounting Research.** (4) I, II. Use of the sources of authoritative guidance in resolving complex, professionally oriented problems in financial, governmental, and tax reporting. Analysis and presentation of case-material is covered. Pr.: ACCTG 433 and 442 or conc. enrollment.

**ACCTG 442. Auditing I.** (3) I, II. An introduction to the environment of auditing and the objectives and techniques of both financial and operational auditing. Pr.: ACCTG 433 and 422 or conc. enrollment.

**ACCTG 491. C.P.A. Theory and Law.** (3) II. Study of theory of accounts and law through a review of current literature and recent C.P.A. examinations. Pr.: MANGT 392, ACCTG 321, and 312.

**ACCTG 492. C.P.A Problems.** (3) II. A study of problems in various C.P.A. examinations. Pr.: ACCTG 321 and 312.

**Undergraduate and graduate credit**

**ACCTG 631. Accounting Internship.** (3) I, II. Provides a full semester of practical accounting experience prior to entering graduate accounting program. Pr.: Twenty-four hours of accounting and admission to M.Acc. program.

**ACCTG 710. Accounting Concepts and Analysis.** (3) II. The accumulation, presentation, interpretation, and quantitative applications of accounting data for business use. Pr.: MATH 100 and ECON 120 may be taken concurrently.

**ACCTG 711. Taxation II.** (3) I. A study of the federal and state taxation of partnership and corporate income, estates and trusts, gift taxes, and inheritance taxes. Introduction to tax and estate planning. Pr.: ACCTG 422.

**ACCTG 722. Advanced Auditing.** (3) I. An in-depth exposure to authoritative auditing pronouncements and specialized topics, e.g., statistical methods, EDP auditing, internal auditing, operational auditing, and audit management. Pr.: ACCTG 421 and 18 hours of accounting.

**Finance**

Ali M. Fatemi,\* Head

Professors Fatemi,\* Graham,\* Hollinger,\* and Richards;\* Assistant Professors Dukas,\* Ekman, Tavakkol, Park, and Shenoy.

The finance curriculum emphasizes corporate financial management and allows students to specialize in commercial banking, investments, and investment banking. Supplemental areas include financial planning, real estate, and insurance. Finance majors should expect to develop a broad understanding of business management, effective communications skills, and a sound background in accounting, economic theory, management information systems, and quantitative techniques. These skills are necessary to work effectively with other internal and external participants in the management, financing, and regulation of business enterprises.

Financial managers specialize in controlling the resource investments required to support an enterprise's operating activities, planning and negotiating appropriate financing arrangements to support these investment requirements, and managing the risks inherent in an enterprise's investment and financing activities.

**Requirements for major in finance**

**BAPP program** ..... 60  
(See the general section of the College of Business Administration.)

**Business core** ..... 32  
ACCTG 331 Accounting Processes and Controls ..... 4  
FINAN 450 Essentials of Finance ..... 3

MANGT 420 Management Concepts ..... 3  
MANGT 421 Production/Operations Management ..... 3  
MANGT 466 Management Information Systems ..... 4  
MANGT 596 Business, Government, and Society ..... 3  
MANGT 695 Business Strategy ..... 3  
MKTG 400 Marketing ..... 3  
STAT 351 Business and Economics Statistics II ..... 3  
ACCTG 432 Controllorship ..... 3  
ACCTG 433 Financial Reporting ..... 4

**Major field** ..... 20  
FINAN 550 Financial Institutions and Markets ..... 3  
FINAN 551 Introduction to Investments ..... 3  
FINAN 660 Intermediate Finance ..... 4  
FINAN 670 Financial Management ..... 4

Six credit hours selected from the following. At least 3 credits must be selected from courses numbered 553 or above:

FINAN 455 Professional Financial Planning .... 3  
FINAN 460 Insurance ..... 3  
FINAN 552 Real Estate ..... 3  
FINAN 554 International Financial Management ..... 3  
FINAN 652 Working Capital Management .... 3  
FINAN 653 Securities and Portfolio Analysis ..... 3  
FINAN 654 Futures and Options ..... 3  
FINAN 655 Commercial Bank Management .... 3  
ACCTG 342 Taxation I ..... 3

**Economics electives** ..... 6  
All courses numbered 510 or above in consultation with the student's academic advisor. One course must be selected from either ECON 510 Intermediate Macroeconomics or ECON 520 Intermediate Microeconomics.

**Unrestricted electives** ..... 12-13  
130

**Finance courses**

**Undergraduate credit**

**FINAN 450. Essentials of Finance.** (3) I, II, S. Study of the financial performance characteristics for a business firm accompanied by analysis of the timing, risk, and return attributes of the firm's underlying investment and financing policies. Pr.: ECON 120, STAT 350, CIS 110 or 200 and lab, and ACCTG 221.

**FINAN 455. Professional Financial Planning.** (3) I, II. A study of the principles and practices of professional financial planning in the financial services industry. Topics include programs relating to savings, insurance, investment, real estate, employee benefits, and retirement and income tax management and estate planning. Pr.: ECON 110, 120, and junior standing.

**FINAN 460. Insurance.** (3) I, II. A study of life, property, casualty, and health insurance from the purchaser's point of view with additional emphasis on the operation and contribution of the insurance industry. Pr.: ECON 110.

**FINAN 498. Problems in Finance.** (Var.) I, II, S. Internship program and selected projects appropriate to the student's program of study. Pr.: Consent of department head based on background courses appropriate to the project selected.

**Undergraduate and graduate credit in minor field**

**FINAN 550. Financial Institutions and Markets.** (3) I, II. The role of financial intermediaries and markets in facilitating the efficient financing of economic activity. Primary emphasis is on financial management concepts that underlie the operation of commercial banks and nonbank institutions in the financial system. Pr.: FINAN 450.

**FINAN 551. Introduction to Investments.** (3) II, S. A study of investment institutions, and principles and practices from the individual viewpoint. Corporate, civil, foreign, and real estate investment are compared as to risk, return, and intrinsic value. Pr.: FINAN 450.

**FINAN 552. Real Estate.** (3) I, II. Principles and practices including legal, economic, and social implications from the viewpoint of the real estate practitioner, investor, and society. Pr.: Junior standing.

**FINAN 554. International Financial Management.** (3) I. An application of financial management concepts to investment, financing, and managerial control decisions undertaken by the multinational firm within its institutional environment of monetary arrangements, financial intermediary organizations, and balance of payments considerations that affect the international flow of capital. Pr.: FINAN 450.

**Undergraduate and graduate credit**

**FINAN 652. Working Capital Management.** (3) I. Application of the concepts of managerial finance to evaluate a firm's short-term investment and financing decisions. Pr.: FINAN 450.

**FINAN 653. Securities and Portfolio Analysis.** (3) I. A theoretical and empirical study of financial management techniques employed by the professional investor to evaluate the underlying risk-return tradeoff on a particular financial asset investment opportunity and the implications of efficient portfolio management techniques for modifying this risk-return tradeoff experience. Pr.: MATH 220 or 205, STAT 351, and FINAN 450.

**FINAN 654. Futures and Options.** (3) II. An application of the option pricing theory to the valuation of speculative securities such as financial futures, stock options, index options, and futures option contracts. Pr.: FINAN 653.

**FINAN 655. Commercial Bank Management.** (3) II. An application of financial management concepts to the liquidity management, investment portfolio analysis, capital budgeting, and capital structure decision-making process required by a commercial bank to perform effectively its financial intermediation role within the financial system's institutional, regulatory, and competitive environment. Pr.: FINAN 450.

**FINAN 660. Intermediate Finance.** (4) I, II. In-depth study of a firm's long-term financing, capital investment, and working capital decisions. Topics include cash-flow analysis, capital asset valuation, business financial, and market risk, dividend policy, capital structure theory, and short-term financial management. Pr.: MATH 205 and FINAN 450.

**FINAN 670. Financial Management.** (4) I, II. A case-oriented analysis of current topics in financial management, designed as a capstone course in corporate finance. Pr.: FINAN 551 and 660.

**FINAN 710. Managerial Finance.** (3) I. An intensive coverage of the fundamentals of financial management applicable to the management of nonfinancial institutions. Pr.: MATH 100 and ECON 120.

**General Business**

The general business major allows students, in consultation with their academic advisors, to structure a program that fits their individual interests. This major is especially appropriate for students who plan to operate their own businesses and who therefore need extensive background in all areas of business. It is also suitable for those who wish to emphasize certain types of advanced courses, such as those that

stress business applications of quantitative techniques or the behavioral sciences.

**Requirements for major in general business**

**BAPP program** ..... 60  
 (See the general section of the College of Business Administration)

**Business core courses** ..... 25

FINAN 450	Essentials of Finance	3
MANGT 420	Management Concepts	3
MANGT 421	Production/Operations Management	3
MANGT 466	Management Information Systems	4
MANGT 596	Business, Government, and Society	3
MANGT 695	Business Strategy	3
MKTG 400	Marketing	3
STAT 351	Business and Economics Statistics II	3

**Major field** ..... 18  
 Eighteen credit hours to be taken from courses offered by the College of Business Administration and distributed as follows:

Twelve hours must be selected from among the required courses in finance, management, and marketing majors representing all three majors.

The remaining 6 hours must be selected from business courses listed as either required or elective for those three majors.

**Economics electives** (all courses numbered above 120 except 505 and 506) ..... 6

**Restricted electives** ..... 9  
 Humanities, natural science, quantitative, or social science courses below qualify for restricted electives above.

**Humanities**—See BAPP requirements in this college section.

**Natural science**—See BAPP requirements in this college section.

**Quantitative**—All courses in the computing and information sciences department numbered 300 and above; MATH 221 or 222; all statistics courses numbered 500 and above.

**Social science**—All courses in anthropology, history, political science, psychology, sociology, and economics, except those used as BAPP requirements; all courses in geography, except those listed as natural sciences; DEN 450 Impact of Engineering Technology on Society; ENVD 510 Places and People; HDFS 110 Introduction to Human Development; HDFS 350 Family Relationships and Sex Roles.

**Unrestricted electives** ..... 8-9  
 126

**General business courses Undergraduate credit**

**GENBA 101. General Topics in Business.** (2) I. An introduction to the academic and professional challenges in business and industry. Topics such as environment, ethics, cultural diversity, and gender will be examined.

**GENBA 299. Honors Colloquium in Business.** (1) I, II. Open to freshmen and sophomores in the honors program for the College of Business Administration. Discussions and lectures on topics of interest to business students.

**GENBA 391. Administrative Communications.** (3) On sufficient demand. Preparation of business communications, reports, and correspondence, and analysis of communication systems within an enterprise structure. Pr.: ENGL 120 and SPCH 106.

**GENBA 498. Problems in Business Administration.** (Var.) I, II, S. In-depth analysis of special problems in general business including study of current literature. Pr.: Senior standing and consent of instructor and the department head.

**GENBA 499. Honors Seminar.** (1) I, II. Open to juniors and seniors in the honors program for the College of Business Administration. Selected seminars, lectures, and convocations on topics of interest to business students. Discussion sessions will follow.

**GENBA 506. Theories of Gender.** (3) I. Surveys major contemporary U.S. theories of gender and their development, including impact of feminist movement on the development of theory, interactions of race and gender, women's culture and men's roles. Compares approaches of social sciences and humanities. Pr.: Six hours of women's studies.

**Management**

Yar M. Ebadi,\* Head

Professors Ebadi\* and Paul;\* Associate Professors Elsea\* and Townsend;\* Assistant Professors Babbar, Bunch, Hagmann, Henricks, Hightower, McCahon,\* Niehoff,\* Pearson, and Sheu; Instructors Krumwiede and Rice; Emeriti: Professors Barton-Dobenin, Dcihl, and Jones; Associate Professor Thiessen; Assistant Professors Buzenberg and Riley.

The curriculum in management allows for areas of emphasis in human resource management, management information systems, production and operations management, and general management. In addition, the Department of Management offers courses to improve potential managers' integrative skills as well as top management skills in corporate strategy and institutional leadership. This background provides individuals with excellent opportunities for rapid advancement in professional management careers in larger organizations.

The KSU Center for Leadership is housed in the Department of Management. The center, which is the only one of its kind in the state, provides opportunities for individuals interested in learning more about leadership issues.

**Secondary major in industrial and labor relations**

See the Secondary Majors section of this catalog.

**Requirements for major in management**

**BAPP program** ..... 60

**Business core** ..... 37

ECON 520	Intermediate Microeconomics	3
or		
ECON 540	Managerial Economics	3
FINAN 450	Essentials of Finance	3
MANGT 420	Management Concepts	3
MANGT 421	Production/Operations Management	3

MANGT 466	Management Information Systems	4
MANGT 520	Organizational Behavior	3
MANGT 521	Quantitative Management	3
MANGT 531	Personnel and Human Resources Management	3
MANGT 596	Business, Government, and Society	3
MANGT 695	Business Strategy	3
MKTG 400	Marketing	3
STAT 351	Business and Economics Statistics II	3

**Major field** ..... 12  
 One of the following fields of emphasis:

**Human resources management emphasis**  
 Select 12 hours from:

MANGT 530	Industrial and Labor Relations	3
MANGT 620	Organizational Design	3
MANGT 623	Compensation Management	3
MANGT 630	Labor Relations Law	3
MANGT 633	Advanced Personnel Management	3
MANGT 690	International Management	3
or		
MANGT 390	Business Law I	3

**Management information systems emphasis**  
 Select 12 hours from:

MANGT 566	Systems Analysis and Design	3
MANGT 622	Decision Analysis	3
MANGT 666	Application of Data Models in Business	3
MANGT 696	Computer Applications in Management	3
MANGT 690	International Management	3
or		
MANGT 390	Business Law I	3

**Production/operations management emphasis**  
 Required:

MANGT 522	Operations Planning and Control	3
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Select 9 hours from:

MANGT 622	Decision Analysis	3
MANGT 641	Management of Quality	3
MANGT 651	Operations Strategy	3
MANGT 661	Management of Services	3

**General management**  
 Select 3 credit hours from each major field emphasis above and 3 additional credit hours from any of the three fields of emphasis or from the following list:

ACCTG 331	Accounting Processing and Control	4
ACCTG 342	Taxation I	3
FINAN 550	Financial Institutions and Markets	3
FINAN 551	Introduction to Investments	3
FINAN 660	Intermediate Finance	4
FINAN 670	Financial Management	4
MANGT 440	Entrepreneurship	3
MKTG 450	Consumer Behavior	3
MKTG 640	Marketing Research	3
MKTG 690	Marketing Management	3

**Economics electives** ..... 3  
 All courses numbered above 120 except 505 and 506.

**Restricted electives** ..... 6  
 Humanities, natural science, quantitative, or social sciences below qualify for restricted electives above.

**Humanities electives**—See BAPP requirements in this college section.

**Natural science electives**—See BAPP requirements in this college section.

**Quantitative electives**—All courses in the computing and information sciences department numbered 300 and above; MATH 221 or 222; all statistics courses numbered 500 and above.

**Social science electives**—All courses in anthropology, history, political science, psychology, sociology, and economics, except those used as BAPP requirements or economics electives; all courses in geography, except those listed as natural sciences; DEN 450 Impact of

Engineering Technology on Society; ENVD 510 Places and People.

Unrestricted electives ..... 8  
126

## Management courses

### Undergraduate credit

**MANGT 202. Small Business Operations.** (3) I, II. Opportunities in business ownership, principles governing the starting of a small enterprise; importance, status, problems, and management of a small business. Pr.: ECON 110. Not open to students in College of Business Administration.

**MANGT 330. Introductory Seminar.** (1) I, A multidisciplinary introduction to the field of industrial and labor relations. Examines the economic, legal, psychological, and sociological aspects of the field.

**MANGT 390. Business Law I.** (3) I, II. A study of law as it relates to business, including court procedures and systems, contracts, torts, agency and employment law, and business crimes. Pr.: Junior standing.

**MANGT 392. Business Law II.** (3) On sufficient demand. A study of civil law as it affects commercial transactions, including corporations, partnerships, property, commercial paper, and secured transactions. Pr.: MANGT 390.

**MANGT 420. Management Concepts.** (3) I, II, S. Managing organizations through fundamental processes of developing plans, structuring work relationships, coordinating effort and activities, directing and motivating subordinates, and controlling. Also includes managerial roles and responsibilities, effective decision making, productivity improvement, and models and theories of human behavior. Pr.: ECON 120, PSYCH 110, SOCIO 211, and junior standing.

**MANGT 421. Production/Operations Management.** (3) I, II, S. Description and analysis of problems related to the output of goods and services, operations planning and control, and systems management. Pr.: MATH 205 and STAT 351.

**MANGT 440. Entrepreneurship.** (3) On sufficient demand. The role of the entrepreneur is examined in the conception, start-up, organization, and development of new independent businesses. New venture problems to be studied include identification of possible new products and services, evaluation of practical commercial potential, and development of a business plan, with attention to financing, operating, and marketing. Pr.: FINAN 450, MANGT 420, MKTG 400. Instructor may waive prerequisites based on appropriate business experience.

**MANGT 466. Management Information Systems.** (4) I, II, S. A comprehensive view of the organization's information requirements and the role of computer information systems in gathering and producing information. Concepts of data resource management, assessing developments in information technology, and information systems' impact on organizations. Problems and techniques concerning the development and installation of responsive systems with special attention to managers' use of systems' outputs. Case studies and selected applications. Three hours rec. and two hours lab a week. Pr.: CIS 110 or 200 and lab; MANGT 420.

**MANGT 495. Business Internship.** (3) S. Eight weeks of business experience between junior and senior years designed to coordinate the interests of students and firms. Pr.: FINAN 450, MANGT 420, MKTG 400, completion of junior year, and consent of instructor.

**MANGT 498. Independent Studies in Management.** (Var.) I, II, S. In-depth analysis of special problems in management including study of current literature. Pr.: Senior standing and consent of the instructor and the department head.

### Undergraduate and graduate credit in minor field

**MANGT 520. Organizational Behavior.** (3) I, II. Examination of psychological and sociological variables important in understanding individual motivation, group functioning, change, creativity, and leadership in organizations. Pr.: MANGT 420.

**MANGT 521. Quantitative Management.** (3) I, II. Quantitative techniques, models, and the integrative nature of management systems. Includes PERT, CPM, linear programming, and inventory models. Pr.: CIS 110 or 200 and lab, MANGT 420, MATH 205, and STAT 350.

**MANGT 522. Operations Planning and Control.** (3) II. Development of concepts and understanding of planning and control systems for allocating resources and scheduling activities in business firms. To guide and coordinate the flow of materials, labor inputs, and goods and services through physical productive systems. Topics include: aggregate planning, master production scheduling, production activity planning and control, operations information systems, inventory control, material requirements planning, and total quality control. Pr.: MANGT 421.

**MANGT 530. Industrial and Labor Relations.** (3) I. Basic course in industrial and labor relations. Broad coverage of the institution of collective bargaining and its environment, the goals and operation of labor unions, the impact of unions on management, and labor relations law. Pr.: Junior standing.

**MANGT 531. Personnel and Human Resources Management.** (3) I, II. The personnel program and its operational processes of manpower planning, recruiting, testing, developing, and evaluating. Analysis of the personnel department's role in the organization with emphasis on problem solving. Pr.: MANGT 420.

**MANGT 566. Systems Analysis and Design.** (3) I. Development of a basic understanding of the systems approach and an examination of the systems impact on managerial decision making. Evaluation of systems analysis alternatives from a manager's point of view to formalize complex managerial situations effectively. Management issues associated with each stage of the systems development life cycle—especially identification of management information requirements and implementation and maintenance strategies. Relationship of systems design and organization structure. Pr.: MANGT 466 and 520.

**MANGT 596. Business, Government, and Society.** (3) I, II, S. The interrelationships and interactions of business with the social, political, and economic institutions. The impact of changes in the external environment on business and the managerial task. Pr.: FINAN 450, MANGT 420, and MKTG 400.

**MANGT 620. Organizational Design.** (3) On sufficient demand. An in-depth analysis of theories and research in organizational structure and climate. Includes the impact of the strategic environment; organizational size, complexity, volatility, and culture; technology; task design and specialization of labor; and organizational change. Pr.: MANGT 520.

**MANGT 622. Decision Analysis.** (3) I, II. Application of decision-making models and quantitative techniques to business problems and policy. Pr.: MANGT 421.

**MANGT 623. Compensation Management.** (3) I. An in-depth analysis of theories, research, and practices of performance appraisal and compensation systems. Includes study of the impact of economic, behavioral, legal, and political forces on compensation management. Pr.: MANGT 531.

**MANGT 630. Labor Relations Law.** (3) II. Detailed examination of the development and current status of labor relations law governing the private sector in interstate commerce. Topics to be discussed include antitrust prosecution of unions, injunctions, unfair labor practices, NCR policies, employee rights, union

rights, employer rights, and contract enforcement. Pr.: Junior standing.

**MANGT 631. Collective Bargaining.** (3) On sufficient demand. Study of the unionized labor market. The goals, strategies, and tactics of unions and management will be examined in detail. Other topics include the environment of collective bargaining, contract negotiations, administration, and enforcement. Pr.: MANGT 530; or ECON 120 and MANGT 630.

**MANGT 633. Advanced Personnel Management.** (3) On sufficient demand. An in-depth analysis of selected topics in personnel management and employment legislation including study of current research and literature. Pr.: MANGT 531.

**MANGT 637. Industrial Conflict Resolution.** (3) On sufficient demand. Examination of causes and nature of conflict in business and between organizations. The resolution of dysfunctional conflict and management of functional conflict. Special emphasis on resolution techniques, including mediation, arbitration, negotiation, and litigation avoidance. Pr.: MANGT 530 and 630.

**MANGT 639. Advanced Labor Relations.** (3) On sufficient demand. Research methods, model building, economics of the unionized labor markets, and the behavioral theory of negotiations will be examined in detail. Pr.: MANGT 631 or ECON 620.

**MANGT 641. Management of Quality.** (3) I, in alternate years. Development of quality as a management philosophy through the study of ideas from contemporary quality philosophies of Deming, Juran, and Taguchi. Statistical process control charting as a process and quality improvement tool and product and process design as important components of quality. Pr.: MANGT 421.

**MANGT 651. Operations Strategy.** (3) I, in alternate years. Emphasis on the elements of operations strategy as a subcomponent of general business strategy. Product/process design, operations scheduling, inventory control, and quality control alternatives are investigated and analyzed in different combinations to understand their effect on productivity and competitiveness of organizations. Pr.: MANGT 522.

**MANGT 661. Management of Services.** (3) II, in alternate years. Identifying and comprehending the subtle differences between manufacturing and services. Management in accordance to a coherent theory for services and greater productivity. Service characteristics of design, planning, location, layout, human resource management, technology and information, scheduling, quality and process control. Pr.: MANGT 421.

**MANGT 666. Application of Data Models in Business.** (3) I. Examination of interrelationship between managers and database designers from the user's perspective. Database design strategies for the functional areas of business such as accounting, marketing, and manufacturing management with a focus on making data responsive to changing information needs and supportive of organizational plans and goals. Pr.: MANGT 466.

**MANGT 690. International Management.** (3) On sufficient demand. Examination of business decision parameters and strategy in a multinational context. The influence of cultural, economic, political, and social differences on decision making and the operation of American enterprises in the international environment. Pr.: FINAN 450, MANGT 420, MKTG 400.

**MANGT 695. Business Strategy.** (3) I, II, S. An integration of previous courses through the study of problems in policy formulation and implementation. Cases and current topics with emphasis on strategic planning. Open only to seniors or graduate students. Pr.: FINAN 450, MANGT 420, and MKTG 400.

**MANGT 696. Computer Applications in Management.** (3) II. A study of computer solutions to business problems and the development of computer models and

programs in PER1, inventory control, mathematical programming, simulation, operations data analysis, and information systems. Pr.: CIS 110 or 200 and lab, and MANGT 421.

**MANGT 720. Management of Organizations.** (3) I. An intensive coverage of managerial concepts, with emphasis on micro topics such as motivation, perception, individual differences, interpersonal communications, and group processes, and macro topics such as organization design and the external environment. Integration of micro and macro levels of analysis is accomplished by examining organizational processes such as leadership, conflict, power, and organizational change. Pr.: ECON 120 or conc. enrollment.

**MANGT 721. Production and Operations Management.** (3) II. Concepts and quantitative methods are integrated into a conceptual framework of production systems with applications and current issues. Major problems in managing the production, distribution, and information functions of manufacturing and service systems. Capacity determination, resource requirements planning, operating systems designs, scheduling, quality control models and systems, technological change and innovation, quantitative methods, comparisons of production and service processes and systems. Pr.: MANGT 720, MATH 205, and STAT 707 or conc. enrollment.

**MANGT 766. Introduction to Management Information Systems.** (3) II. Identifying and developing the sources of raw materials of MIS building blocks. Covering such topics as data organization; decisions support models and issues; systems reliability and maintenance; capturing and developing information from management science models; and structuring information in terms of managerial decision making and organizational functions, including a comprehensive case. Two hours lec. and three hours lab a week. Pr.: CIS 110 and MANGT 720.

**MANGT 791. Legal and Social Environment of Business.** (3) I. A study of the legal and social foundations of contemporary business; an analysis of public policies toward business; and case discussions of problems in the interaction of business firms with other elements of society. Pr.: Open to graduate students in business administration and accounting and to other graduate students with consent of instructor.

# Marketing

Wayne Norvell,\* Head

Professors Coleman,\* Fraser-Hite, and Norvell;\* Associate Professors Andrus and Hite; Assistant Professor Laughlin; Instructors Ahern and Thierer.

Study in marketing covers such areas as the consumer, the seller, marketing strategy, marketing research, and marketing decisions. Dual degree and dual major programs, combining marketing with other fields, may be arranged by consulting the marketing department office.

## Requirements for major in marketing

<b>BAPP program</b> .....	60
<b>Business core courses</b> .....	25
FINAN 450 Essentials of Finance .....	3
MANGT 420 Management Concepts .....	3
MANGT 421 Production/Operations Management .....	3
MANGT 466 Management Information Systems .....	4

MANGT 596 Business, Government, and Society .....	3
MANGT 695 Business Strategy .....	3
MKTG 400 Marketing .....	3
STAT 351 Business and Economic Statistics II .....	3

<b>Major field</b> .....	18
MKTG 450 Consumer Behavior .....	3
MKTG 640 Marketing Research .....	3
MKTG 690 Marketing Management .....	3

Plus 9 hours from:

MKTG 541 Retailing .....	3
MKTG 542 Sales Management .....	3
MKTG 543 Promotional Strategy .....	3
MKTG 544 International Marketing .....	3
MKTG 545 Marketing Channels .....	3
MKTG 550 Industrial Marketing .....	3

**Economics electives** .....

One *must* be selected from the following four courses:

ECON 510 Intermediate Macroeconomics	
ECON 520 Intermediate Microeconomics	
ECON 530 Money and Banking	
ECON 540 Managerial Economics	

The second elective may be selected from the first four or from the following:

ECON 555 Urban and Regional Economics	
ECON 631 Principles of Transportation	
ECON 633 Public Finance	
ECON 681 International Trade	

**Restricted electives** .....

Humanities, natural, quantitative, or social sciences below qualify for restricted electives.

**Humanities**—See BAPP requirements in this college section.

**Natural science**—See BAPP requirements in this college section.

**Quantitative**—All courses in the computing and information sciences department numbered 300 and above; MATH 221 or 222; all statistics courses numbered 500 and above.

**Social science**—All courses in anthropology, political science, psychology, sociology, and economics, except those used as BAPP requirements or economics electives; all courses in geography, except those listed as natural sciences; DEN 450 Impact of Engineering Technology on Society; ENV 510 Places and People; HDFS 110 Introduction to Human Development; HDFS 350 Family Relationships and Sex Roles.

<b>Unrestricted electives</b> .....	8-9
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## Agribusiness option in marketing

Marketing majors interested in agriculture may take an option in agribusiness. Students choosing the agribusiness option complete all requirements for the marketing major plus hours in agribusiness.

### Requirements for agribusiness option in marketing

<b>BAPP program</b> .....	62
Complete the BAPP program with one exception: natural science electives—9 credit hours; BIOL 198 Principles of Biology (4 hours) and CHM 110 General Chemistry (5 hours)	
<b>Business core courses</b> .....	43
FINAN 450 Essentials of Finance .....	3
MANGT 420 Management Concepts .....	3
MANGT 421 Production/Operations Management .....	3
MANGT 466 Management Information Systems .....	4
MANGT 596 Business, Government, and Society .....	3

MANGT 695 Business Strategy .....	3
MKTG 400 Marketing .....	3
MKTG 450 Consumer Behavior .....	3
MKTG 640 Marketing Research .....	3
MKTG 690 Marketing Management .....	3
STAT 351 Business and Economics Statistics II .....	3
AGEC 500 Production Economics .....	3
AGFC 505 Agricultural Market Structure .....	3
AGEC 518 Economic Principles of Agricultural Business Firms .....	3

**Economics electives** .....

Select one course from the following:

ECON 510 Intermediate Macroeconomics .....	3
ECON 530 Money and Banking .....	3
ECON 555 Urban and Regional Economics .....	3
ECON 631 Principles of Transportation .....	3
ECON 633 Public Finance .....	3
ECON 681 International Trade .....	3

### Nineteen hours must be taken from the following three groups of electives:

**Agribusiness electives** .....

AGEC 510 Agricultural Policy .....	3
AGFC 512 Farm Management .....	3
AGFC 513 Agricultural Finance .....	3
AGEC 515 Marketing of Agricultural and Food Products .....	3
AGEC 516 Agricultural Law and Economics .....	3
AGEC 517 Rural Banking .....	3

Only one from the following may be selected toward the 9 hours:

AGFC 520 Grain Marketing .....	3
	<b>or</b>
AGEC 521 Livestock-Meat Marketing .....	3
AGEC 522 Commodity Futures Marketing .....	3
AGEC 523 Export Marketing .....	3
AGEC 525 Natural Resource Economics .....	3
AGEC 605 Price Analysis .....	3
AGEC 610 Agricultural and Natural Resources Policy .....	3
AGEC 615 International Agricultural Development .....	3

### Agricultural sciences and/or product technology electives

AGRON 220 Crop Science .....	4
	<b>or</b>
HORT 200 Plant Science .....	4
AGRON 305 Soils .....	4
AGRON 340 Market Grading of Cereals .....	2
AGRON 501 Range Management .....	3
ASI 102 Principles of Animal Science .....	3
	<b>and</b>
ASI 103 Dairy Science Lab .....	1
	<b>or</b>
ASI 104 Poultry Science Lab .....	1
	<b>or</b>
ASI 105 Animal Science and Industry Lab .....	1
ASI 300 Principles of Livestock Feeding .....	3
ASI 302 Introduction to Food Science .....	3
ASI 305 Fundamentals of Food Processing .....	3
ASI 350 Principles of Meat Science .....	3
ASI 361 Meat Processing .....	2
ASI 405 Fundamentals of Milk Processing .....	3
ASI 430 Food Products Evaluation .....	3
ASI 694 Food Plant Management .....	3
ENTOM 300 Economic Entomology .....	3
ENTOM 305 Livestock Entomology .....	3
FN 132 Basic Nutrition .....	3
FN 301 Trends in Food Products .....	3
FOR 285 Introduction to Forestry .....	3
GENAG 500 Food Science Seminar .....	3
GRSC 108 Principles of Milling .....	3
GRSC 305 Fundamentals of Food Processing .....	3
GRSC 120 Introductory Bakery Technology .....	2
	<b>and</b>
GRSC 121 Introductory Bakery Technology Lab .....	1
PLPTH 500 Principles of Plant Pathology .....	3

**Additional agribusiness option electives** . . . . . 2-4  
 Select additional courses from agribusiness electives and agricultural sciences and/or product technology electives to total 19 credit hours.

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## Marketing courses

### Undergraduate credit

**MKTG 400. Marketing.** (3) I, II, S. A general study of marketing principles which lead to the development of marketing strategy. A review of environmental influences and key analytical tools used in formulating marketing plans. Product or service design, distribution, pricing, and promotional programs. Pr.: ECON 110 and 120.

**MKTG 442. Sales Communication.** (3) I, S. Focuses on the nature of interpersonal communications, both oral and written, between buyers and sellers. The mechanics and intricacies of personal sales presentations. Concepts of buyer behavior and communication theory. Students develop selling communications skills through practice.

**MKTG 450. Consumer Behavior.** (3) I, II, S. An examination of consumer motives, attitudes, and decision processes as these relate to product imagery and purchase symbolism. The sociological and psychological foundations of marketplace choice are analyzed, including life-style, social status, age, income, taste, habit, custom, fashion, self-concept, and opinion influences. Pr.: MKTG 400 and junior standing.

**MKTG 498. Independent Study in Marketing.** (Var.) I, II, S. Selected topics in marketing. Pr.: Consent of department head.

### Undergraduate and graduate credit in minor field

**MKTG 541. Retailing.** (3) I. An introduction to retailing from the management point of view; study of retail policies and organization; the operation of the buying and selling functions, merchandise control, store systems, personnel management, retail accounting, and expense control. Pr.: MKTG 400.

**MKTG 542. Sales Management.** (3) II, S. Management of the sales force in other than retail settings. Involves hiring, screening, recruiting, training, organizing, motivating, supervising, controlling, and evaluating members of the sales force. Also focuses on the development and execution of sales strategies as well as on the mechanics and need for sales forecasting. Pr.: MKTG 400.

**MKTG 543. Promotional Strategy.** (3) I. Focuses on the management of promotional programs which include elements of advertising, personal selling, sales promotion, and public relations. Includes a review of concepts from economics, behavioral sciences, and mathematics which play a role in creating, executing, and evaluating promotional programs. Pr.: MKTG 400 and 450.

**MKTG 544. International Marketing.** (3) II. This course deals with the management of marketing problems arising from various degrees of foreign involvement (exports, licensing, foreign subsidiaries). Emphasis is on the management of marketing functions in a multinational context where the parameters differ from those in domestic marketing. Topics include international economic factors, foreign cultures, nationalism and government influences, and economic development. Pr.: MKTG 400.

**MKTG 545. Marketing Channels.** (3) II, S. Study of the quantitative and qualitative factors involved in selecting, developing, managing, and controlling marketing channels of distribution. Includes decision models from industrial marketers through purchasing units. Pr.: MKTG 400.

**MKTG 550. Industrial Marketing.** (3) I. A study of the nature of the industrial marketplace, concentrating on those aspects that differentiate it from the consumer markets. The major topics are analysis of market needs, market segments, organizational buying behavior, purchasing agent functions and activities, marketing strategy and mix for institutional customers, not-for-profit and services marketing, and buyer/seller relations. Pr.: MKTG 400.

### Undergraduate and graduate credit

**MKTG 640. Marketing Research.** (3) I, II, S. Designed to acquaint the students with various marketing research concepts, methods, and techniques; and to develop their ability to evaluate, use, and present research findings. Pr.: STAT 351, CMPSC 200 and lab, and MKTG 400.

**MKTG 690. Marketing Management.** (3) I, II, S. Analysis of marketing situations which lead to appropriate management of the marketing program's objectives. Capstone course integrates knowledge of marketing and other business management principles into marketing strategy, development, implementation, and control. Pr.: MKTG 640 and 450.

**MKTG 700. Marketing Theory and Practice.** (3) I. A comprehensive study of marketing concepts and analytical tools used in developing marketing strategy. Pr.: ECON 110 and 120. ECON 120 may be taken conc.

# Education

Michael C. Holen, Dean

Janice R. Wissman, Associate Dean

Paul R. Burden, Assistant Dean

Robert C. Newhouse, Assistant Dean

Michael F. Perl, Director, Center for Student and Professional Services and Coordinator of Laboratory Experiences

Willard J. Nelson, Associate Director, Center for Student and Professional Services

Candace Bond, Certification Officer and Associate Director, Center for Student and Professional Services

Directors, Coordinators and Other Staff:

Angle, Barnett, Borchers, Elzinga,

Flaherty, Hammel, Havlicek, Jensen,

Kiefer, Kulp, McGowan, Mixer, Murphy, Soldan, and Weroha.

6 Bluemont Hall

532-5525

College of Education programs prepare individuals for the broad spectrum of educational positions.

Primary consideration is given to preparing education students for the various positions in elementary, secondary, occupational, and vocational programs, and the personnel who support these programs. In addition, the college provides consultative services and in-service training for the improvement of various aspects of education programs at all levels.

The College of Education cooperates with all other colleges and departments in its interdisciplinary approach to the preparation of teachers and other educational personnel.

The undergraduate teacher education programs are accredited by the Kansas Board of Education, North Central Association of Colleges and Secondary Schools, and the National Council for Accreditation of Teacher Education.

The College of Education participates in the intercollegiate programs in women's studies and gerontology, described earlier in the Secondary Majors section of this catalog.

## Support Facilities and Programs

In addition to major instructional and research programs, the College of Education provides service to K-State faculty and students, local schools, and a variety of other entities in the state and region.

Specific services of the College of Education are provided or coordinated through the following centers.

### Center for Extended Services and Studies

The center initiates and responds to requests for staff development programs, administrative searches, curriculum studies, staff development needs assessments, program evaluations, and other studies designed to enhance education at all levels and environments. Formalized partnerships have been established through the center to provide technical assistance and leadership to selected education foundations in Kansas.

The center is staffed and maintained through the assignment of faculty and staff in the College of Education and through contracts with faculty from K-State and other professionals as determined by the nature of the project. Coordination of K-State's educational development resources is a major responsibility of this service unit.

### Center for Rural Education and Small Schools

Activities designed to address the unique educational needs of small schools and rural communities in Kansas and the plains states are the major focus of this center. Its basic services as ongoing endeavors are in research—to identify unique needs, effective techniques, and decision-making processes—and assistance programs centered on the development, coordination, and delivery of information and services. Development and maintenance of linkages with local schools and state and federal agencies are important functions of the center. A highly successful annual conference on rural education and small schools has attracted national attention and was initiated by the center and the College of Education.

### Center for Economic Education

With joint support from K-State and many Kansas businesses, the Center for Economic Education has developed and conducted pre- and in-service programs on economic education, including consumer economic awareness. Center staff provide consultation seminars, non-credit workshops, and graduate credit course work for schools and educators interested in improving the competence of their students in economic education. A mini-grant program for teachers, the nationally acclaimed Stock Market Game, and an

extensive materials library (free loan basis) are important functions of the center.

### Midwest Regional Processing Center for the Stock Market Game

The College of Education and Computing and Network Services work with the Securities Industry Foundation for Economic Education in processing portfolios for states participating in the Stock Market Game. In addition, curriculum materials and a consultation service are provided to state coordinators to enhance the teaching of economic concepts and to assist in interpreting weekly stock portfolios.

### Instructional Media Center

The Instructional Media Center provides a range of services, instructional materials, and audiovisual equipment for faculty and students. Professional-quality materials such as tapes, overhead transparencies, slides, films, and displays are produced for faculty members. Students use the media center to prepare similar materials for use in class projects and in student teaching. Audiovisual equipment of many types is maintained and provided by the center. The instructional materials collection includes films, filmstrips, slides, and tapes used in teacher education.

A video recording studio is used in the production of instructional television recordings. The Instructional Media Center also includes an outstanding audio recording studio. These studios accommodate production and reproduction of a variety of recorded teaching and individual study materials.

Facilities are available for group and individual uses of instructional media, including rooms for group viewing of films and video tapes, and an independent development laboratory for the individual use of instructional materials. The laboratory includes learning spaces with all materials and equipment needed for totally individualized instruction.

### Center for Science Education

Administratively housed in the College of Education, the Center for Science Education is a university-wide vehicle for marshaling and coordinating K-State's historically independent and compartmentalized endeavors in science, mathematics, technology, and environmental education. Groups of faculty affiliates specializing in science, mathematics, computer science, educational technology, and environmental education from across the K-State campus

are brought together to address teaching and learning issues.

The center's mission is to improve the quality of science, mathematics, and technology teaching and learning throughout Kansas and the prairie states from kindergarten through the Ph.D. level. The center facilitates collaboration among individuals and units on and off campus for the purpose of conducting research; developing curriculum materials, pedagogical strategies, and organizational mechanisms; demonstrating their effectiveness in model school sites; and disseminating the latest knowledge to an audience of school administrators, teachers, researchers, and other professionals in related organizations and non-formal educational settings.

## Honors Program

The honors program in the College of Education has been established for undergraduate students who have demonstrated high academic achievement. The major purpose of the honors program is to give selected students an opportunity to expand their knowledge of the teaching profession and to acquire a desire to be leaders in the profession. The program is designed for students in the College of Education and other students who are completing a teacher certification program through another college at K-State.

Participants may expect to receive recognition of academic ability and achievements; learn and interact with other honor students in small groups; establish close association with faculty members in seminars and research projects; exercise creativity and explore leadership responsibilities; and have alternatives to selected required courses in the professional education component.

### Admission requirements

1. Present a written statement of interest in the program.
2. Submit an ACT Composite score of 28 or higher or evidence of a cumulative grade point average of 3.5 in a minimum of 9 semester hours of college work.
3. Enroll in the non-credit course DED 010 Introduction to the Honors Program.
4. Have a satisfactory interview with a faculty member of the Honors Program Coordinating Committee.

### Student progression after admission

1. Formal admission to the honors program by the Coordinating Committee.
2. Enrollment each semester in DED 020 Honors Program (0).

3. Enrollment in an honors section of EDCEP 315 Educational Psychology (3), and/or other courses designated for honors students.
4. Enrollment in a minimum of two Honors Seminars (DED 320) prior to graduating.
5. Maintenance of a grade point average of 3.5 or better in all college work.
6. Completion of DED 420 Honors Research (1-3), for at least 2 credit hours under the supervision of a professor in the College of Education.

### Features of the honors program

Honors seminars are offered each semester. Students will be encouraged to enroll in one seminar each semester although the minimum requirement for the program is two honors seminars. One of the required seminars may be taken in another college at K-State. The seminars will focus on topics that will broaden the knowledge of future teachers and give them insights into leadership responsibilities in their professions.

Honors Research gives students an opportunity to work with professors having similar research interests. Research topics may be selected from a range of areas and they may reflect the student's particular interests.

## Teacher Education

The College of Education is the designated authority for all K-State teacher certification recommendations to the Kansas Board of Education. All certification programs offered by K-State have been approved by the Kansas Board of Education.

The programs are designed to develop competencies essential for teaching. Some programs are parts of degree requirements in colleges other than the College of Education. All College of Education program requirements are subject to revision as necessary to meet Kansas certification standards. Students should contact their advisors or the director of certification if they have questions about certification program changes.

Certification through the teacher education program is available for three teaching levels: early childhood education prepares for preschool teaching, birth to K; elementary education prepares for grades K-9; and secondary programs satisfy state certification requirements for grades 7-12.

### Admission requirements

The application for admission to a teacher education program must be filed when the

applicant has satisfied all of the admission requirements. Transfer students who have satisfied all the admission requirements should apply at the time of initial enrollment.

Students making changes in degree programs must reapply for teacher education.

Because revised elementary education curriculum requirements were in final review at the time this catalog was printed, students should follow the guidelines in the *Undergraduate Student Handbook of the College of Education* for changes.

### Hours

Fifty total hours must be completed, including all transfer and K-State credits.

### English composition

Both Expository Writing I and II must be completed satisfactorily with the average of both of these grades being at least a C. Students may take an English exam if a grade average of C is not achieved.

### Public speaking

A grade of C or better is required in SPCH 105, 106, or 109. Students may complete the requirement with the quiz-out conducted by the speech department. Courses in interpersonal communication may not apply.

### Overall GPA

*Full admission:* 2.5 is required in all college work attempted, including transfer and K-State credits.

*Probationary admission:* An applicant with a cumulative grade point average of 2.4 or above may apply for admission on a probationary status, provided all other requirements have been met. Students admitted on a probationary basis must achieve a cumulative grade point average of 2.5 by the time they have completed the first 30 hours after admission to teacher education, or they will be dropped from the teacher education program.

### Secondary education and early childhood teaching specialty

A 2.5 GPA is required in all college work attempted in the teaching specialty at other institutions and at K-State. There is no probationary admission for students with a teaching field GPA of less than 2.5.

### Pre-professional skills tests

A transfer student may be admitted *provisionally* before the test is taken, but the student must take the test the next time it is given on campus or he or she will be dropped from teacher education. Tests will be given throughout the year on dates specified by the testing service and will include sections on reading, writing, and mathematics. A score of 172 on each section, reading, writing, and math,

is required for admission to teacher education.

### **Pre-professional laboratory experience**

Completion of an early field experience is required for admission to teacher education. This requirement may be met for elementary majors with DED 100 and secondary majors with DED 102. Students enrolled in home economics education, agricultural education, early childhood education, or speech clinician programs should contact their advisors concerning the proper course to satisfy this requirement. Students may be provisionally admitted to teacher education if they are enrolled in an early field experience at the time of application. If the field experience is not completed with a passing grade, the student will be dropped from teacher education.

### **Application deadlines**

Requirements met by end  
of summer semester . . . . . October 1  
Requirements met by end  
of fall semester . . . . . February 15  
Requirements met by end  
of spring semester . . . . . June 15

When the applications are approved, students are notified of their acceptance into the respective teacher education professional program and are reassigned from a pre-professional advisor to a professional-level advisor. Students who do not meet the requirements will be notified of the options available to them.

### **Professional semester**

The professional semester comprises a series of prescribed courses that allocate one-half or more of the semester to teaching participation (student teaching). This semester usually occurs in the fall or spring of the senior year. There is no teaching participation experience offered during summer sessions.

Students desiring to be recommended for certification by K-State must earn credit for teaching participation in residence. Students who have had any secondary methods course at another college or university will be required to audit the equivalent course at K-State.

Students may only take the courses prescribed for the professional semester unless permission is obtained through the Office of the Coordinator of Laboratory Experiences. Teaching participation is graded Credit/No Credit.

### **Application for student teaching**

The application for student teaching must be submitted to the College of Education coordinator of laboratory experiences not later than December 20 of the year preceding the professional semester.

Students must submit the application by this deadline even though all admission requirements to the professional semester are not fully satisfied.

The application will be obtained from and returned to the coordinator of laboratory experiences. Junior and senior transfer students from other educational institutions should file the application immediately upon enrollment.

### **Admission to the professional semester**

Students will be approved for the professional semester when the requirements listed below have been met. If notified that all requirements for the professional semester have not been satisfied, students may request through the College of Education advisor that the application be postponed for one semester. Only one postponement is permitted without filing a new application for student teaching.

### **Requirements for all applicants to the professional semester**

Full admittance to a teacher education program.

Completion of 90 semester hours.

An overall grade point average of 2.5 in all college or university course work attempted.

Physical examination by the student health center or by a licensed physician. The student verifies to the coordinator of laboratory experiences that the physical examination has been completed.

### **Additional requirements for elementary majors**

Completion of EDCEP 315, EDETC 318, and EDEL 470, 471, 472, 473, and 474.

### **Additional requirements for secondary majors**

A grade point average of 2.5 in all teaching fields based on all teaching field courses attempted at K-State and at all colleges or universities attended. Completion of Blocks I and II, and EDCIP 410 and EDETC 318.

### **Student teaching assignment request**

All student teaching options require a special application called the Student Teaching Assignment Request. This form may be obtained from the office of the coordinator of laboratory experiences and returned to that office by:

*September 25* for students participating in the spring professional semester.

*February 25* for students participating in the fall professional semester.

Should either of these dates fall on a Saturday, Sunday, or holiday, the next working day will be considered as the due date.

### **Professional semester options**

In addition to the conventional professional semester, the following options are available:

#### **MITEC option**

There are Multi-Institutional Teacher Education Centers in Topeka, Kansas City, and Emporia. The Kansas City center includes Kansas City, Kansas, and the suburban area. The MITEC option is a voluntary, full-semester, off-campus program. This professional semester option requires advanced planning with the education advisor and the coordinator of laboratory experiences. Students must make special requests for this program.

#### **CUTE option**

The Cooperative Urban Teacher Education option is in an urban educational setting in Kansas City in which students spend a full semester off campus. A limited number of students is selected by application for this option.

#### **Interruption of degree**

The following College of Education policy regarding interruption of academic programs applies to all people seeking teacher certification as well as those enrolled in degree programs in the College of Education.

Students who graduate within four years from the time they enter K-State without having previously earned credit from another institution shall have the opportunity to graduate under the academic program (course and total credit requirements) in existence at the time of entrance, unless they cannot be certified by the state of Kansas under the original entry requirements.

Students may interrupt studies for one or more semesters. Normally, a student will be expected to complete the degree program in not more than two years beyond the scheduled time. Students whose education has been interrupted will have to meet new degree requirements if a change has occurred.

This policy applies to students who are admitted to the university with previously attained credit as follows:

#### **Allowed for completion**

Less than 30 credits . . . . . 4 years  
30 to 59 credits . . . . . 3 years  
60 to 89 credits . . . . . 2 years  
90 or more credits . . . . . 1 year

Most students who interrupt their educations for military service during peacetime do so by voluntary enlistment. In such a case the above policy would hold. In wartime or national emergency, students

with good grade records might be drafted. In these cases, it would be expected that students could graduate under the requirements that existed at the time they originally entered unless previously required courses were no longer offered or certification requirements changed. In such instances, the student would modify the entry program to include the currently required courses.

### Professional certification

#### Initial certification

The College of Education has the responsibility to serve as the recommending agent for all K-State graduates who wish to qualify for certification. The degrees earned in the College of Education in elementary education and in secondary education will fulfill certification program requirements in the state of Kansas. Early childhood, elementary, and secondary teaching certification may be accomplished through the completion of the approved program and the appropriate degree.

Students who do not apply for the initial certification when they are eligible will be expected to meet the requirements in effect at the time they do apply for initial certification. Students enrolled in and earning degrees in colleges other than the College of Education must complete all requirements of an approved teacher education program.

The state of Kansas will issue initial teaching certificates only to individuals who have completed an approved teacher education program, received the recommendation of their college or university, and successfully passed the precertification examination. This examination consists of the three sections of the Pre-Professional Skills test and the Professional Knowledge section of the National Teachers Examination. These tests will be administered at K-State several times each academic year.

The state of Kansas may not issue a teaching certificate to any applicant who has been convicted of a felony or who has had a teaching certificate revoked in another state.

People seeking initial certification who present degrees from other accredited institutions must meet all requirements of the teacher education program. For additional information, these individuals should contact the Office of Certification, 13 Bluemont Hall.

#### Additional certification endorsements

K-State will recommend for certification those individuals who are already certified, but who are adding an endorsement to the certificate (e.g., reading specialist, administrator, counselor, an additional

teaching area). K-State may become the recommending agent for individuals presenting degrees from other accredited institutions. These persons must complete 8 hours in residence.

#### Recertification

Renewal applications not requesting an additional certification endorsement are sent directly to the Kansas Board of Education.

For additional information on precertification testing, applications, or procedures, contact the Office of Certification in 13 Bluemont Hall.

## Approved Programs

All students preparing to be certified to teach in preschool, elementary, or secondary schools must fully complete the approved teacher education program regardless of which college awards the degree. The approved program consists of: general education studies, a major or specialization, and professional education studies.

Both degrees offered through the College of Education are four-year programs. The curricula in elementary education and in secondary education fulfill program requirements for teacher certification in the state of Kansas.

### Elementary education

Bachelor of science in elementary education  
Minimum of 126 hours required  
Certification K-9

#### General education requirements

##### Humanities (12 hours minimum)

ENGL 100	Expository Writing I	3
ENGL 120	Expository Writing II	3
SPCH 105	Public Speaking IA	2
	or	
SPCH106	Public Speaking I	3
	or	
SPCH 109	Oral Communication Honors	3
	Modern language, linguistics, or literature	3-4

##### Psychology (one course minimum)

PSYCH 110	General Psychology	3
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##### Social sciences (9 hours minimum)

Psychology not included here. Courses must be selected from: anthropology, economics, geography (excluding GEOG 220 and 221), history, political science, and sociology. The total of social sciences and general psychology must be a minimum of 12 semester hours.

##### Natural sciences (12 hours minimum)

Required: At least one biological science course, at least one physical science course, at least one laboratory course.

##### Mathematics (3 hours minimum)

Recommended: MATH 320 Mathematics for Elementary School Teachers, I (3 cr.) and MATH 321 Mathematics for Elementary Teachers, II (3 cr.).

##### General education electives (11 hours minimum)

Additional courses of a general nature in the humanities, social sciences, natural sciences, mathematics, statistics, and computer science; students are

encouraged to include course work in women's studies and minority studies from the humanities and/or social sciences.

Minimum required general education hours . . . . . 50

#### Physical education requirement

KIN 101	Principles of Physical Fitness	1
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#### Pre-professional entry level

For the freshman and sophomore years, or until requirements for admission to teacher education have been satisfied, students in the College of Education will enroll in the appropriate pre-professional curriculum: elementary (EDPPE) or secondary (EDPPS). These students are advised by a College of Education pre-professional advisor in 13 Bluemont Hall concerning the courses essential for entry into the teacher education program.

Students transferring to K-State after earning credit at another institution will be enrolled in a pre-professional program until it has been determined that requirements for admission to teacher education have been satisfied. Students attending community colleges are encouraged to plan their degree programs in a four-year sequence. The College of Education invites students to seek advice from the Center for Student and Professional Services concerning course selections.

#### Professional level

All students must file an application for admission to the teacher education program. When a student's application has been approved, he or she is admitted to the professional level and assigned to a professional-level advisor.

#### Professional and specialized courses required

The following course is required for admission to teacher education:

DED 100	Pre-Professional Laboratory Experience	1
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The following courses may be taken before a student is admitted to the teacher education program.

ART 425	Art for Elementary Schools	3
EDAF 215	Educational Implications of Growth and Development	3
EDEL 300	Principles of Elementary Education	3
FN 352	Concepts of Personal Health	3
	or	
EDEL 379	Physical Education for the Elementary School Teacher	3
MUSIC 405	Music for Elementary Teachers	3
ENGL 540	Literature for Children	3
EDSP 723	Exceptional Child in the Regular Classroom	3

The application for admission to a teacher education program must be filed and approved before a student may enroll in any of the following courses. These courses must be completed before entry into the professional semester. Refer to an earlier section for specific requirements for admission to teacher education.

EDCEP 315	Educational Psychology	3
EDETC 318	Instructional Media and Technology	2
EDEL 470	Science for Elementary Schools	3
EDEL 471	Language Arts for Elementary Schools	3

EDEL 472	Social Studies for Elementary Schools .....	3
EDEL 473	Mathematics for Elementary Schools .....	3
EDEL 474	Elementary School Reading .....	3
Professional semester: see earlier information for specific prerequisites.		
EDEL 585	Teaching Participation in the Elementary School .....	8
EDEL 600	Reading with Practicum .....	3
EDCIP 410	Foundations of Education .....	2
EDCIP 455	Teaching in a Multicultural Society .....	1
		56

**Area of concentration**

The hours selected in the area of concentration are in addition to those taken to meet general education requirements. A 2.5 grade point average is required in all areas for which certification is requested. Guidelines for applicable courses are available in the Center for Student and Professional Services. Concentrations are offered in the following fields: art, biological science, communication arts, English, human development and family studies, general science, health education, mathematics, modern languages,\* music, physical science, social science, special education, and speech pathology.

\*Students choosing a modern language concentration and seeking middle level certification must demonstrate proficiency in speaking and understanding the foreign language during the semester preceding student teaching by making a satisfactory score on the Modern Language Department Oral Proficiency Interview. The interview is conducted by members of the modern language department faculty by arrangement with each individual. Students should contact the modern language education advisor for additional information on course level and other certification requirements.

Minimum hours required in the area of concentration ..... 15

**Electives**

Remaining hours in the degree are unrestricted and may be taken as additional hours in the major, general education, and related courses.

Total hours required in electives ..... 4

**Total credit hours required for graduation ..... 126**

**Secondary education**

Bachelor of science

Minimum of 126 hours required

Certification grades 7-12

All students wishing to teach in secondary schools must fully complete the approved teacher education program regardless of which college awards the degree. The approved program consists of: general education studies, professional education studies, and teaching field studies as specifically outlined in the following sections.

**General education requirements**

**Communications (8-9 hours)**

ENGL 100	Expository Writing I .....	3
ENGL 120	Expository Writing II .....	3
SPCH 105	Public Speaking IA .....	2
or		
SPCH 106	Public Speaking I .....	3
or		
SPCH 109	Oral Communication Honors .....	3

**Humanities (12 hours)**

Any two of the following four: ENGL 230, 231, 233, 234 .....		6
Literature: ENGL 261, 262, 271, 272, 361, 362, 381, or 382 .....		3

Restricted elective .....	3
<b>Social science (9 hours)</b>	
History: HIST 101, 102, 251, or 252 .....	3
ANTH 200 Introduction to Cultural Anthropology .....	3
Restricted elective .....	3

**Quantitative sciences (6-7 hours)**

(College Algebra is a prerequisite for statistics and computer science.)	
MATH 100 College Algebra (or higher level math course) .....	3
Any math course over 100	
or	
STAT 320 Elements of Statistics (or higher level statistics course) ....	3
or	
CIS 200 Fundamentals of Computer Programming and Lab .....	4

**Natural science (7 hours)**

Biological (BIOL 198 Principles of Biology, 4 hours, is recommended.)
Physical (PHYS 101 The Physical World, 3 hours, is recommended.)

**General education electives (5-7 hours)**

**Physical education**

KIN 101 Principles of Physical Fitness .....	1
50	

**Professional education requirements**

**Pre-professional education**

Required for admission to teacher education and prerequisite for Block I.

DED 102 Teaching as a Career .....	1
EDCEP 215 Educational Implications of Growth and Development .....	3

**Block I**—Admission to teacher education required. Courses must be taken concurrently and are a prerequisite for Block II.

EDCEP 315 Educational Psychology .....	3
EDSP 323 Exceptional Students-Secondary School .....	2
EDSEC 376 Core Teaching Skills and Lab .....	3

**Block II**—Courses must be taken concurrently and are a prerequisite for Block III.

EDSEC 476 Content Area Methods/Secondary School .....	2
EDSEC 477 Middle Level/Secondary Reading ..	2
EDSEC 420 Content and Reading Methods Lab .....	1

**Block III**—Courses must be taken concurrently.

EDCIP 455 Teaching in a Multicultural Society .....	1
EDCEP 525 Interpersonal Relations in the School .....	1
EDSEC 586 Teaching Participation/Secondary School .....	12

**Non-blocked courses**—These courses must be taken after admission to teacher education and prior to student teaching.

EDCIP 410 Foundations of Education .....	3
EDETC 318 Instructional Media and Technology .....	2
36	

**Electives**

Hours will vary with majors; they will bring the total hours to 126.

**Teaching Fields**

**Agriculture education**

For agriculture education requirements, see the section on secondary education programs outside the College of Education.

**Art education (EDART)**

Students preparing for K-12 certification must complete ART 425 Art for Elementary Schools and student teaching on both the elementary and secondary levels.

ART 100 Design I .....	2
ART 190 Drawing I .....	2
ART 195 Survey of Art History I .....	3
ART 196 Survey of Art History II .....	3
ART 200 Design II .....	2
ART 210 Drawing II .....	2
ART 220 Water Color I .....	2
ART 225 Figure Drawing I .....	2
ART 230 Sculpture I .....	2
ART 235 Printmaking I .....	2
ART 245 Painting I .....	2
ART 265 Ceramics I .....	2
ART 270 Metalsmithing and Jewelry .....	2
ART 295 Photography in Art .....	2
ART 545 Twentieth Century Art History I ...	3
ART 690 Techniques in Teaching Art .....	2
Art electives .....	4

Additional hours in an area of concentration in one of the following: painting, printmaking, sculpture, metals, drawing, graphic design, or ceramics .....

45

**Business education (EDBUS)**

ACCTG 231 Accounting for Business Operations	3
ACCTG 241 Accounting for Investments and Finances .....	3
MANGT 390 Business Law I .....	3
MANGT 420 Management Concepts .....	3
MKTG 400 Marketing .....	3
GENBA 391 Administrative Communications ...	3
EDSEC 215 Information Processing .....	3
EDSEC 315 Administrative Data Applications ..	3
EDSEC 415 Administrative Support Services and Technology .....	1
EDSEC 416 Office Management .....	3
ECON 530 Money and Banking .....	3
or	
FINAN 450 Business Finance .....	3

Select one of the following:

FINAN 460 Insurance .....	3
MANGT 440 Entrepreneurship .....	3
MANGT 466 Management Information Systems .....	4

**Option A: Computer literacy** .....

CIS 300 Algorithms and Data Structures ...	3
EDETC 718 Microcomputers in Instruction ....	2
EDETC 719 Microcomputers in Instruction Lab .....	1
EDETC 476 Content Area Methods in the Secondary School: Computers .....	2

**Option B: Vocational office education** .....

EDSEC 611 Coordination Techniques .....	1
EDSEC 612 Job Analysis .....	1
EDSEC 620 Principles and Philosophy of Vocation Education .....	3
EDSEC 701 Administration and Supervision of Vocational Education .....	2

**Option C: Accounting** .....

ACCTG .....	3
ACCTG .....	3

**Supporting courses required**

ECON 110 Principles of Macroeconomics .....	3
ECON 120 Principles of Microeconomics .....	3
CIS 110 Introduction to Personal Computing .....	3
CIS 200 Fundamentals of Computer Programming .....	3
CIS 203 Fundamentals of Computer Programming Laboratory .....	1

Select one of the following:

HDFS 105 Introduction to Personal and Family Finance .....	3
HDFS 400 Family Economics .....	3

HDFS 405	Advanced Personal and Family Finance .....	3
		<b>56-59</b>

**English (EDENG)**

Two of the following four survey courses:

ENGL 361	British Survey I .....	3
ENGL 362	British Survey II .....	3
ENGL 381	American Survey I .....	3
ENGL 382	American Survey II .....	3

Required:

ENGL 252	Introduction to Literary Studies .....	3
ENGL 350	Introduction to Shakespeare .....	3
ENGL 400	Advanced Expository Writing for Prospective Teachers .....	3
ENGL 430	The Structure of English .....	3
ENGL 490	Development of the English Language .....	3

ENGL 545	Literature for Adolescents .....	3
ENGL 750	Theory and Practice of Cultural Studies .....	3

ENGL	Literature electives at 600 level and above .....	6
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ENGL	Composition elective (may include ENGL 500, 76I, or 763) .....	3
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PSYCH 650	Psychology of Language .....	3
		<b>39</b>

**English/journalism (EDENJ)**

Two of the following:

ENGL 361	British Survey I .....	3
ENGL 362	British Survey II .....	3
ENGL 381	American Survey I .....	3
ENGL 382	American Survey II .....	3

Required:

ENGL 252	Introduction to Literary Studies .....	3
ENGL 350	Introduction to Shakespeare .....	3
ENGL 430	The Structure of English .....	3
ENGL 490	Development of the English Language .....	3

ENGL 545	Literature for Adolescents .....	3
ENGL 750	Theory and Practice of Cultural Studies .....	3

JMC 235	Introduction to Mass Communications .....	3
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JMC 275	News and Feature Writing .....	3
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JMC 300	Editing and Design .....	3
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JMC 310	Photography I .....	3
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JMC 605	Supervision of School Publications .....	3
JMC 665	Law of Mass Communications .....	3
PSYCH 650	Psychology of Language .....	3
		<b>48</b>

**Home economics education**

For home economics requirements, see the section on secondary education programs outside the College of Education.

**Journalism (EDJOR)**

JMC 235	Introduction to Mass Communications .....	3
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JMC 275	News and Feature Writing .....	3
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JMC 300	Editing and Design .....	3
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JMC 310	Photography I .....	3
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JMC 605	Supervision of School Publications .....	3
JMC 665	Law of Mass Communications .....	3

Electives (12 hours):

RTV 237	Writing for the Electronic Media .....	3
RTV 240	Audio I .....	3

RTV 250	Television Video I .....	3
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JMC 320	Principles of Advertising .....	3
JMC 360	Publications Practice .....	1-4
JMC 380	Advanced News and Feature Writing .....	3

JMC 480	Advanced Editing and Design .....	3
JMC 510	Yearbook Editing and Management .....	2
JMC 555	Advertising Copy and Layout .....	3
JMC 660	History of Journalism .....	3
JMC 685	Mass Communications: Ethics and Issues .....	3
		<b>30</b>

**Mathematics (EDMTH)**

MATH 220	Analytic Geometry and Calculus I ..	4
MATH 221	Analytic Geometry and Calculus II .....	4

MATH 222	Analytic Geometry and Calculus III .....	4
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MATH 240	Elementary Differential Equations .....	4
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Approved mathematics courses numbered 300-799 (18 hours):

MATH 312	Finite Application of Mathematics .....	3
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MATH 511	Introduction to Algebraic Systems ..	3
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MATH 512	Introduction to Modern Algebra I ..	3
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MATH 520	Foundations of Analysis .....	3
MATH 521	The Real Number System .....	3

MATH 570	History of Mathematics .....	3
MATH 572	Foundations of Geometry .....	3

MATH 791	Topics in Mathematics for Secondary School Teachers .....	3
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STAT 320	Elements of Statistics .....	3
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STAT 510	Introductory Probability and Statistics I .....	3
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CIS	Computer science with language course .....	3-4
		<b>40-41</b>

It is recommended that a course in physics be included as part of general education.

**Modern languages (EDMLA)**

Modern language majors must demonstrate proficiency in speaking and understanding the foreign language during the semester preceding student teaching by making a satisfactory score on the Modern Language Department Oral Proficiency Interview. The interview is conducted by members of the modern language department faculty by arrangement with each individual. Students should contact the modern language education advisor for additional information.

**French**

30 hours at 200 level or above to include the following:

FREN 211	French III .....	4
FREN 213	French IV .....	3

FREN 214	French Conversation IVA .....	2
FREN 511	Masterpieces of French Literature I .....	3

FREN 512	Masterpieces of French Literature II .....	3
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FREN 513	French Composition and Conversation .....	3
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FREN 514	French Civilization .....	3
FREN 719	Advanced Spoken and Written French .....	3

FREN	French electives at 500 and above .....	6
		<b>30</b>

**German**

30 hours at 200 level or above to include the following:

GRMN 221	German III .....	4
GRMN 223	German IV .....	3

GRMN 224	German Conversation IVA .....	2
GRMN 521	Introduction to German Literature I .....	3

GRMN 522	Introduction to German Literature II .....	3
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GRMN 523	German Composition .....	3
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GRMN 530	German Civilization .....	3
GRMN 731	Advanced Spoken and Written German .....	3
GRMN	German electives at 500 and above .....	6
		<b>30</b>

**Spanish**

30 hours at 200 level or above to include the following:

SPAN 261	Spanish III .....	4
SPAN 263	Spanish IV .....	3

SPAN 264	Elementary Spanish Conversation IVA .....	2
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SPAN 563	Introduction to the Literature of Spanish America .....	3
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SPAN 564	Spanish Composition and Grammar .....	3
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SPAN 565	Spanish Civilization .....	3
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SPAN 566	Hispanic-American Civilization ....	3
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SPAN 567	Introduction to the Literature of Spain .....	3
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SPAN 571	Advanced Spanish Conversation ...	2
SPAN	Spanish electives at 500 and above ...	7
		<b>30</b>

Certification to teach elementary school foreign language is an optional extension of secondary school certification. The following must be added to the requirements for secondary modern foreign language certification if elementary foreign language certification is desired:

EDEL 585	Teaching Participation in the Elementary School .....	Var.
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EDEL 720	Foreign Language Methods for Elementary Schools (offered spring of even years) .....	3
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**Natural sciences**

**Biological science (EDBSC)**

BIOL 198	Principles of Biology .....	4
BIOL 201	Organismic Biology .....	5

BIOL 455	General Microbiology .....	4
BIOL 303	Ecology of Environmental Problems .....	3

BIOL 529	Fundamentals of Ecology .....	3
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BIOL 631	Ecology .....	3
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ASI 500	Genetics .....	3
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BIOL 400	Human Genetics .....	3
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Eight hours of biology electives. Many different biology courses may be used but it is suggested that the following courses be considered:

ENTOM 312	General Entomology .....	2
ENTOM 313	General Entomology Laboratory ...	1

BIOL 310	Biology and the Future of Man ....	3
BIOL 541	Cell Biology .....	3

BIOL 510	Embryology .....	3
BIOL 620	Evolution .....	3

CHM 210	Chemistry I .....	4
CHM 230	Chemistry II .....	4

CHM 350	General Organic Chemistry .....	3
CHM 351	General Organic Chemistry Lab ...	2

Other required courses:

GEOL 130	Elementary Geology Laboratory ....	1
GEOL 512	Earth Science .....	3

PHYS 115	Descriptive Physics .....	4
EDSEC 614	Lab Techniques in Teaching Science .....	3
		<b>51</b>

**Chemistry (EDCHM)**

CHM 210	Chemistry I .....	4
CHM 230	Chemistry II .....	4

CHM 271	Chemical Analysis .....	4
CHM 350	General Organic Chemistry .....	3

CHM 351	General Organic Chemistry Laboratory .....	2
CHM 500	General Physical Chemistry .....	3
CHM	Chemistry electives .....	5
Supporting courses required:		
BIOL 198	Principles of Biology .....	4
BIOL 201	Organismic Biology .....	5
MATH 220	Analytic Geometry and Calculus I ..	4
MATH 221	Analytic Geometry and Calculus II .....	4
PHYS 113	General Physics I .....	4
PHYS 114	General Physics II .....	4
EDSEC 614	Laboratory Techniques in Teaching Science .....	3
		<b>53</b>

Additional courses recommended:		
MATH 222	Analytic Geometry and Calculus III .....	4
CHM 799	Problems in Chemistry .....	Var.

It is highly recommended that additional courses be selected to fulfill requirements for an additional teaching area in biology or physics. The course selection should be made in consultation with the science education advisor.

**Earth science (EDESC)**

GEOL 100	Introductory Geology .....	3
GEOL 130	Elementary Geology Laboratory .....	1
GEOL 502	Mineralogy .....	3
	<b>or</b>	
GEOL 503	Petrology .....	3
GEOL 520	Geomorphology .....	2
GEOG 220	Environmental Geography I .....	4

Supporting courses required:		
BIOL 198	Principles of Biology .....	4
BIOL 201	Organismic Biology .....	5
CHM 210	Chemistry I .....	4
CHM 230	Chemistry II .....	4
CHM 240	Environmental Chemistry Laboratory .....	1
MATH 100	College Algebra .....	3
MATH 150	Plane Trigonometry .....	3
PHYS 113	General Physics I .....	4
PHYS 114	General Physics II .....	4
PHYS 191	Descriptive Astronomy .....	3
EDSEC 614	Laboratory Techniques in Teaching Science .....	3
		<b>51</b>

It is highly recommended that additional courses be selected to fulfill requirements for an additional teaching area in biology, physics, or chemistry. The course selection should be made in consultation with the science education advisor.

**Physical science (EDPSC)**

PHYS 113	General Physics I .....	4
PHYS 114	General Physics II .....	4

Six hours physics electives selected from the following:		
PHYS 191	Descriptive Astronomy .....	3
PHYS 506	Physics Laboratory I .....	3
PHYS 551	Introduction to Modern Physics .....	3
	<b>or</b>	
PHYS 452	Contemporary Physics .....	4
PHYS 636	Physical Measurements Instrumentation .....	4

Supporting courses required:		
CHM 210	Chemistry I .....	4
CHM 230	Chemistry II .....	4
CHM 240	Environmental Chemistry Laboratory .....	1
CHM 350	General Organic Chemistry .....	3
CHM 351	General Organic Chemistry Laboratory .....	2
GEOL 100	Introductory Geology .....	3
GEOL 130	Elementary Geology Laboratory .....	1
GEOL 512	Earth Science .....	3
BIOL 198	Principles of Biology .....	4
BIOL 201	Organismic Biology .....	5

MATH 220	Analytic Geometry and Calculus I ..	4
MATH 221	Analytic Geometry and Calculus II .....	4
EDSEC 614	Laboratory Techniques in Teaching Science .....	3
		<b>55</b>

**Physics (EDPHY)**

PHYS 017	Colloquium in Physics .....	0
PHYS 213	Engineering Physics I .....	5
PHYS 214	Engineering Physics II .....	5
PHYS 506	Physics Laboratory I .....	3
PHYS 522	Mechanics I .....	3
PHYS 532	Electricity and Magnetism I .....	3
PHYS 551	Introduction to Modern Physics .....	3
PHYS 636	Physical Measurements Instrumentation .....	4

Supporting courses required:		
BIOL	One biology course (selection must be approved by the education advisor) .....	3-4
CHM 210	Chemistry I .....	4
CHM 230	Chemistry II .....	4
CHM 240	Environmental Chemistry Laboratory .....	1
MATH 220	Analytic Geometry and Calculus I ..	4
MATH 221	Analytic Geometry and Calculus II .....	4
MATH 222	Analytic Geometry and Calculus III .....	4
MATH 240	Series and Differential Equations ..	4
EDSEC 614	Laboratory Techniques in Teaching Science .....	3
		<b>57-58</b>

Additional courses recommended:		
GEOL 130	Elementary Geology Laboratory .....	1
GEOL 512	Earth Science .....	3

It is highly recommended that additional courses be selected to fulfill requirements for an additional teaching area in chemistry or mathematics. The course selection should be made in consultation with the science education advisor.

**Physical education**

Students planning to be physical education teachers must complete the approved program in physical education. These students receive the degree bachelor of science.

**Physical education core**

To be taken by all majors		
KIN 101	Principles of Physical Fitness .....	1
KIN 206	Professional Orientation .....	1
KIN 320	Motor Development and Learning ..	3
KIN 325	History and Philosophy of Physical Education .....	3
KIN 330	Biomechanics .....	3
KIN 335	Physiology of Exercise .....	3
KIN 340	Social-Psychological Dimensions of Physical Activity .....	3
KIN 510	Measurement and Research Techniques in Kinesiology .....	3
KIN 561	Adapted Physical Education .....	3
		<b>23</b>

**Elementary specialization**

KIN 315	Treatment of Athletic Injuries .....	3
EDSEC 359	Administration of Physical Education, Athletic, and Intramural Programs .....	3
EDSEC 410	Gymnastics and Aquatics in Physical Education .....	3
EDSEC 420	Rhythms in Physical Education .....	3
EDEL 445	Movement Exploration and Creative Dance for Children .....	3
EDEL 455	Physical Education Activities for Elementary Schools .....	3
DANCE 120	Modern Dance I .....	1
	First Aid and CPR*	
	Skill competency** .....	0-6
		<b>19-25</b>

**Secondary specialization**

KIN 225	Individual and Dual Sports for Secondary Schools .....	2
KIN 230	Team Sports for Secondary Schools .....	2
KIN 315	Treatment of Athletic Injuries .....	3
EDSEC 359	Administration of Physical Education, Athletic, and Intramural Programs .....	3
EDSEC 410	Gymnastics and Aquatics in Physical Education .....	3
EDSEC 420	Rhythms in Physical Education .....	3
DANCE 120	Modern Dance I .....	1
	<b>or</b>	
DANCE 165	Ballet I .....	1
	<b>or</b>	
DANCE 171	Jazz Dance I .....	1
	First Aid and CPR*	
	Skill competency** .....	0-6
		<b>19-25</b>

**K-12 specialization**

KIN 225	Individual and Dual Sports for Secondary Schools .....	2
KIN 230	Team Sports for Secondary Schools .....	2
KIN 315	Treatment of Athletic Injuries .....	3
EDSEC 359	Administration of Physical Education, Athletic, and Intramural Programs .....	3
EDSEC 410	Gymnastics and Aquatics in Physical Education .....	3
EDSEC 420	Rhythms in Physical Education .....	3
EDEL 445	Movement Exploration and Creative Dance for Children .....	3
EDEL 455	Physical Education Activities for Elementary Schools .....	3
DANCE 120	Modern Dance I .....	1
	First Aid and CPR*	
	Skill competency** .....	0-6
		<b>23-29</b>

\*Current first aid and CPR certification required at time of petition.

\*\*Competency must be demonstrated in three activities in each category below by: satisfactory completion of the related lifetime sport class; satisfactory completion of the related coaching class; intercollegiate playing experience; or varsity high school playing experience.

Category A. Team sports and aquatics: basketball, football/baseball/softball, soccer, volleyball, and aquatics (WSI or current WSI certification at time of petition).

Category B. Individual sports: archery, badminton, golf, racquetball/handball, tennis, and wrestling.

**Professional education requirements**

For students seeking teacher certification		
EDCEP 215	Educational Implications of Growth and Development .....	3
EDCEP 315	Educational Psychology .....	3
EDCEP 525	Interpersonal Relations in the School .....	1
EDCIP 410	Foundations of Education .....	3
EDSEC 477	Middle Level/Secondary Reading ..	2
EDSP 323	Exceptional Student in the Secondary School .....	2
Physical education professional semester teaching participation (must be done in area of specialization) .....		
EDEL 300	Principles of Elementary Education .....	3
	<b>or</b>	
EDSEC 376	Core Teaching Skills and Lab .....	3
EDETC 318	Instructional Media and Technology .....	2
EDCIP 455	Teaching in a Multicultural Society .....	1

EDSEC 476	Methods of Teaching in the Secondary School	2-3
EDEL 469	Physical Education in Elementary Schools	3
DED 100	Pre-Professional Laboratory Experiences (elementary)	1
DED 102	Teaching as a Career (secondary)	1
EDSEC 420	Content and Reading Methods Lab	1

**Social sciences**

**Economics (EDEC)**

Required:

ECON 110	Principles of Macroeconomics	3
ECON 120	Principles of Microeconomics	3
ECON 510	Intermediate Macroeconomics	3
ECON 520	Intermediate Microeconomics	3
Fifteen hours of economics (500 level and up)		15

Supporting courses required:

GEOG 100	World Regional Geography	3
<b>or</b>		
GEOG 440	Geography of Natural Resources	3
<b>or</b>		
GEOG 450	Geography of Economic Behavior	3
HIST 251	U.S. History to 1877	3
HIST 252	U.S. History Since 1877	3
MATH 100	College Algebra	3
POLSC 110	Introduction to Political Science	3
SOCIO 211	Introduction to Sociology	3
STAT 350	Business and Economic Statistics I	3
<b>or</b>		
STAT 330	Elementary Statistics for the Social Sciences	3

One of the following:

ACCTG 211	Financial Accounting	4
MATH 205	General Calculus and Linear Algebra	3
MATH 220	Analytic Geometry and Calculus I	4
STAT 351	Business and Economics Statistics II	3

Social science electives:

Additional U.S. history courses	6
<b>or</b>	
Additional political science courses	9
	<b>57-61</b>

**Geography (EDGEO)\***

Required:

GEOG 100	World Regional Geography	3
<b>or</b>		
GEOG 200	Man Space Environment	
GEOG 220	Environmental Geography I	4
GEOG 221	Environmental Geography II	4
GEOG 440	Geography of Natural Resources	3
GEOG 450	Geography of Economic Behavior	3
GEOG 470	Cartography	3

Nine hours at specified levels:

GEOG 300		3
GEOG 500		3
GEOG 700		3

Supporting courses required:

HIST 101	Western Civilization: The Rise of Europe	3
HIST 102	Western Civilization: The Modern Era	3
HIST 251	History of the United States to 1877	3
HIST 252	History of the United States Since 1877	3
POLSC 110	Introduction to Political Science	3
SOCIO 211	Introduction to Sociology	3
STAT 330	Elementary Statistics for the Social Science	3

Social science electives:

Six additional hours of U.S. history	6
<b>or</b>	
Nine hours of political science	9
	<b>56-59</b>

\*A minimum of 12 hours of U.S. history, political science, or world history is required prior to student teaching.

**History (EDHST)\***

Required:

HIST 101	Western Civilization: The Rise of Europe	3
HIST 102	Western Civilization: The Modern Era	3
HIST 251	United States History to 1877	3
HIST 252	United States History Since 1988	3
HIST 397	Junior Seminar	3
HIST 599	Senior Seminar for Secondary Teachers	3

Twelve hours (500 level and above) distributed in three of these fields:

- Ancient medieval and early modern Europe
- Modern Europe including Britain
- The Third World (Asia, Africa, Latin America)
- The United States
- History of science, technology, and the military

Supporting courses required:

ECON 110	Principles of Macroeconomics I	3
GEOG 100	World Regional Geography	3
POLSC 110	Introduction to Political Science	3
POLSC	Political science elective	3
SOCIO 211	Introduction to Sociology	3
		<b>45</b>

\*A minimum of 12 hours or U.S. history, political science, or world history is required prior to student teaching.

**Political science (EDPLS)\***

Required:

POLSC 110	Introduction to Political Science	3
Eighteen hours of political science courses		18
Supporting courses required:		
ECON 110	Principles of Macroeconomics I	3
GEOG 100	World Regional Geography	3
HIST 101	Western Civilization: The Rise of Europe	3
HIST 102	Western Civilization: The Modern Era	3
HIST 251	United States History to 1877	3
SOCIO 211	Introduction to Sociology	3
U.S. or world history courses	6	
	<b>45</b>	

\*A minimum of 12 hours of U.S. history, political science, or world history is required prior to student teaching.

**Sociology (EDSOC)\***

Required:

SOCIO 211	Introduction to Sociology	3
SOCIO 520	Methods of Social Research I	4
SOCIO 511	Comparative Social Theories	3
Nine hours of sociology (400 level and above)		9
Nine hours of sociology (500-799)		9
Six hours social science electives:		
U.S. history or political science courses		6

Supporting courses required:

ECON 110	Principles of Macroeconomics I	3
GEOG 100	World Regional Geography	3
HIST 102	Western Civilization: The Modern Era	3
HIST 251	United States History to 1877	3
HIST 252	United States History Since 1877	3
POLSC 110	Introduction to Political Science	3
POLSC	Political science electives	3
		<b>55</b>

\*A minimum of 12 hours of U.S. history, political science, or world history is required prior to student teaching.

**Social science**

**U.S. history, U.S. government, and world history**

HIST 101	Rise of Europe	3
HIST 102	Modern Era	3
HIST 568	Junior Seminar	3
HIST	Early U.S. history course 500 level and above	3
HIST	Recent U.S. history course 500 level and above	3
POLSC 301	Introduction to Political Thought	3
POLSC 325	U.S. Politics	3
POLSC 333	World Politics	3
POLSC 344	Introduction to Comparative Politics	3
GEOG 100	World Regional Geography	3
ECON 110	Economics I	3
ECON 120	Economics II	3
SOCIO 211	Introduction to Sociology	3
ANTH 200	Introduction to Cultural Anthropology	3

Nine hours from the following:

HIST 599	Senior Seminar	3
POLSC 400	Political Inquiry and Analysis	3
HIST	U.S. history 500 level and above	3
One non-Western social science		3
HIST	One European history course 500 level and above	3
One social science women's studies course		3
One social science American ethnic studies course		3
		<b>51</b>

**Speech (EDSPH)**

All speech education majors are required to complete 36 hours of speech and theatre courses in addition to SPCH 105 or 106, Public Speaking IA or I.

The following courses are required:

SPCH 325	Argumentation and Debate	3
SPCH 321	Public Speaking II	3
SPCH 330	Rhetoric in Western Thought	3
SPCH 426	Coaching and Directing Speech Activities	3
SPCH	500 level or above in general speech	3
<b>or</b>		
THTRE	500 level or above in theatre	3
SPCH 322	Interpersonal Communication	3
<b>or</b>		
SPCH 326	Small Group Discussion	3
THTRE 261	Fundamentals of Acting	3
THTRE 263	Oral Interpretation of Literature	3
THTRE 266	Technical Production I	3
THTRE 370	Dramatic Structure	3
THTRE 565	Principles of Directing	3
JMC 235	Introduction to Mass Communications	3
<b>or</b>		
SPCH 235	Introduction to the Art of Film	3
		<b>36</b>

**Optional Secondary Certification Programs**

Certification in one or more of these optional programs is available only to students who have successfully completed an approved full certification program in another (first or primary) teaching area.

These optional programs give individuals the opportunity to teach in more than one area. These options lead to full certification in the subject or subject area for grades 7 through 12. A cumulative 2.5 grade point average is required in all courses attempted in the subject or subject area. K-State will recommend an endorsement to the teaching certificate for any additional teaching area when all requirements have been completed, provided all requirements of the approved degree program and the secondary area of certification have also been completed.

**Art**

ART 100	Design I	2
ART 190	Drawing I	2
ART 195	Survey of Art History I	3
ART 196	Survey of Art History II	3
ART 200	Design II	2
ART 210	Drawing II	2
ART 220	Water Color I	2
ART 230	Sculpture I	2
ART 235	Printmaking I	2
ART 245	Painting I	2
ART 265	Ceramics I	2
ART 270	Metalsmithing and Jewelry	2
ART 275	Weaving I	2
ART 295	Photography in Art	2
ART 545	Twentieth Century Art History I	3

Six additional hours in an area of concentration in one of the following: painting, printmaking, sculpture, metals, drawing, graphic design, ceramics . . . . . 6

EDSEC 476	Methods of Teaching in the Secondary Schools	2
		<b>41</b>

**Business**

EDSEC 215	Information Processing	3
EDSEC 315	Administrative Data Applications	3
EDSEC 415	Administrative Support Services and Technology	1
EDSEC 416	Office Management	3
ACCTG 231	Accounting for Business Operations	3
ACCTG 241	Accounting for Investments and Finances	3
MANGT 390	Business Law I	3
MKTG 400	Marketing	3
ECON 110	Principles of Macroeconomics	3
ECON 530	Money and Banking	3
EDCI 476	Methods of Teaching Business in the Secondary School	2
CIS 200	Fundamentals of Computer Programming	3
CIS 203	Fundamentals of Computer Programming Laboratory	1
		<b>34</b>

This prepares a student to teach typing, business law, business economics, bookkeeping, office practice, and data processing.

**Computer studies**

**Computer science component (a or b, followed by e)**

a. CIS 200	Fundamentals of Computer Programming	3
CIS 203	Fundamentals of Computer Programming Laboratory	1
	<b>or</b>	
b. CIS 591	Computer Science Applications	3
	Followed by	
c. CIS 300	Algorithmic Processes	3

**Professional knowledge component**

EDSEC 476	Methods of Teaching in the Secondary School (Computer Studies)	2
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EDETC 718	Microcomputers in Instruction	2
EDETC 719	Microcomputers in Instruction Lab	1
EDETC 786	Microcomputers in Management of Instruction	3
	<b>or</b>	
CIS 110	Introduction to Personal Computing	3
		<b>14-15</b>

**English**

Select two of the following four courses:

ENGL 361	British Survey I	3
ENGL 362	British Survey II	3
ENGL 381	American Survey I	3
ENGL 382	American Survey II	3
ENGL 350	Introduction to Shakespeare	3
ENGL 400	Advanced Expository Writing for Prospective Teachers	3
ENGL 430	The Structure of English	3
ENGL 490	Development of the English Language	3
ENGL 515	Literature and Society	3
ENGL 545	Literature for Adolescents	3
EDSEC 476	Methods of Teaching English in Secondary School	2
PSYCH 650	Psychology of Language	3
		<b>29</b>

**Journalism**

JMC 275	News and Feature Writing	3
JMC 285	Advanced News and Feature Writing	3
JMC 300	Editing and Design	3
JMC 665	Law of Mass Communications	3
EDSEC 476	Methods of Teaching English/Journalism in the Secondary School	2
		<b>14</b>

**Health**

FN 352	Concepts of Personal Health	3
KIN 376	First Aid and CPR	1
FN 655	Community Health Programs	3
FN 132	Basic Nutrition	3
HDFS 465	You and Your Sexuality	3
FEC 110	Consumer Action	2
BIOL 198	Principles of Biology	4
BIOL 240	Structure and Function of the Human Body	6
BIOCH 120	Introductory Organic and Biological Chemistry	5
PSYCH 202	Drugs and Behavior	2
EDSEC 476	Methods of Teaching Health in the Secondary School	2
EDSEC 576	Safety Education	2
		<b>36</b>

**Mathematics**

MATH 220	Analytic Geometry and Calculus I	4
MATH 221	Analytic Geometry and Calculus II	4
MATH 222	Analytic Geometry and Calculus III	4
MATH 572	Foundations of Geometry	3
MATH 511	Introduction to Algebraic Systems	3
	<b>or</b>	
MATH 512	Introduction to Modern Algebra	3
	Six semester hours of electives chosen from the following:	
MATH 240	Elementary Differential Equations	4
MATH 570	History of Mathematics	3
MATH 312	Finite Applications of Mathematics	3
MATH 520	Foundations of Analysis	3
MATH 521	The Real Number System	3

Supporting courses required:

STAT 320	Elements of Statistics	3
CIS	Computer Science with Language Course	3-4
EDSEC 476	Methods of Teaching Mathematics in the Secondary School	2
		<b>32-33</b>

A supporting course in physics is recommended.

**General mathematics**

MATH 100	College Algebra	3
MATH 308	Topics in Mathematics for Elementary School Teachers	4
	<b>or</b>	
MATH 521	The Real Number System	3
MATH 205	General Calculus and Linear Algebra	3
MATH 312	Finite Applications in Mathematics	3
MATH 570	History of Mathematics	3
MATH 572	Foundations of Geometry	3
EDSEC 476	Methods of Teaching Secondary School Mathematics	2
STAT 320	Elements of Statistics	3
CIS	Computer Science with Language	3-4
		<b>26-28</b>

**Modern foreign language**

Students seeking modern language endorsement must demonstrate proficiency in speaking and understanding the foreign language during the semester preceding student teaching by making a satisfactory score on the Modern Language Department Oral Proficiency Interview. The interview is conducted by members of the modern language department faculty by arrangement with each individual. Contact the modern language education advisor for additional information.

**French**

FREN 211	French III	4
FREN 213	French IV	3
FREN 214	French Conversation IVA	2
FREN 511	Masterpieces of French Literature I	3
	<b>or</b>	
FREN 512	Masterpieces of French Literature II	3
FREN 513	French Composition and Conversation	3
FREN 514	French Civilization	3
FREN	French electives at 500 or above	6
EDSEC 476	Methods of Teaching Foreign Language in the Secondary School	2
		<b>26</b>

**German**

GRMN 221	German III	4
GRMN 223	German IV	3
GRMN 224	German Conversation IVA	2
GRMN 521	Introduction to German Literature I	3
	<b>or</b>	
GRMN 522	Introduction to German Literature II	3
GRMN 523	German Composition	3
GRMN 530	German Civilization	3
GRMN	German electives at 500 or above	6
EDSEC 476	Methods of Teaching Foreign Language in the Secondary School	2
		<b>26</b>

**Spanish**

SPAN 261	Spanish III	4
SPAN 263	Spanish IV	3
SPAN 264	Elementary Spanish Conversation IVA	2
SPAN 564	Spanish Composition and Grammar	3

SPAN 565	Spanish Civilization .....	3
	<b>or</b>	
SPAN 566	Hispanic-American Civilization ....	3
SPAN	Spanish electives at 500 or above ...	6
SPAN 563	Spanish-American Masterpieces ...	3
	<b>or</b>	
SPAN 567	Spanish Masterpieces .....	3
EDSEC 476	Methods of Teaching Foreign Language in the Secondary School .....	2
		<b>26</b>

**Modern foreign language elementary school**

Certification to teach elementary school foreign language is an optional extension of secondary school certification. The following must be added to the requirements for secondary modern foreign language certification:

EDSEC 620	Foreign Language Methods for Elementary Schools (offered spring of even years) .....	3
EDSEC 585	Teaching Participation in the Elementary School .....	Var.

**Natural science**

**Biology**

Core:		
BIOL 198	Principles of Biology .....	4
BIOL 201	Organismic Biology .....	5
BIOL 303	Ecology of Environmental Problems .....	3
	<b>or</b>	
BIOL 529	Fundamentals of Ecology .....	3
CHM 110	General Chemistry .....	5
	<b>or</b>	
CHM 210	Chemistry I .....	4
EDC1 614	Laboratory Techniques in Teaching Science .....	3
EDSEC 476	Methods of Teaching Science in the Secondary School .....	2

Plus a minimum of 6 semester hours chosen from the following:		
BIOL 310	Biology and the Future of Man ....	3
ENTOM 312	General Entomology .....	2
ENTOM 313	General Entomology Laboratory ...	1
BIOL 430	Population Biology .....	4
	<b>or</b>	
AS1 500	Genetics .....	3
BIOL 455	General Microbiology .....	4
		<b>27-28</b>

Other biology department courses may be considered for meeting the above requirements. It is important that they be approved in advance by a science education advisor, however, since most biology courses are designed to meet the needs of curricula other than the classical natural sciences and would *not* satisfy the requirements.

Highly recommended, but not required:		
CHM 230	Chemistry II .....	4
PHYS 115	Descriptive Physics .....	4
GEOL 512	Earth Science .....	3

**Chemistry**

CHM 210	Chemistry I .....	4
CHM 230	Chemistry II .....	4
CHM 240	Environmental Chemistry Laboratory .....	1
CHM 350	General Organic Chemistry .....	3
BIOL 198	Principles of Biology .....	4
PHYS 113	General Physics I .....	4
	<b>or</b>	
PHYS 115	Descriptive Physics .....	4
EDSEC 614	Laboratory Techniques in Teaching Science .....	3
EDSEC 476	Methods of Teaching Science in the Secondary School .....	2

Plus a minimum of 3 semester hours chosen from the following:		
BIOL 201	Organismic Biology .....	5
CHM 500	General Physical Chemistry .....	3
GEOL 512	Earth Science .....	3
GEOL 100	Introductory Geology .....	3
PHYS 114	General Physics II .....	4
PHYS 191	Descriptive Astronomy .....	3
		<b>28</b>

Other natural science courses may be considered for meeting the above requirements. It is important that they be approved in advance by a science education advisor, however, since most science courses are designed to meet the needs of curricula other than the classical natural sciences and would *not* satisfy the requirements.

Highly recommended, but not required:		
MATH 220	Analytic Geometry and Calculus I ...	4

**Earth science or space science**

Core:		
GEOL 512	Earth Science .....	3
GEOL 100	Introductory Geology .....	3
GEOL 130	Elementary Geology Laboratory ....	1
BIOL 198	Principles of Biology .....	4
CHM 210	Chemistry I .....	4
PHYS 113	General Physics I .....	4
	<b>or</b>	
PHYS 115	Descriptive Physics .....	4
EDSEC 614	Laboratory Techniques in Teaching Science .....	3
EDSEC 476	Methods of Teaching Science in the Secondary School .....	2

Plus a minimum of two courses chosen from the following:		
GEOL 300	Historical Geology .....	4
GEOL 502	Mineralogy .....	3
	<b>or</b>	
GEOL 503	Petrology .....	3
GEOL 520	Geomorphology .....	2
GEOL 105	Oceanography .....	3
PHYS 191	Descriptive Astronomy .....	3
		<b>29-31</b>

Other geology or physics courses may be considered for meeting the above requirements. It is important that they be approved in advance by a science education advisor, however, since most science courses are designed for curricula other than the classical natural sciences and would *not* satisfy the requirements.

Highly recommended, but not required:		
GEOG 220	Environmental Geography I .....	4

**General science**

Core:		
BIOL 198	Principles of Biology .....	4
CHM 110	General Chemistry .....	5
	<b>or</b>	
CHM 210	Chemistry I* .....	4
GEOL 512	Earth Science .....	3
PHYS 113	General Physics I .....	4
	<b>or</b>	
PHYS 115	Descriptive Physics .....	4
EDSEC 614	Laboratory Techniques in Teaching Science .....	3
EDSEC 476	Methods of Teaching Science in the Secondary School .....	2
		<b>20-21</b>

\*Required for chemistry and physics options.

The core and one of the following options must total a minimum of 27 semester hours.

<b>Biology option</b>		
BIOL 201	Organismic Biology .....	5
BIOL 303	Ecology of Environmental Problems .....	3
	<b>or</b>	
BIOL 529	Fundamentals of Ecology .....	3

**Chemistry option**

CHM 230	Chemistry II .....	4
CHM 271	Chemical Analysis .....	4
	<b>or</b>	
CHM 350	General Organic Chemistry .....	3
	<b>and</b>	
CHM 351	General Organic Chemistry Laboratory .....	2

**Physics option**

A minimum of 12 hours		
PHYS 114	General Physics II .....	4
PHYS	One physics course that has Physics II as a prerequisite	
PHYS	Additional physics courses	

**Earth science option**

GEOL 100	Introductory Geology .....	3
GEOL 130	Elementary Geology Laboratory ....	1

At least two courses selected from the following:		
GEOL 105	Oceanography .....	3
GEOL 300	Historical Geology .....	4
GEOL 502	Mineralogy .....	3
GEOL 503	Petrology .....	3
GEOL 520	Geomorphology .....	2
PHYS 191	Descriptive Astronomy .....	3

Other natural science courses may be considered for meeting the above requirements. It is important that they be approved in advance by a science education advisor, however, since most science courses are designed to meet the needs of curricula other than the classical natural science and would *not* satisfy the requirements.

**Physics**

BIOL 198	Principles of Biology .....	4
	<b>or</b>	
BIOL 201	Organismic Biology .....	5
CHM 210	Chemistry I .....	4
PHYS 113	General Physics I .....	4
PHYS 114	General Physics II .....	4
PHYS 452	Contemporary Physics .....	4
GEOL 512	Earth Science .....	3
GEOG 440	Geography of Natural Resources ...	3
	<b>or</b>	
BIOL 303	Ecology of Environmental Problems .....	3
	<b>or</b>	
BIOL 310	Biology and the Future of Man ....	3
CIS 200	Fundamentals of Computer Programming .....	2
CIS 206	BASIC Language Laboratory .....	1
	<b>or</b>	
	Other approved language .....	1
MATH 205	General Calculus and Linear Algebra .....	3
EDSEC 476	Methods of Teaching Science in the Secondary School .....	2
EDSEC 614	Laboratory Techniques in Teaching Science .....	3
		<b>37-38</b>

Other natural science courses may be considered for meeting the above requirements. It is important that they be approved in advance by a science education advisor, however, since most science courses are designed to meet the needs of curricula other than the classical natural sciences and would *not* satisfy the requirements.

Highly recommended, but not required:		
MATH 220	Analytic Geometry and Calculus I ...	4
MATH 221	Analytic Geometry and Calculus II .....	4

**Physical science**

PHYS 115	Descriptive Physics .....	4
CHM 210	Chemistry I .....	4
BIOL 198	Principles of Biology .....	4
GEOL 512	Earth Science .....	3
GEOL 100	Introductory Geology .....	3
GEOL 130	Elementary Geology Lab .....	1
MATH 210	Technical Calculus I .....	3

EDSEC 614	Laboratory Techniques in Teaching Science .....	3
EDSEC 476	Methods of Teaching Science in the Secondary School .....	2
		<b>27</b>

**Physical education**

KIN 325	History and Philosophy of Physical Education .....	3
	<b>or</b>	
KIN 340	Social and Psychological Dimensions of Physical Activity .....	3
Required:		
KIN 225	Individual and Dual Sports for Secondary Schools .....	2
KIN 230	Team Sports for Secondary Schools .....	2
KIN 315	Treatment of Athletic Injuries .....	3
KIN 320	Motor Development and Learning ..	3
KIN 330	Biomechanics .....	3
KIN 335	Physiology of Exercise .....	3
KIN 510	Measurement and Research Techniques in Kinesiology .....	3
KIN 561	Adapted Physical Education .....	3
EDSEC 359	Administration of Physical Education, Athletic, and Intramural Programs ..	3
EDSEC 410	Gymnastics and Aquatics in Physical Education .....	3
EDSEC 421	Rhythms in Physical Education .....	3
EDSEC 476	Methods of Teaching Physical Education in the Secondary School .....	2
First Aid and CPR*		<b>36</b>

\*Current first aid and CPR certification required at time of petition.

Students are advised to include the following courses in their general education requirements. These courses are prerequisites to the requirements listed above.

SOCIO 211	Introduction to Sociology .....	3
STAT 320	Elements of Statistics (Pr.: MATH 100) .....	3
BIOL 198	Principles of Biology .....	4
BIOL 240	Structure and Function of the Human Body .....	6

**Psychology**

PSYCH 110	General Psychology .....	3
PSYCH 250	Experimental Methods in Psychology .....	4
PSYCH 520	Life Span Personality Development .....	3
PSYCH 535	Social Psychology .....	3
PSYCH 460	Information Processing and Memory .....	3
	<b>or</b>	
PSYCH 475	Principles of Learning and Motivation .....	3
	<b>or</b>	
PSYCH 480	Fundamentals of Perception and Sensation .....	3

Supporting courses required:

STAT 320	Elements of Statistics .....	3
	<b>or</b>	
STAT 330	Elementary Statistics for the Social Sciences .....	3
EDCEP 715	Principles of Measurement .....	3
EDSEC 476	Methods of Teaching Social Science in the Secondary School .....	2
		<b>25</b>

**Social science**

The following three social science teaching fields may be completed only in conjunction with U.S. history, world history, and U.S. government.

**Anthropology and sociology**

ANTH 260	Introduction to Archaeology .....	3
SOCIO 540	Social Organization .....	3
SOCIO 550	Introduction to Social Interaction ..	3
	Select one of the following:	
ANTH 220	Introduction to Linguistics .....	3
	Anthropology .....	3
ANTH 508	Male and Female: Cross-Cultural Perspectives .....	3
ANTH 519	Practical Anthropology .....	3
SOCIO 530	Population: Human Ecology .....	3
ANTH 532-550	Ethnography courses .....	3
ANTH 604	Culture and Personality .....	3
SOCIO 640	Sociology of the Family .....	3
		<b>12</b>

**Geography**

GEOG 500	Geography of the United States .....	3
	Select one of the following:	
GEOG 440	Geography of Natural Resources .....	3
GEOG 450	Geography of Economic Behavior ..	3
	One 600-level regional geography course or one 700-level systematic geography course (course 710 through 780) .....	3
		<b>9</b>

**Economics**

ECON 510	Intermediate Macroeconomics .....	3
ECON 520	Intermediate Microeconomics .....	3
ECON 530	Money and Banking .....	3
ECON 636	Capitalism and Socialism .....	3
		<b>12</b>

**Social science comprehensive**

The following must be used in conjunction with the teaching fields of economics, geography, history, political science, or sociology.

HIST 599	Senior Seminar .....	3
HIST 102	Modern Era .....	3
HIST 101	Western Civilization: The Rise of Europe .....	3
HIST 251	United States History to 1877 .....	3
HIST 252	United States History Since 1877 ..	3
ECON 110	Principles of Macroeconomics .....	3
GEOG 100	World Regional Geography .....	3
POLSC 110	Introduction to Political Science .....	3
POLSC 325	U.S. Politics .....	3
SOCIO 211	Introduction to Sociology .....	3
ANTH 200	Introduction to Cultural Anthropology .....	3
HIST	History courses (300 or above) .....	9
POLSC	Political science courses (300 or above) .....	3
	One course in economics or geography or sociology .....	3
EDSEC 476	Methods of Teaching Social Studies in the Secondary School .....	2
		<b>50</b>

Satisfactory completion of this program will qualify a person to be certified to teach American history, world history, economics, geography, political science, and sociology.

**Speech**

SPCH 321	Public Speaking II .....	3
THTRE 263	Oral Interpretation of Literature .....	3
SPCH 426	Coaching and Directing Speech Activities .....	3
SPCH 325	Argumentation and Debate .....	3
THTRE 160	Introduction to Theatre .....	3
SPCH 322	Interpersonal Communications .....	3
	<b>or</b>	
SPCH 326	Small Group Discussion .....	3
EDSEC 476	Methods of Teaching Speech in the Secondary School .....	2
		<b>20</b>

# Secondary Education Programs Outside the College of Education

The general education requirements as outlined in an earlier section must be completed by all students expecting to be certified to teach with the exception of students in agriculture. Students in these fields should see their academic advisor for specific requirements.

Students who pursue degrees in certifiable majors in the College of Arts and Sciences are responsible for satisfying all the requirements for teacher education as well as the degree requirements of arts and sciences.

**Agricultural education (AED)**

Students planning to be agricultural education teachers must complete the approved program in agricultural education.

**Professional education requirements**

EDSEC 400	Leadership and Personal Development in Agricultural Education .....	1
EDSEC 503	Teaching Adult Classes in Agriculture .....	1
EDSEC 505	Field Experiences in Agricultural Education .....	1
EDSEC 620	Principles and Philosophy of Vocational Education .....	3
EDSEC 621	Program Planning in Vocational Education .....	3
EDCEP 215	Educational Implications of Growth and Development .....	3
ATM 659	Agricultural Mechanic Methods .....	3

The following courses must be completed before entry into the professional semester:

EDSEC 300	Introduction to Agricultural Education .....	1
EDCEP 315	Educational Psychology .....	3
EDSP 323	Exceptional Student in the Secondary School .....	3
EDSEC 376	Core Teaching Skills and Lab .....	3
EDSEC 477	Middle Level Secondary Reading ..	2
EDSEC 420	Block II Lab Content and Reading Methods .....	1
EDETC 318	Instructional Media and Technology .....	2

**Professional semester (see information earlier for specific prerequisites)**

EDCIP 455	Teaching in a Multicultural Society .....	1
EDCEP 525	Interpersonal Relations in the Schools .....	1
EDSEC 476	Content Area Methods in the Secondary School: Agricultural Education .....	2
EDSEC 586	Teaching Participation in the Secondary Schools and Professional Development Seminar .....	10
		<b>44</b>

**Home Economics Education (HED)**

Students planning to be vocational home economics teachers must complete the approved teacher certification program as part of the requirements for the bachelor of science in human ecology degree program in the College of Human Ecology, home economics education. Completion of this program satisfies state of Kansas program requirements for vocational home economics certification for grades 7-12.

**Professional education requirements**

DED 120	Teaching as a Career	1
EDCEP 215	Educational Implications of Growth and Development	3

The following courses must be completed before entry into the professional semester:

EDCEP 315	Educational Psychology	3
EDSP 323	Exceptional Student in the Secondary School	2
EDSEC 376	Core Teaching Skills and Lab	3
EDSEC 420	Content and Reading Methods Lab	1
EDSEC 476	Content Area Methods in Secondary School: Home Economics Education	2
EDSEC 620	Principles and Philosophy of Vocational Education	3
EDETC 318	Instructional Media and Technology	2
EDSEC 477	Middle Level/Secondary Reading	2
EDSEC 710	Occupational Home Economics	2

Professional semester (see information earlier for specific prerequisites):

EDCEP 525	Interpersonal Relations in the School	1
EDCIP 455	Teaching in a Multicultural Society	1
EDSEC 621	Program Planning in Vocational Education	2
EDSEC 586	Teaching Participation in Secondary School	12
		<b>40</b>

**Music education (MUSED)**

Students planning to be music teachers must complete the approved program in music education. These students will be enrolled in the College of Arts and Sciences and receive the degree bachelor of music education. Certification covers grades K-12.

The following course is required for admission to teacher education:

DED 102	Teaching as a Career	1
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The following course may be taken before the student is admitted to teacher education:

EDCEP 215	Educational Implications of Growth and Development	3
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The application for admission to a teacher education program must be filed and approved before a student may enroll in any of the following courses which must be completed before entry into the professional semester. Refer to an earlier section for specific requirements for admission to teacher education.

EDETC 318	Instructional Media and Technology	2
MUSIC 511	Music in the Schools K-6	4
MUSIC 512	Music in the Junior/Senior High School	4
EDCEP 315	Educational Psychology	3
EDSP 323	Exceptional Student in the Secondary School	2
EDCIP 410	Foundations of Education	3
EDCEP 525	Interpersonal Relations in the School	1
EDSEC 376	Core Teaching Skills and Lab	3
EDCIP 455	Teaching in a Multicultural Society	1
EDSEC 477	Middle Level/Secondary Reading	2
MUSIC 670	Advanced Studies in Music Education	2

Professional semester (see information earlier for specific prerequisites):

EDSEC 582	Teaching Participation in Music*	12
		<b>43</b>

\*A full semester of student teaching is required in music education.

**Early childhood education**

Bachelor of science in human development and family studies

Minimum of 125 hours required

Early childhood certification, birth to kindergarten eligibility

Students planning to be certified as early childhood teachers must complete the approved program in early childhood education in the College of Human Ecology, Department of Human Development and Family Studies.

The general education requirements as outlined in an earlier section must be completed. Reference should be made to the section Admission to Teacher Education at the beginning of the College of Education section of this catalog.

**Speech-language pathologist and school audiologist**

The speech pathology-audiology program at K-State meets the requirements for the Certificate of Clinical Competence of the American Speech-Language-Hearing Association, and the Kansas Department of Education requirements for speech-language pathologist and school audiologist. The approved program requires both undergraduate- and graduate-level course work in the speech department of the College of Arts and Sciences resulting in the M.A. degree from the Graduate School. Students interested in the program are encouraged to obtain an advisor in the speech pathology/audiology program, Department of Speech, as early as possible. However, late entry into the program as a junior or senior is possible.

**General Courses****General courses in education**

**DED 010. Introduction to the Honors Program.** (0) I, II. Direction and goals for the honors program in the College of Education. Meets twice during the semester. Pr.: Nine hours of college work completed.

**DED 020. Honors Program.** (0) I, II. All students accepted into the College of Education honors program must enroll each semester. Pr.: Sophomore or higher standing, 3.5 cumulative grade point average, acceptance into the honors program.

**DED 051. Study Skills Laboratory.** (1-3) I, II. Helps the student to learn effective study methods, analyze difficulties in reading and studying, and prepare for and improve performance in examinations.

**DED 100. Pre-Professional Laboratory Experiences.** (1) I, II. Supervised experiences in education designed to facilitate orientation and investigation of teaching through the teacher aide program. Maximum credit of 3 hours. No more than 1 credit per semester.

**DED 102. Teaching as a Career.** (1) I, II. Introduction to teaching as a career and to teacher preparation. Includes visits to and teacher aiding in public school classrooms with emphasis on the teacher's role. For lower-division students not yet admitted to teacher education.

**DED 105. Introduction to Women's Studies.** (3) I, II. A systematic introduction to women's studies as an academic discipline, drawing research from humanities, social science, education, human ecology, and management to analyze images of women, status of women, sex differences, gender roles and stereotypes, patterns of success, women and relationships, current controversial issues affecting women, and feminism as a social and historical movement. An academic perspective on issues of equality and justice for women, emphasizing scholarship on how women perceive their own lives.

**DED 160. Introduction to American Ethnic Studies.** (3) I. This course introduces students to the major concepts related to ethnicity and to some of the major American ethnic groups.

**DED 315. Introduction to Gerontology.** (3) II. A multidisciplinary introduction to the field of aging. Examines social, psychological, developmental, organizational, and economic aspects of aging. Theoretical, methodological, and applied issues of aging will be related to contemporary American society. Same as DAS 315; also offered through the Colleges of Agriculture, Architecture and Design, and Human Ecology.

**DED 320. Honors Seminar.** (1) I, II. Selected topics in education. May be taken more than once for credit. For students in honors program only.

**DED 405. Senior Seminar in Women's Studies.** (3) I. An intercollegiate, interdisciplinary course organized topically with students presenting papers which draw upon previous and concurrent academic experience and which approach a given topic with a consistent focus on the role of women. Provides supervised independent study and subsequent discussion, allowing students to integrate and order their perceptions about the unique roles, problems, and contributions of women. Pr.: DED 105 Introduction to Women's Studies and 15 hours of women's studies courses.

**DED 415. Senior Seminar in Gerontology.** (3) I. Integration of course work in gerontology with an in-depth project in a special interest area. Pr.: Completion of 15 hours of course work in gerontology second major. Same as DAS 315; also offered through the Colleges of Agriculture, Architecture and Design, and Human Ecology.

**DED 420. Honors Research.** (1-3) I, II. Individual research projects under the supervision of a professor in the College of Education. For students in honors program only. Pr.: A minimum of 2 hours credit in DED 320 or 1 hour credit in DED 320 and 1 hour selected from GENAG 310, DAS 399, GNHE 399.

**DED 499. Senior Seminar in American Ethnic Studies.** (3) Guided research in American ethnic studies. Students prepare a research paper on a relevant subject of their choice. Each student is responsible for arranging to work with a member of the American ethnic studies faculty. Pr.: DED 160 Introduction to American Ethnic Studies.

**DED 500. Topics in Women's Studies.** (Var.) I, II, S. Exploration of an interdisciplinary topic in women's studies. Cross-listed with the Dean of Human Ecology and the Dean of Arts and Sciences.

**DED 505. Independent Study in Women's Studies.** (1-3) I, I. Independent, interdisciplinary, supervised studies in an area of women's studies which does not fall within the boundaries of a traditional department. May be repeated once for credit with change of topic. Pr.: Junior standing, consent of instructor(s), and approval of women's studies faculty.

**DED 506. Contemporary Feminist Frameworks.** (3) I. Surveys major contemporary U.S. theories of gender and their development, including impact of feminist movement on the development of theory, interactions of race and gender, women's culture, and men's roles. Compares approaches of social sciences and humanities. Pr.: Six semester hours women's studies.

**DED 560. Topics in American Ethnic Studies.** (1-4) I or II. Selected topics of special interest in American ethnic studies. Repeatable with change of topic. Pr.: DED 160 Introduction to American Ethnic Studies. Cross-listed with the Dean of Human Ecology and the Dean of Arts and Sciences.

## Adult and Continuing Education

W. Franklin Spikes, Chair

Professors Meisner,\* Oaklief,\* and Spikes;\* Associate Professors Carter\* and Polson,\* Others: Marshall; Emeritus: Hausmann.

### Adult and continuing education courses

#### Undergraduate credit

**EDACE 318. Adult and Continuing Education Colloquium.** (Var.) On sufficient demand. Discussion, assigned readings, and lectures over selected trends, developments, and problems which are peculiar to the overall field of adult and continuing education. Students are encouraged to engage in self-study concerning their place in the profession of adult and continuing education. No more than 6 hours may apply to a degree.

#### Undergraduate and graduate credit in minor field

**EDACE 502. Independent Study in Education.** (1-3) I, II. Selected topics in professional education. Maximum of 3 hours applicable toward degree requirements. Pr.: Consent of department head.

#### Undergraduate and graduate credit

**EDACE 704. Extension Organization and Programs.** (3) I, S. Development and objectives of Cooperative Extension and other university adult education programs; with emphasis on programs and procedures. Cross-listed as EDSEC/EDACE 704. Pr.: Consent of instructor.

**EDACE 706. Principles of Teaching Adults in Extension.** (3) II, S. Methods and principles of adult teaching, with emphasis on Cooperative Extension Service; application to various adult education programs. Cross-listed as EDSEC/EDACE 706. Pr.: Senior standing, juniors by consent of instructor.

**EDACE 713. Occupational Analysis.** (2-3) I, II, S. An introduction to various techniques used in analyzing occupations and jobs. Emphasis on developing and organizing related instructional materials and content. Cross-listed with EDACE/EDSEC 713. Pr. or conc.: EDSEC 620.

**EDACE 714. International Education.** (3) On sufficient demand. Contemporary overview of the field of international education and an introduction to three of its parts: comparative education, intercultural education, and development education. Pr.: PSYCH 110.

**EDACE 725. Adult Basic Education Techniques.** (3) On sufficient demand. Emphasis on providing students with an understanding of the selection, utilization, and development of adult basic education reference, resources, and other materials. Pr.: EDACE 215.

**EDACE 733 and 738. Practica in Adult Education.** (1-6) On sufficient demand. Related occupational or professional experiences in approved industry, school, Cooperative Extension Service, or similar agency setting under faculty supervision. Pr.: Consent of instructor.

**EDACE 733. Adult Education.**

**EDACE 738. Occupations in Business and Industry.**

**EDACE 739. Coordination of Cooperative Vocational Education.** (2-3) I, II, S. Emphasis on the legal aspects and other minimum requirements essential to conducting cooperative vocational education programs at the secondary and postsecondary levels. Pr. or conc.: EDSEC 620.

**EDACE 750. Women, Education, and Work.** (2-3) II, S. Emphasizes the collective and individual educational needs of women in and out of the work force and the part that occupational/educational preparation contributes to their participation in the work force. Pr.: SOCIO 211 or equiv.

**EDACE 753. Introduction to Occupational Education.** (3) I, II, S. Overview of occupational education at all levels and its role in society. Designed for administrators, counselors, and vocational educators who perform a leadership function involving occupational education programs. Pr.: Teaching experience or consent of instructor.

**EDACE 754. Adult Basic Education.** (3) On sufficient demand. Evolving adult basic and high school equivalency education concepts will be examined. Program implementation, supervision, methods, and materials are emphasized. Pr.: Adult teaching experience or consent of instructor.

**EDACE 775. Readings in Adult Education.** (1-3) I, II, S. Readings in research and application in specialized areas in education. May be taken more than once. Pr.: EDCEP 215. No more than 3 hours may apply to a graduate degree.

**EDACE 780. Introduction to Adult Education.** (3) I, II, S. A survey of adult education. Consideration given to articulation with other levels of education. Identification of changing needs within the field are reviewed. Pr.: Consent of instructor.

**EDACE 782. Educational Gerontology.** (3) On sufficient demand. For both the practitioner and those interested in educational gerontology as a field of inquiry, this course will combine practice and theory. It will examine education for and about aging, with particular reference to the role, needs, and ability of persons in the later years as learners. Stressing current trends and prospective new developments in the field, it will include a review of present programs and discussion of the teaching-learning process for older adults. Pr.: EDACE 780.

**EDACE 786. Topics in Adult Education.** (1-3) I, II, S. Examination of current topic in area of specialization of faculty. Varied topics offered each semester so course may be repeated. Pr.: EDCEP 215.

**EDACE 790. Characteristics of the Adult Learner.** (3) II, S. For teachers and administrators in adult and occupational programs who need a familiarity with the major characteristics of adulthood which affect the adult as a learner. Includes an examination of early, middle, and late adulthood. Pr.: EDACE 780 or EDCEP 215 or PSYCH 110.

**EDACE 791. Career Education.** (2-4) On sufficient demand. Emphasis on providing for prevocational and adult experiences including orientation and exploratory and applied experiences in school and nonschool situations. Cross-listed with EDACE/EDSEC 791. Pr.: Teaching experience or consent of instructor.

**EDACE 792. Hospital and Industry Adult Education.** (3) On sufficient demand. An introduction to principles, roles, organization, procedures, and problems of adult education in hospitals, industry, and related agencies.

**EDACE 795. Problems in Adult and Continuing Education.** (Var.) I, II, S. Independent study of specific problems in the areas of adult or occupational education.

## Counseling and Educational Psychology

Michael Dannells, Chair

Professors Bradley,\* Hanna,\* M. Holen,\* K. Hoyt,\* Neely,\* Newhouse,\* Newton,\* Parish,\* and Sinnett;\* Associate Professors Benton,\* Dannells,\* Lynch,\* and Steffen;\* Assistant Professor Hughey;\* Courtesy appointments: Cashin,\* D. Hoyt,\* Rowlett, Sanderson, Scott, and Werring; Emeritus: Danskin and Kaiser.

The Department of Counseling and Educational Psychology contributes to the undergraduate teacher preparation program through its offerings in educational psychology and interpersonal relations in schools.

### Counseling and educational psychology courses

#### Undergraduate credit

**EDCEP 111. Group Life Seminar.** (1) I, II. Introduction to organized group experience through participation in weekly small group meetings. Study of such questions as effective communication, the function of groups, and human growth through social interaction. Open to selected freshmen and other new students, with consent of instructor.

**EDCEP 211. Leadership Training Seminar.** (2) I, II. General principles of leadership as applied to small groups. Study of the role of the leader, group processes and interaction, defining group goals, and techniques of observation. Workshop and supervision in small group leadership. Pr.: Sophomore standing and consent of instructor.

**EDCEP 215. Educational Implications of Growth and Development.** (3) I, II, S. Physical, intellectual, emotional, social, and personality development from conception to adulthood; understanding of these phases of development and their importance for education essential as background for those desiring to enter the teaching profession.

**EDCEP 311. Interaction and Guidance for the Paraprofessional.** (3) I, II. Application of a systematic approach to interaction skills in a paraprofessional helping relationship. Includes background knowledge of listening skills and practice in emitting skills which influence interaction quality. Pr.: Junior standing.

**EDCEP 315. Educational Psychology.** (3) I, II, S. The application of psychological principles to the teaching-learning process with special emphasis on principles of learning, motivation, information processing, individual differences, and measurement. Pr.: Admission to teacher education, and EDCEP 215. Secondary education students must take this course simultaneously with EDSP 323 and EDSEC 376.

#### Undergraduate and graduate credit in minor field

**EDCEP 502. Independent Study in Education.** (1-3) I, II, S. Selected topics in professional education. Maximum of three hours applicable toward degree requirements. Pr.: Consent of department head.

**EDCEP 525. Interpersonal Relations in the Schools.** (1) I, II. A didactic and experiential course designed to develop an understanding of human relations skills in the schools. Provides knowledge and skills necessary to

work effectively with students, parents, and school personnel. Particular emphasis is on the basis for interpersonal relations in education, communication skills, the facilitative relationship, working with students in groups, and conducting meetings with parents and school personnel. Pr.: EDSEC 420, 476, and 477. Simultaneous enrollment required for EDCIP 455, EDCEP 525, and EDSEC 586.

### Undergraduate and graduate credit

**EDCEP 711. Middle School Classroom Guidance.** (3) On sufficient demand. Techniques of integrating guidance principles for pre- and early teens into a middle school concept; investigation of classroom dynamics for middle school teachers as members of the guidance team; involvement of teachers in model guidance programs. Pr.: EDCEP 315.

**EDCEP 715. Principles of Measurement.** (3) I, II, S. Principles of constructing, administering, and evaluating tests and other measures used in schools. Focus on norm- and criterion-reference uses of teacher-made and standardized measures as an integral part of teaching. Pr.: EDCEP 315.

**EDCEP 721. Mental Hygiene in the School and Community.** (3) On sufficient demand. Dynamics creating different personalities and deviant behavior. The educative process as it affects personality integrity. Pr.: PSYCH 280 or EDCEP 215.

**EDCEP 775. Readings in Education.** (1-3) I, II, S. Readings in research and application in specialized areas in education. May be taken more than once. Pr.: EDCEP 215.

**EDCEP 786. Topics in Education.** (1-3) I, II, S. Examination of current topic in specialization of faculty. Varied topics offered each semester so course may be repeated. Pr.: EDCEP 215.

**EDCEP 795. Problems in Education.** Credit arranged. I, II, S. Selected students are permitted to secure specialized training appropriate to the needs of the individual. The student's project may involve intensive library investigation in a special field or the collection and analysis of data pertinent to a given problem. All work is done independently under the direction of a faculty member. As many conferences are held as necessary to assure successful completion of a project. Pr.: Background of courses necessary for the problem undertaken and consent of instructor.

## Curriculum, Instruction, and Policy Studies

Floyd Price, Chair

Professors Boyer,\* Byrne,\* Price,\* Rankin,\* and Wright;\* Associate Professors Burden\* and Griffith;\* Assistant Professor Spears; Other: Abbott and Hunter; Emeritus: Littrell.

The Department of Curriculum, Instruction, and Policy Studies focuses on curriculum program components and educational policies that include how academic decisions are made, how degree programs are conceptualized, and how school district curriculum policies are developed. It also focuses on the distinction between written policies and unwritten policies, theoretical factors of curriculum

and instruction, and programmatic issues of human resource development.

The department attracts a number of students who are in human service fields other than elementary/secondary teaching. These fields include social work, paraprofessionals in medicine, mental health, law enforcement, the chaplaincy, and various roles in the military establishment.

### Curriculum, instruction, and policy courses

#### Undergraduate credit

**EDCIP 410. Foundations of Education.** (2-3) I, II, S. For prospective teachers. The philosophical, historical, sociological, and political influences on education as they relate to and explain contemporary issues in education in the United States. Pr.: Junior standing and admission to teacher education.

**EDCIP 455. Teaching in a Multicultural Society.** (1) I, II. Application of multicultural understandings to teaching in a multicultural society. Strategies for working effectively with students to achieve educational equity. Pr.: EDSEC 420, 476, and 477. Simultaneous enrollment required for EDCIP 455, EDCEP 525, and EDSEC 586.

#### Undergraduate and graduate credit in minor field

**EDCIP 502. Independent Study in Education.** (1-3) I, II, S. Selected topics in professional education. Maximum of 3 hours applicable toward degree requirements. Pr.: Consent of department head.

#### Undergraduate and graduate credit

**EDCIP 611. Educational Sociology.** (3) I, II, S. A study to gain an understanding of the ways in which the school can effectively use the social process in developing and educating the individual and to show the interrelationships of such institutions as the family, the church, the playgrounds, and the various youth-serving agencies with the school. Pr.: Senior standing.

**EDCIP 704. Extra-Class Activities.** (3) On sufficient demand. Organization, sponsorship, and objectives of clubs, publications, athletics, dramatics, musical organizations, assemblies, home room, and student council in junior and senior high schools. Pr.: Senior standing or consent of instructor.

**EDCIP 706. Aerospace Education Workshop.** (3) S. To provide elementary and secondary teachers with knowledge, skills, and attitudes about aerospace activities and the total impact of air and space vehicles upon society. Pr.: EDSEC 586 or teaching experience.

**EDCIP 721. Economic Education Workshop.** (3) S. Basic economic concepts and how to integrate them into elementary and secondary curriculums and an examination of recent economic education materials. Pr.: Senior standing or higher.

**EDCIP 725. The Teacher and Child Abuse.** (3) On sufficient demand. An exploration of child abuse and neglect with specific references to legal and moral responsibilities of teaching. Suggestions for detection, reporting, and responsive instruction for suspected cases of child abuse and neglect. Pr.: PSYCH 110 and junior standing.

**EDCIP 730. Education of the Disadvantaged.** (3) On sufficient demand. Consideration of the life-space of the disadvantaged learner and its relationship to curriculum, organization, and interpersonal relationships in schools. The development of realistic, relevant goals for the teacher of the disadvantaged. Pr.: EDAF 410 or 611.

**EDCIP 733. Curriculum Materials for Ethnic Diversity.** (3) On sufficient demand. An examination

and analysis of recent materials and practices of schools serving multiethnic student bodies, particularly minorities from disadvantaged backgrounds. Materials include any items used by the school in implementing the curriculum. Pr.: Senior standing or higher.

**EDCIP 735. Curriculum Materials for Nonsexist Teaching.** (3) II, S. Analysis of recent materials from perspective of concern with their potential for sex-role stereotyping. Examination of teaching resource materials for curriculum intended to facilitate nonsexist teaching. Pr.: Junior standing or higher.

**EDCIP 737. Drug Abuse Education.** (3) On sufficient demand. Emphasis on the development of effective drug abuse education programs with attention given to the role delineation for schools and teachers. Materials and procedures for developing values and attitudes in an education setting. Pr.: Senior standing.

**EDCIP 775. Readings in Education.** (1-3) I, II, S. Readings in research and application in specialized areas in education. May be taken more than once. Pr.: EDCEP 215.

**EDCIP 786. Topics in Education.** (1-3) I, II, S. Examination of current topic in area of specialization of faculty. Varied topics offered each semester so course may be repeated. Pr.: EDCEP 215.

**EDCIP 795. Problems in Education.** (Var.) I, II, S. Independent study of a specific problem in curriculum or instruction. Pr.: Junior standing or higher.

## Educational Administration

G. Kent Stewart, Chair

Professors Bailey,\* Litz,\* Shoop,\* Stewart,\* and Wilson;\* Associate Professors Pankake\* and Thompson;\* Other: Livingston,\* Emeritus: Keys.

### Educational administration courses Undergraduate and graduate credit in minor field

**EDADM 502. Independent Study in Education.** (1-3) I, II, S. Selected topics in professional education. Maximum of three hours applicable toward degree requirements. Pr.: Consent of department head.

#### Undergraduate and graduate credit

**EDADM 775. Readings in Education.** (1-3) I, II, S. Readings in research and application in specialized areas in education. May be taken more than once. Pr.: EDCEP 215.

**EDADM 786. Topics in Education.** (1-3) I, II, S. Examination of current topic in specialization of faculty. Varied topics offered each semester so course may be repeated. Pr.: EDCEP 215.

**EDADM 795. Problems in Education.** Credit arranged. I, II, S. Selected students are permitted to secure specialized training appropriate to the needs of the individual. The student's project may involve intensive library investigation in a special field or the collection and analysis of data pertinent to a given problem. All work is done independently under the direction of a faculty member. As many conferences are held as necessary to assure successful completion of a project. Pr.: Background of courses necessary for the problem undertaken and consent of instructor.

# Educational Technology and Computer Education

Jackson Byars, Chair

Associate Professors Hortin\* and Talab;\* Assistant Professors Byars,\* McGrath,\* and McLellan;\* Courtesy appointments: Knupfer, McFarlin, and B. Newhouse; Emeritus: Goodenow.

The Department of Educational Technology and Computer Education offers course work in the fields of educational technology, school library media, and computer-based education.

## Educational technology and computer education courses

### Undergraduate credit

**EDETC 318. Instructional Media and Technology.** (2) I, II. Experiences in the selection, production, use, and evaluation of instructional materials. Applications of technology in education, including microcomputer use, but not programming. Operation and simple maintenance of equipment. Pr.: Admission to teacher education.

### Undergraduate and graduate credit in minor field

**EDETC 502. Independent Study in Education.** (1-3) I, II, S. Selected topics in professional education. Maximum of 3 hours applicable toward degree requirements. Pr.: Consent of department head.

### Undergraduate and graduate credit

**EDETC 705. Organization and Processing of Instructional Materials.** (2) I. Supervisory experiences in cataloging, organization, arrangement, and processing of print and nonprint materials for media centers and libraries. Issues in and approaches to coding and bibliographic concepts are explored. Pr.: EDETC 318 and ENGL 355 or 545.

**EDETC 718. Microcomputers in Instruction.** (2) I, II, S. Trends in computer applications in instruction, major components and functions of microcomputer instructional systems, and use of authoring systems for computer-assisted instruction. Does not prepare the student to teach computer programming. Pr.: EDEL 585 or EDSEC 586.

**EDETC 719. Microcomputers in Instruction Lab.** (1) I, II, S. Applications of BASIC and PASCAL to design of computer-assisted instruction and other classroom application of microcomputers. One two-hour lab a week. Conc. with EDETC 718. Pr.: CIS 200 and 203.

**EDETC 723. Computer Applications in Subject Areas.** (1-3) On sufficient demand. Theory and practice of using computer software to enhance teaching and learning in specific subject areas. Subjects covered will vary. May be repeated for credit in different subject areas. Pr.: EDETC 318 and EDCEP 315.

**EDETC 756. Visual Communication.** (3) I, alternate S. Implications of visual communication and learning for the design of instructional programs. Pr.: Graduate standing or EDETC 318 and EDCEP 315.

**EDETC 762. Instructional Television.** (3) II, alternate S. The principles of instructional television: its development, programming, techniques, and application. Pr.: Junior standing.

**EDETC 763. Instructional Design.** (3) I, alternate S. Implications of the major theories and models of instructional design to the development of instructional programs. Pr.: EDETC 318 and EDCEP 315.

**EDETC 764. Telecommunications in Education.** (Var. 2-3) Alternate S. Examination of the relationship of current telecommunications media and hardware to the design of instruction. Pr.: EDETC 318 and permission of instructor or graduate standing.

**EDETC 765. Planning and Developing Instructional Materials.** (3) II, S. The principles and processes involved in planning and producing instructional materials, ranging from the preparation of simple graphic and photographic materials to computer-assisted programmed instruction. Pr.: EDETC 861 or consent of instructor.

**EDETC 775. Readings in Education.** (1-3) I, II, S. Readings in research and application in specialized areas in education. May be taken more than once. Pr.: EDCEP 215.

**EDETC 786. Topics in Education.** (1-3) I, II, S. Examination of current topic in area of specialization of faculty. Varied topics offered each semester so course may be repeated. Pr.: EDCEP 215.

**EDETC 795. Problems in Education.** (Var.) I, II, S. Independent study of a specific problem in curriculum or instruction. Pr.: Junior standing or higher.

## Elementary Education

Ray Kurtz, Chair

Professors Kurtz,\* Schell,\* and Staver;\* Associate Professors Fallin,\* Heller,\* Perl,\* and Smith;\* Assistant Professors Green, Hancock, K. Holen, Kellstrom, and Swearingen; Others: Borchers, Shroyer, and Simons; Emeriti: Bloomquist, Brookhart, Craig, McAnarney, and Trennepohl.

The Department of Elementary Education offers a four-year program leading to certification in the elementary school. The program prepares students for teaching kindergarten through the ninth grade. The studies for the bachelor's degree include three areas: general education, professional education, and area of concentration.

### Elementary education courses

#### Undergraduate credit

**EDEL 218. Elementary Teacher Education Colloquium.** (1-2) On sufficient demand. Discussion, assigned readings, and lectures over selected trends, developments, and problems in the field of teaching.

**EDEL 300. Principles of Elementary Education.** (3) I, II. An overall view of the elementary school: organization, management, purpose, curriculum trends, and pupil characteristics. Pr.: Junior standing.

**EDEL 379. Physical Education for the Elementary School Teacher.** (3) Materials, techniques, and programs in physical education suitable for the different ages in the elementary school. Two hours rec. and two hours lab a week. Pr.: Sophomore standing and DED 202 or consent of instructor. Not open to majors in physical education and leisure studies.

**EDEL 445. Movement Exploration and Creative Dance for Children.** (3) I. Application of scientific principles to

the teaching of basic movement concepts and creative dance for grades K-6. Emphasis upon a guided discovery and problem-solving approach. One hour lec. and four hours lab a week. Pr.: KIN 320, 330, and 335 (or any two and conc. enrollment in the third).

**EDEL 455. Physical Education Activities for Elementary Schools.** (3) II. Application of scientific principles to the teaching of physical education for grades K-6, emphasizing fundamental motor skills, games of low and high organization, lead-up games, self-testing activities, warm-up activities, physical fitness testing, and classroom games. One hour lec. and four hours lab a week. Pr.: KIN 320, 330, and 335 (or any two and conc. enrollment in the third).

**EDEL 469. Physical Education in Elementary Schools.** (3) I, II. Methods of teaching and organization of materials in a progression for an elementary physical education program. Pr.: Admission to teacher education, KIN 206, and at least two courses from the elementary physical education specialization.

**EDEL 470. Science for Elementary Schools.** (3) I, II. The relationships among nature, environment, and elementary science in their roles in childhood education resources and activities suitable to the elementary school. Pr.: Admission to teacher education.

**EDEL 471. Language Arts for Elementary Schools.** (3) I, II. Modern trends in the teaching of reading, oral language, composition, and spelling. Pr.: Admission to teacher education.

**EDEL 472. Social Studies for Elementary Schools.** (3) I, II. Course of study content as a basis for consideration for modern classroom procedure; objectives and problems in the teaching of social studies. Pr.: Admission to teacher education.

**EDEL 473. Mathematics for Elementary Schools.** (3) I, II. The teaching of mathematics in the elementary schools, including the nature of mathematical processes, curriculum, methods of instruction, instructional materials, and the evaluation of outcomes. Pr.: Admission to teacher education.

**EDEL 474. Elementary School Reading.** (3) I, II. An introductory course in the content, methods, and materials of the total reading program in the elementary school. Pr.: Admission to teacher education.

### Undergraduate and graduate credit in minor field

**EDEL 502. Independent Study in Education.** (1-3) I, II, S. Selected topics in professional education. Maximum of 3 hours applicable toward degree requirements. Pr.: Consent of department head.

**EDEL 585. Teaching Participation in the Elementary School.** (Var.) I, II. Observation and teaching participation under the direction of selected elementary teachers. Pr.: EDEL 300, 470, 471, 472, 473, 474, and admission to student teaching. Conc. successful completion of EDEL 600 required.

### Undergraduate and graduate credit

**EDEL 600. Reading with Practicum.** (3) I, II. Supervised observation and teaching of reading in approved school classrooms. Pr.: EDEL 474 or teaching experience. May not apply to reading specialist endorsement.

**EDEL 717. Corrective Reading Instruction.** (1-3) On sufficient demand. Supervised tutoring of children with reading difficulties. Not open to students with credit in EDEL 847. Pr.: Student teaching experience.

**EDEL 720. Foreign Language Methods for Elementary Schools.** (3) On sufficient demand. Methods of teaching and organization of materials for the foreign language program in the elementary school. Pr.: Educational Psychology II, 24 hours in the foreign language, and conc. enrollment in either Preprofessional Lab (DED 100, 1 cr.) or Teaching Participation in the Elementary School (EDEL 585, 4 cr.).

**EDEL 739. Environmental Education.** (1-3) On sufficient demand. The selection, adaptation, and development of environmental education K-12 curriculum materials; procedures for an integrated curricular implementation; the selection of appropriate instructional strategies. Pr.: A course in environmental studies.

**EDEL 775. Readings in Education.** (1-3) I, II, S. Readings in research and application in specialized areas in education. May be taken more than once. Pr.: EDCEP 215.

**EDEL 779. Primary School Education.** (3) On sufficient demand. A course for those interested in the kindergarten and primary school child. Emphasis will be placed on curriculum development, pertinent research, and innovative practices in early education. Pr.: EDCEP 315.

**EDEL 780. Kindergarten Education.** (3) On sufficient demand. A specialized study of the kindergarten in the American school: methods and materials for working with the kindergarten child, including communication and explanation skills and readiness for reading. Pr.: EDCEP 215, EDEL 300, and junior standing.

**EDEL 786. Topics in Education.** (1-3) I, II, S. Examination of current topic in area of specialization of faculty. Varied topics offered each semester so course may be repeated. Pr.: EDCEP 215.

**EDEL 795. Problems in Education.** (Var.) I, II, S. Independent study of a specific problem in curriculum or instruction. Pr.: Junior standing or higher.

## Secondary Education

John D. Parmley, Chair

Professors Hause,\* Heerman,\* and Welton;\* Associate Professors Alexander,\* Enochs,\* Laurie,\* Parmley,\* Scharmann,\* Sturr,\* and Wissman;\* Assistant Professors Dalida, Deering, Harbstreit,\* Royse, and Weimer;\* Instructors Jankovich, Kane, and Stone; Emeriti: Bartel, Carpenter, Prawl, Terrass, and Wauthier.

The Department of Secondary Education offers a four-year degree program leading to certification as a secondary school teacher in one or more of the following fields: art, business, English, journalism, mathematics, modern languages, speech, natural sciences, physical education, and social science. In addition, the department provides teaching methods courses and secondary education student teaching experiences to serve students in music education. The department also provides similar courses for students in agricultural education and home economics education.

### Secondary education courses

**EDSEC 050. Developmental Reading Laboratory.** (3) I, II. Improves the college student's reading skills, rates of comprehension, vocabulary, and study skills. Pr.: Consent of instructor.

### Undergraduate credit

**EDSEC 215. Information Processing.** (3) I. Application of technical knowledge and decision-making skills in development of usable printed business documents. Emphasis is placed upon teaching theories and strategies as they apply to keyboarding.

**EDSEC 218. Secondary Teacher Education Colloquium.** (1-2) On sufficient demand. Discussion, assigned readings, and lectures over selected trends, developments, and problems in the field of teaching.

**EDSEC 298. Coaching and Officiating Wrestling.** (2) On sufficient demand. Study of rules, theory, and practices; methods of coaching. Pr.: KIN 250.

**EDSEC 299. Coaching and Officiating Swimming.** (2) II, in even years. Study of rules, theory, and practices; methods of coaching. Pr.: KIN 250.

**EDSEC 300. Introduction to Agricultural Education.** (1) I, II. Introduction to the program responsibilities, methodology, organization, current trends and issues, and future direction of programs in agricultural education. Students will be actively involved in the discussion and application of course material both in the classroom and in early field experiences conducted as a part of this course.

**EDSEC 301. Coaching and Judging Gymnastics.** (2) On demand. Study of rules, theory, and practices; methods of coaching. Pr.: KIN 250.

**EDSEC 302. Coaching and Officiating Basketball.** (2) II. Study of rules, theory, and practices; methods of coaching. Pr.: KIN 250.

**EDSEC 303. Coaching and Umpiring Baseball.** (2) I, in even years. Study of rules, theory, and practices; methods of coaching. Pr.: KIN 250.

**EDSEC 304. Coaching and Officiating Track and Field.** (2) II, in odd years. Study of rules, theory, and practices; methods of coaching. Pr.: KIN 250.

**EDSEC 305. Coaching and Officiating Football.** (2) I. Study of rules, theory, and practices; methods of coaching. Pr.: KIN 250.

**EDSEC 306. Coaching and Officiating Volleyball.** (2) I. Study of rules, theory, and practices; methods of coaching. Pr.: KIN 250.

**EDSEC 309. Coaching and Officiating Tennis and Golf.** (2) I, in odd years. Study of rules, theory, and practices; methods of coaching. Pr.: KIN 250.

**EDSEC 315. Administrative Data Applications.** (3) II. Development of competencies in the usage of integrated software packages as they apply to the automated business environment. Pr.: EDSEC 215.

**EDSEC 359. Administration of Physical Education, Athletic, and Intramural Programs.** (3) I. Study of problems associated with the conduct of activity programs. Specifically considered are selection and care of equipment and facilities, public relations, legal liability, and scheduling. Pr.: Junior standing.

**EDSEC 376. Core Teaching Skills: Secondary/Middle.** (3) I, II. General teaching practices and the opportunity to apply that information in a laboratory setting. Two hours of lec. and two of lab a week. Pr.: Admission to teacher education, DED 102, and EDCEP 215. Must be taken simultaneously with EDCEP 315 and EDSP 323.

**EDSEC 400. Leadership and Personal Development in Agricultural Education.** (1) I, II. An examination of the role of the FFA advisor in the leadership and personal development of agricultural education students.

**EDSEC 410. Gymnastics and Aquatics in Physical Education.** (3) I. Application of scientific principles to the teaching of gymnastics. Emphasis upon skill technique and spotting procedures for grades K-12. Pr.: KIN 320, 330, and 335 (or any two and conc. enrollment in the third).

**EDSEC 415. Administrative Support Services and Technology.** (1) II. Intended to develop subject matter competencies needed for careers in the business office:

Computer usage (desktop publishing), uses of various office equipment and procedures, and awareness of computer networking, telecommunication and emerging technology.

**EDSEC 416. Office Management.** (3) I. An examination of the management and operation of the office from a practical viewpoint including a study of administrative systems, the ergonomic environment of the office, and the management of human resources in the office.

**EDSEC 420. Block II Lab: Content and Reading Methods.** (1) I, II. Field-based experience to help the pre-professional teacher practice the incorporation of specific content area with reading methods in the secondary and middle schools. Pr.: EDCEP 315, EDSP 323, and EDSEC 376. Simultaneous enrollment required for EDSEC 420, 476, and 477.

**EDSEC 421. Rhythms in Physical Education.** (3) II. Application of scientific principles to the teaching of rhythmical skills. Emphasis on methods of teaching creative, folk, square, and social dance in grades K-12. Pr.: KIN 320, 330, and 335 (or any two and conc. enrollment in the third).

**EDSEC 427. Sports Skill Progressions.** (3) II. Strategies for the effective teaching of team and individual and dual sports for secondary physical education. Emphasis will be on learning skill progressions, written preparation of lesson and unit plans, and writing effective objectives for an activity program. Additional course work will cover skill analysis and peer teaching opportunities for physical education majors.

**EDSEC 461. Observation in Physical Education.** (2) I, II. Observation of students engaged in school or community physical activity programs. Emphasis upon developmental assessment, interaction with students, and limited planning and organization of appropriate physical education activities. Two hours lab a week and one hour rec. Pr.: Junior standing and one or more physical education methods courses.

**EDSEC 476. Content Area Methods in the Secondary School.** (2-3) I, II. Principles of teaching applied to content area instruction in the secondary school; motivation; organization of subject matter; lesson planning; evaluation and reporting; challenging the levels of ability; organization and management of the classroom; methodology and materials of the secondary schools. Pr.: EDCEP 315, EDSP 323, and EDSEC 376. Simultaneous enrollment required for EDSEC 420, 476, and 477.

**EDSEC 477. Middle Level/Secondary Reading.** (2) I, II. Introduction and development of effective study/skilled reading strategies and abilities for learning from content area text material. Pr.: EDCEP 315, EDSP 323, and EDSEC 376. Simultaneous enrollment required for EDSEC 420, 476, and 477.

### Undergraduate and graduate credit in minor field

**EDSEC 502. Independent Study in Education.** (1-3) I, II, S. Selected topics in professional education. Maximum of 3 hours applicable toward degree requirements. Pr.: Consent of department head.

**EDSEC 503. Teaching Adult Classes in Agriculture.** (2-3) On sufficient demand. Organization and preparation of materials and methods used in teaching adult classes in vocational education in agriculture for young farmers and adults. Departments are visited for evaluation of programs and results. Pr.: EDSEC 620.

**EDSEC 505. Field Experience in Agricultural Education.** (2-3) On sufficient demand. A course for prospective teachers to help bridge the gap between classroom theory and student teaching. Emphasis will be on observation of and participation in school and community organizations and programs. Pr.: EDSEC 300 and EDCEP 215 and consent of instructor.

**EDSEC 560. Art for Exceptional Children.** (3) II. Use of art courses and activities to meet the needs of the mentally retarded, physically impaired, emotionally disturbed, or gifted child. Three hours lec. Pr.: PSYCH 110. Same as ART 560.

**EDSEC 576. Safety Education.** (2) II, S. Personal safety in home, school, community, and work place will be addressed. Special attention is given to local, state, and national resources related to safety practice and safety education.

**EDSEC 582. Teaching Participation in Music.** (8-12) I, II. Observation and teaching under the direction of selected music teachers in elementary, middle level, and secondary school music programs. Pr.: Admission to student teaching.

**EDSEC 586. Teaching Participation in the Secondary Schools and Professional Development Seminar.** (Var.) I, II. Guided observation, teaching participation, and study of teaching practices under direction of selected teachers in middle/junior and senior high schools. Student teachers will participate in seminar sessions to discuss issues and experiences encountered during this school-based experience. Pr.: EDSEC 420, 476, and 477. Simultaneous enrollment required for EDCIP 455, EDCEP 525, and EDSEC 586.

**EDSEC 587. Supervised Practicum for Athletic Coaches.** (2) I, II. Observation and coaching participation under the direction of selected coaches in public school, club, city recreation, or other nonpublic school sport settings. Pr.: KIN 250, 315, and one coaching and officiating course.

## Undergraduate and graduate credit

**EDSEC 611. Coordination Techniques.** (1) II. Acquaints students with techniques in selecting, implementing, and coordinating occupational programs between the school and the business community. Pr.: EDSEC 620.

**EDSEC 612. Job Analysis.** (1) II. Acquaints students with techniques of analyzing jobs and tasks related to occupations. Pr.: EDSEC 620.

**EDSEC 614. Laboratory Techniques in Teaching Science.** (3) I, II. Rationale for laboratory in secondary school science. The design and implementation of laboratory activities and demonstrations in a high school science program. Pr.: EDSEC 476 (Science).

**EDSEC 620. Principles and Philosophy of Vocational Education.** (3) I, II, S. Provision for vocational education in Kansas and other states and countries; principles and philosophy underlying such education, relation of vocational education to school objectives and community, state, and national needs. Pr.: EDCEP 315.

**EDSEC 621. Program Planning in Vocational Education.** (2-3) I, II, S. The program development and planning process; development of guides for teaching and evaluating reimbursable secondary programs. Pr.: EDSEC 620.

**EDSEC 701. Administration and Supervision of Vocational Education.** (2-3) II, S. On sufficient demand. Emphasis on the duties and responsibilities of administrative and supervisory personnel responsible for the promotion, development, and coordination of comprehensive vocational-technical education programs at the local level. Pr.: Teaching experience or consent of instructor.

**EDSEC 704. Extension Organization and Programs.** (3) I, S. Development and objectives of Cooperative Extension and other university adult education programs; with emphasis on programs and procedures. Cross-listed as EDSEC/EDACE 704. Pr.: Senior standing or consent of instructor.

**EDSEC 705. Organization Problems in Teaching Agricultural Mechanics.** (Var.) On sufficient demand. Analysis of the agricultural mechanics course of study; needs and interests of students; learning difficulties; skills and technical knowledge required; correlation

with agriculture; application of laws of learning to the teaching process; determination of objectives. Pr.: EDSEC 586.

**EDSEC 706. Principles of Teaching Adults in Extension.** (3) II, S. Methods and principles of adult teaching, with emphasis on Cooperative Extension Service; application to various adult education programs. Cross-listed as EDSEC/EDACE 706. Pr.: Senior standing, juniors by consent of instructor.

**EDSEC 710. Occupational Home Economics Education.** (2) I. Principles and procedures in planning and organizing home economics-related occupational programs. The course includes an approved occupational experience in business/industry and consideration of methods and teaching materials peculiar to these programs. Pr.: EDCEP 215 or conc. enrollment.

**EDSEC 713. Occupational Analysis.** (2-3) I, II, S. An introduction to various techniques used in analyzing occupations and jobs. Emphasis on developing and organizing related instructional materials and content. Cross-listed with EDACE/EDSEC 713. Pr. or conc.: EDSEC 620.

**EDSEC 715. Reading in the Content Areas.** (3) On sufficient demand. Information concerning the reading process and techniques for helping students develop reading and study skills needed in the content areas. Course is designed for classroom middle level and secondary teachers. Pr.: Senior standing.

**EDSEC 732-737. Practica in Education.** (1-6) On sufficient demand. Related occupational or professional experiences in approved industry, school, Cooperative Extension Service, or similar agency setting under faculty supervision. Pr.: Consent of instructor.

**EDSEC 732. Career Education.**

**EDSEC 734. Agriculture-Related Occupations.**

**EDSEC 735. Business and Office Occupations.**

**EDSEC 736. Extension Education.**

**EDSEC 737. Home Economics-Related Occupations.**

**EDSEC 740. Advising Youth Organizations.** (2-3) On sufficient demand. An examination of the role of an advisor in the effective operation of a youth organization. Pr.: PSYCH 110.

**EDSEC 741. German Culture in Second-Language Learning.** (3) Emphasis on the study of German culture and application to German curriculum, including the development of materials. Pr.: Twenty-four credits in 200 and above in German or equiv. (Same as GRMN 741).

**EDSEC 743. French-Speaking Cultures in Second Language Learning.** (3) On sufficient demand. Emphasis on the study of French culture and applications to the French curriculum, including the development of materials. Pr.: 24 credits at 200 or above in French, or equiv. Cross-listed with modern languages FREN 743.

**EDSEC 770. Methods for Second Language Acquisition/Learning.** (3) On sufficient demand. Study of the development of second language instruction, both historical and current. Syntax, morphology, discourse analysis, and global proficiency evaluation are foci for analysis of methods and for the development of a personal method of teaching. Pr.: EDSEC 476 and 24 credits in one second language at 200 level and above or equivalent.

**EDSEC 775. Readings in Education.** (1-3) I, II, S. Readings in research and application in specialized areas in education. May be taken more than once. Pr.: EDCEP 215.

**EDSEC 776. Teaching in the Middle/Junior High School.** (3) On sufficient demand. Several instructional approaches consistent with the characteristics of the emerging adolescent student (grades 5-9) will be examined in relation to current research. Direct development of alternative curricular programs,

appropriate use of interdisciplinary activities and nontraditional materials will be emphasized. Pr.: EDCEP 315, middle-level field experience, elementary or secondary content methods course.

**EDSEC 777. Hispanic Cultures in Second-Language Learning.** (3) Emphasis on the study of Spanish culture and applications to the Spanish curriculum, including the development of materials. Pr.: Twenty-four credits in Spanish at 200 or above or equivalent. Same as SPAN 777.

**EDSEC 786. Topics in Education.** (1-3) I, II, S. Examination of current topic in area of specialization of faculty. Varied topics offered each semester so course may be repeated. Pr.: EDCEP 215.

**EDSEC 791. Career Education.** (2-4) On sufficient demand. Emphasis on providing for prevocational and adult experiences including orientation and exploratory and applied experiences in school and nonschool situations. Cross-listed with EDACE/EDSEC 791. Pr.: Teaching experience or consent of instructor.

**EDSEC 795. Problems in Education.** (Var.) I, II, S. Independent study of a specific problem in curriculum or instruction. Pr.: Junior standing or higher.

## Special Education

Warren J. White, Chair

Professor Dettmer,\* Dyck,\* and R. Zabel;\* Associate Professors Thurston,\* White,\* and M. K. Zabel; Other: Knackendoffel; Emeritus: DeMand and Ohlsen.

Studies in special education accommodate students who wish to specialize in teaching children and youth with certain exceptionalities. Students must complete an undergraduate teacher education program leading to certification for either elementary or secondary school teaching. Program focus is to work with the mentally retarded, learning disabled, gifted, and the behavior disordered student at the preschool, elementary, and secondary levels.

### Special education courses

#### Undergraduate credit

**EDSP 323. Exceptional Student in the Secondary School.** (2) I, II, S. Designed for regular classroom teachers in meeting the needs of exceptional adolescents. Support strategies for teachers and exceptional students in the mainstream of education. Pr.: Admission to teacher education, and EDCEP 215. Must be taken simultaneously with EDCEP 315 and EDSEC 376.

#### Undergraduate and graduate credit in minor field

**EDSP 502. Independent Study in Education.** (1-3) I, II, S. Selected topics in professional education. Maximum of three hours applicable toward degree requirements. Pr.: Consent of department head.

#### Undergraduate and graduate credit

**EDSP 722. Psychology of Exceptional Children.** (3) I, II, S. Psychological aspects of the superior, the subnormal, the emotionally disturbed, and the physically handicapped child, with attention to early identification and treatment. Pr.: PSYCH 280 or EDCEP 215.

**EDSP 723. The Exceptional Child in the Regular Classroom.** (3) I, II. Designed for regular classroom

teachers in meeting the needs of exceptional children. Support strategies for teachers and exceptional children in the mainstream of education will be explored. Pr.: EDCEP 215.

**EDSP 728. Characteristics of the Emotionally Disturbed.** (3) I, II. A survey and exploration of approaches to the educational needs of the socially and emotionally disturbed child. Development of curricula and learning environment will be emphasized. Pr.: EDSP 722 or 763 and/or consent of instructor.

**EDSP 731. Characteristics of Learning Disabilities.** (3) I, II. An explanation of important concepts and practices in the area of learning disabilities. Emphasis will be placed upon diagnosis of underlying causes and their characteristics. Pr.: EDSP 722 or 763.

**EDSP 732. Remediation Education for the Emotionally Disturbed.** (3) On sufficient demand. Educational planning, instructional methods, behavioral management, curricula modification, and use of appropriate media and materials with the emotionally disturbed. Pr.: EDCEP 315.

**EDSP 733. Remediation of Learning Disabilities.** (3) On sufficient demand. Educational planning, instructional methods, behavioral management, curricula modifications, and use of appropriate media and materials with the learning disabled. Pr.: EDSP 731.

**EDSP 750. Introduction to Education of the Gifted.** (3) On sufficient demand. An overview of historical perspectives related to gifted child education, various facets of intellectual and creative functioning, national and state guidelines for planning and implementing gifted programs, modifying curriculum and classroom strategies to nurture gifted potential, current issues in gifted education. Pr.: EDSP 722 or 723.

**EDSP 753. Curriculum Development for the Mentally Retarded.** (3) On sufficient demand. Curriculum content, methods, and organization of work in the education of mentally retarded children using experience units. Pr.: EDSP 763.

**EDSP 755. Guidance of the Exceptional Individual.** (3) On sufficient demand. Strategies for teachers in working with the academic, vocational, personal, and social adjustment of the exceptional individual. The course will focus on the individual in preschool, elementary, secondary, postsecondary, and adult settings. Pr.: EDSP 722 or 763.

**EDSP 763. Education of Exceptional Children.** (3) I, II. A general study of special education, with emphasis on the development and organization of instructional materials; parent education; and coordination of the services of physicians, health departments, welfare agencies, and the school. Included is the study of administration of special services at the national, state, and local levels. Pr.: EDCEP 215 and EDEL 300 or EDCEP 315.

**EDSP 764. Mental Retardation.** (3) On sufficient demand. Etiological, psychological, sociological, and educational aspects of mental retardation. Pr.: EDSP 763.

**EDSP 775. Readings in Education.** (1-3) I, II, S. Readings in research and application in specialized areas in education. May be taken more than once. Pr.: EDCEP 215.

**EDSP 785. Practicum in Education of Exceptional Children.** (3-6) On sufficient demand. Observation and participation in teaching exceptional children under the supervision of selected teachers in special education programs. Pr.: Admission to student teaching and senior standing.

**EDSP 786. Topics in Education.** (1-3) I, II, S. Examination of current topic in specialization of faculty. Varied topics offered each semester so course may be repeated. Pr.: EDCEP 215.

**EDSP 787. Field Experiences in Special Education.** (1-3) On sufficient demand. Observation and supervised activities in schools, camps, clinics, or institutions related to student's area of special interest or preparation. Pr.: EDSP 722 or 763.

**EDSP 795. Problems in Education.** Credit arranged. I, II, S. Selected students are permitted to secure specialized training appropriate to the needs of the individual. The student's project may involve intensive library investigation in a special field or the collection and analysis of data pertinent to a given problem. All work is done independently under the direction of a faculty member. As many conferences are held as necessary to assure successful completion of a project. Pr.: Background of courses necessary for the problem undertaken and consent of instructor.

# Engineering

Donald E. Rathbone, Dean  
 Kenneth K. Gowdy, Associate Dean  
 John P. Dollar, Assistant Dean  
 Ray E. Hightower, Assistant Dean  
 Andrew D. Cordero, Director of Minorities Programs

146 Durland Hall  
 532-5590

A course of study leading to a degree in the College of Engineering provides a well-rounded university education and equips students with a broad theoretical and practical background to meet the new and demanding problems of our technological society.

The College of Engineering offers the bachelor of science degree in the following fields: agricultural engineering, architectural engineering, chemical engineering, civil engineering, computer engineering, construction science, electrical engineering, engineering technology, industrial engineering, mechanical engineering, nuclear engineering.

## General Requirements

### General engineering (DEN)

Entering freshmen who are undecided as to a major in engineering may enroll in general engineering for one year. They will take the following program of study, which is completely applicable to all engineering programs.

<b>Fall semester</b>		
ENGL 100	Expository Writing I .....	3
CHM 210	Chemistry I .....	4
MATH 220	Analytic Geometry and Calculus I ..	4
DEN 160	Engineering Concepts .....	2
Humanities or social science electives .....		3
KIN 101	Principles of Physical Fitness .....	1
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<b>Spring semester</b>		
ENGL 120	Expository Writing II .....	3
<b>or</b>		
Elective*	.....	3
CHM 230	Chemistry II .....	4
MATH 221	Analytic Geometry and Calculus II .....	4
ECON 110	Principles of Macroeconomics .....	3
Humanities or social science elective .....		3
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\*Expository Writing II is optional if prerequisites for Written Communication for Engineers (ENGL 415) are met from Expository Writing I.

### Pre-engineering or transfer students

Many of the fundamental courses required for a degree in engineering may be obtained through pre-engineering programs at other four-year institutions or at community colleges. In general, two years of course work will be transferable. However, there are differences among the curricula; students electing this route should work closely with their advisors and K-State to ensure a proper selection of courses. Questions should be referred to the College of Engineering dean's office.

The following chart indicates the number of transferable credit hours for various courses, and is a guide to courses that current K-State students will be taking.

Students transferring at the junior level may find it advantageous to attend the summer session preceding fall enrollment.

### Basic pre-engineering subjects

	Use in various curricula; credit hours at K-State									
	AGE	ARE	CE	CHE	COMPEN	CNS	EECE	IE	ME	NE
Accounting	*					3	*	3		
Biology	4			*	*		*			*
Chemistry	8	8	8	8	4	*	8	8	8	8
Computer programming	2	2	2	1	5	2	5	2	2	2
Economics (Macroeconomics)	3	3	3	3	3	3	3	3	3	3
Expository Writing I and II **	6	6	6	6	6	6	6	6	6	6
Geology			3	*	*	3	*			*
Graphics	2	4	2	*	*	4	*	2	5	*
Mathematics (Analytic Geometry and Calculus and Elementary Differential Equations)	16	16	16	16	16	4	16	16	16	16
Organic chemistry				8	*		*			*
Physics	10	10	10	10	10	8	10	10	10	10
Qualitative analysis			*	4						*
Social science/humanities electives†	13	12	13	15	15	12	15	13	15	13
Speech (public speaking)	2	2	2	2	2	2	2	3	2	2
Statics††	3	3	3	*		3			3	
Statistics (calculus-based)	*	*	*		3		3	3	*	

#### \*Elective

Excess credit hours in courses listed above may possibly be used in elective areas after consultation with a K-State departmental advisor and the dean's office.

\*\*Expository Writing II is optional for all programs if an A or B grade is achieved in Expository Writing I.

†Two courses must be junior/senior level (not available at two-year schools)

††Confer with dean's office on Statics requirements for COMPEN, EECE, IE, and NE. The grade **CR** is not acceptable for transfer into College of Engineering programs.

Engineering subjects that normally are offered during the summer include:

CE 333	Statics .....	3
EECE 241	Introduction to Computer Engineering .....	3
EECE 510	Circuit Theory I .....	3
NE 385	Engineering Computational Techniques .....	2
ME 512	Dynamics .....	3
ME 513	Thermodynamics I .....	3
ME 571	Fluid Mechanics .....	3

### Engineering sciences

Engineering sciences apply science and mathematics to the basic engineering areas. Students pursuing a B.S. degree in engineering must satisfy the following requirements:

A minimum of 32 semester hours of engineering science courses.

At least 9 semester hours of engineering science courses outside the student's major department.

At least four of the six subject areas in the following list must be represented in the 32 semester hours.

#### Engineering materials

CHE 350	Engineering Materials .....	2
CHE 352	Engineering Materials .....	3
NE 515	Nuclear Engineering Materials .....	2
EECE 795	Solid State Engineering .....	3

#### Analytical mechanics

<b>Either</b>		
CE 333	Statics .....	3
<b>and</b>		
ME 512	Dynamics .....	3
<b>or</b>		
CE 530	Statics and Dynamics .....	4

#### Circuits, fields, and electronics

EECE 510	Circuit Theory I .....	3
EECE 519	Electrical Circuits and Controls .....	4
EECE 557	Electromagnetic Theory .....	4
EECE 632	Engineering Applications of Microcomputer Systems .....	3

#### Thermodynamics

CHE 515	Chemical Engineering Thermodynamics I .....	2
ME 513	Thermodynamics .....	3

#### Flow and rate processes

ME 571	Fluid Mechanics .....	3
CHE 530	Transport Phenomena I .....	3

#### Computing and information sciences

Other courses in these subject areas that may properly be considered as belonging to engineering sciences. In addition, there are areas of engineering science that are not listed.

### Humanities and social science electives

To add breadth to education and to help prepare for a more effective role in society each engineering student is required to take several courses in the social sciences and humanities. The following list of electives has been approved by the faculty.

Anthropology—Any course
Architecture—Any course in history or appreciation of architecture
Art—Any course
Economics—Any course above 110, which is required
Engineering—DEN 299 Honors Seminar in Engineer-

ing (2); DEN 399 Honors Colloquium in Engineering (1); DEN 450 Impact of Engineering and Technology on Society (3)

English—Any course in literature
Geography—Any course except 220, 221, 470, 700, 702, and 705
History—Any course
Journalism—235, 530, 560, 570, and 575
Modern languages—Any course (except English or the student's native language)
Music—Any course in theory, history, or appreciation of music (Music 150 must be the 2-credit-hour class)
Philosophy—Any course except 110, 220, and 510
Political science—Any course
Psychology—Any course
Sociology—Any course except 520, 724, 725, and social work courses

Courses must be selected from at least two areas listed above and at least two advanced level courses must be taken. These are normally 400 level or above, except for modern languages where the third and following courses in a sequence are considered advanced level. Not more than 3 credit hours may be taken in applied art. All courses must be taken for a letter grade.

### Engineering equipment fee

The Engineering Equipment Fee is in addition to the normal university fees. Contact the Office of the Dean of Engineering for further information or see the Fees section of this catalog.

### Grade requirements

Before attempting a course taught in the College of Engineering, a grade of C or better must be earned in its prerequisite courses.

### Summer school

Many of the courses appearing in the engineering curricula, not only those which are offered in the College of Engineering but also those in the College of Arts and Sciences, may be taken during the summer term.

High school seniors who have had insufficient mathematics to enroll in MATH 220 Analytic Geometry and Calculus I are urged to investigate the possibility of summer school to remove this mathematics deficiency. MATH 125 College Algebra and Trigonometry and MATH 150 Plane Trigonometry are offered during the summer sessions and provide an excellent transition from high school mathematics into the engineering curriculum.

### International student admission

Applications for admission of international students are judged by several factors, including, but not limited to: secondary school record, test scores, academic record at the college and university level, trend in grades, and grades in mathematics, physical sciences, and related areas.

Because of a limitation on the number of international students that can be accom-

modated, the College of Engineering reserves the right to apply more rigorous admissions criteria to applicants who are not U.S. citizens.

## Interdisciplinary Studies

Although engineering curricula are generally structured, it is possible to pursue a secondary field of interest through the judicious selection of electives. If added flexibility is needed to pursue specific goals, students may petition the advisor and department head for the substitution of required courses. Some of the more popular secondary areas are:

### Business administration

Increasing numbers of engineers are assuming managerial positions in all phases of industrial operations. Some of the courses listed in the section of dual degrees could be appropriate technical electives for students with goals in management.

### Pre-medicine

Many recent advances in medical research techniques, patient monitoring systems, artificial limbs and organs, and aerospace and undersea medicine have developed from the partnership of medicine and engineering. Engineering students wishing to satisfy entrance requirements to a typical school of medicine must take at least two semesters of biology and two semesters of organic chemistry, and should take additional social science/humanities electives. The pre-medical advisor in the College of Arts and Sciences should be consulted prior to the junior year.

### Pre-law

A graduate degree in law can be desirable for engineers wishing to pursue careers in industrial management or patent law. While there are no specific courses required for entry to law school, appropriate elective areas are economics, political science, history, sociology, psychology, anthropology, accounting, and finance. The pre-law advisor in the College of Arts and Sciences should be consulted prior to the junior year.

### Computer science

Modern electronic computers are powerful tools for the solution of complex engineering and/or management problems. Individuals with training in both engineering and computer science possess the background to attack problems over a broad range of areas. Appropriate courses include:

**Languages**

CIS 200	Fundamentals of Computer Programming
CIS 300	Algorithms and Data Structures
CIS 350	Computer Architecture and Organization
CIS 505	Introduction to Programming Languages

**Design**

EECE 241	Introduction to Computer Engineering
EECE 444	Computer Engineering Laboratory I
EECE 544	Computer Engineering Laboratory II
EECE 641	Design of Digital Systems I

**Computational techniques**

CHE 316	Chemical Engineering Computational Techniques
IE 560	Introduction to Operations Research
IE 573	Industrial Simulation
ME 760	Engineering Analysis I
NE 696	Nuclear Systems Design

**Mathematics, physics, and chemistry**

Engineering students with interests in research should plan on graduate study. Preparation at the undergraduate (B.S.) level could be enhanced by additional courses in mathematics and the basic sciences. Refer to the departmental listings in the College of Arts and Sciences section for possible electives.

**Bioengineering**

Bioengineering is a broad field overlapping the life sciences and many engineering disciplines. Some of the subareas are biomechanics, ergonomics, bioinstrumentation, biomaterials, bioenergetics, water and waste treatment, food engineering, and environmental engineering. In addition to the courses listed in the pre-medicine section, other courses of interest include:

AGE 510	Environmental Design of Agricultural Buildings
AGE 520	Energy Use and Control in Agricultural Systems
AGE 680	Principles of Occupational Safety and Health Management
AGE 700	Agricultural Process Engineering
CHE 715	Biochemical Engineering
CHE 725	Biotransport Phenomena
CE 563	Environmental Engineering Fundamentals
CE 565	Water and Wastewater Engineering
CE 761	Environmental Engineering Chemistry
CE 762	Water Treatment Systems
CE 766	Wastewater Engineering I: Biological Processes
EECE 771	Control Theory Applied to Bioengineering
EECE 772	Theory and Techniques of Bioinstrumentation
EECE 773	Bioinstrumentation Laboratory
IE 623	Industrial Ergonomics
IE 625	Work Environments
ME 622	Environmental Engineering I
ME 722	Environmental Engineering II

**Food engineering**

Engineers are needed in the food industry for process development and design, equipment design, and management of operations. Students should select technical electives to augment a background in chemistry, microbiology, agricultural and food sciences, and process engineering.

**Energy systems engineering**

The increasing demand for energy is one of the major problems confronting all nations. New energy sources are needed in addition to more effective use of present resources. Interested students should select courses from the following areas: thermodynamics, energy conversion, nuclear reactor technology, electric energy systems, and engineering economics.

**Natural resources/environmental sciences option**

Increasing national and international concerns have generated opportunities for individuals to contribute to the resolution of environmental and resource problems. These issues are so complex that they lie beyond the scope of any one discipline.

The natural resources and environmental science option broadens students' perspectives through course offerings and interaction with students and faculty from many disciplines. The option prepares students to apply broadly-based knowledge to the use, management, sustainability, and quality of soil, air, water, mineral, biological, and energy resources.

The NRS option includes entry requirements; at least five block courses selected from natural science, applied science, and social science/humanities offerings; and an interdisciplinary capstone course. Interested students should contact Steve J. Thien, acting director, 317B Throckmorton Hall, 532-7207.

## Dual Degree Programs

Students who want to pursue interdisciplinary interests in depth may wish to enroll in a dual degree program. In general, the second degree may be earned with an additional year of study. A minimum of 150 semester hours is required for two B.S. degrees. To receive two bachelor of science degrees from the College of Engineering, a student must take at least 20 hours of course work in each major department. Since there are many possible combinations, questions should be referred to the dean's office. Five programs of interest are listed below:

**Engineering and business administration**

Ordinarily the program must have begun during the student's sophomore year. Students desiring to pursue this dual degree program should contact the dean's office in the College of Business Administration.

**Agricultural engineering and feed science and management**

A five-year dual degree program leading to a bachelor of science degree in agricultural engineering and a bachelor of science degree in feed science and management requires 159 credit hours, including the general option requirements for agricultural engineering and 37 hours of courses listed below:

GRSC 100	Principles of Milling	3
GRSC 110	Flow Sheets	2
STAT 318	Elements of Statistics	3
ASI 318	Fundamentals of Nutrition	3
GRSC 510	Feed Technology I	4
GRSC 750	Feed Technology II	4
BIOCH 120	Introduction to Organic and Biochemistry	5
GRSC 650	Concepts of Milling Design	3
GRSC 661	Qualities of Feed and Food Ingredients	3
GRSC 651	Feed Plant Sanitation	4
GRSC 785	Advanced Flour and Feed Technology	3
		<u>37</u>

Eleven of the 37 hours are used to satisfy the technical elective requirement in the general option.

**Civil engineering and geology**

Students interested in specializing in foundation engineering are advised to complete the B.S. degree requirements in civil engineering plus the requirements listed below to qualify for the B.S. degree in geology:

General requirements for a B.S. degree in arts and sciences (see the College of Arts and Sciences section).

Complete the following courses in geology:

GEOL 300	Historical Geology	4
GEOL 502	Mineralogy	3
GEOL 503	Petrology	3
GEOL 520	Geomorphology	2
GEOL 530	Structural Geology	3
GEOL 630	Stratigraphic-Sedimentation	4
GEOL 680	Field Geology	6
Geology elective		<u>5</u>
		<u>30</u>

**Chemistry and chemical engineering**

In addition to the required courses in chemical engineering, interested students should take:

CHM 551	Advanced Chemistry Lab	2
CHM 697	Structure and Bonding	2
CHM 545	Chemical Separations	2
CHM 666	Instrumental Analysis	3
CHM 599	Undergraduate Research	3
MLANG 121	German I	4
MLANG 122	German II	4
CHM 667	Instrumental Analysis Lab	1
		<u>21</u>

Electives should be chosen to satisfy the humanities and social sciences requirements and the engineering science requirements listed earlier in the College of Engineering section.

### **Architecture and architectural engineering**

Students enrolled in the Department of Architectural Engineering and Construction Science can undertake a dual major with the curriculum of architecture. Interested students should consult with their advisors.

## **Program Options**

### **Integrated master's degree program**

A five-year integrated program leading to a B.S. degree in any engineering field at the end of four years and a master of science degree at the end of five years is available for promising undergraduate students. In architectural engineering, the comparable numbers are five and six years.

Students who have completed the sophomore year and have outstanding scholastic records are invited to join the program. Each student, in consultation with a faculty advisor, will plan an individualized program of study that meets requirements for the B.S. and M.S. degrees. Features of the program include integrated planning, participation in research as an undergraduate, and enrollment in graduate-level courses in the senior year. Students participating in the program will be considered for financial assistance in the form of scholarships, fellowships, research assistantships, and part-time work.

### **Engineering honors program**

The honors program in the College of Engineering offers interested students intellectual challenges consistent with their abilities and interests. Entering engineering freshmen with high school averages or American College Testing Program composite scores within the top five percent will be invited to join the program. Transfer students with superior academic records also are eligible and will be invited to join the honors program. Sophomores and other upperclassmen enrolled in engineering who have not previously qualified for the honors program may, with the endorsement of a member of the engineering faculty and the approval of the engineering college honors committee, join the program.

Participation in the honors program will not alter the time required for graduation for most students and should be a stimulating experience. In addition to enrolling in honors sections in course work, students may enroll in a variety of seminars, colloquia, and research problems designed to enrich and challenge them. The honors program in engineering is closely integrated with the honors programs of the other colleges and provides an excellent opportu-

nity for interdisciplinary study. Students in the honors program may elect to withdraw from the program at any time.

### **Cooperative education program**

The College of Engineering, through its cooperative education program, offers students in engineering an opportunity to obtain experience in industry as an integral part of their formal education. After completion of the freshman year, engineering students alternate sessions of work and study taking three years (five work periods) to complete the sophomore and junior academic program. In this tandem arrangement, one student is a full-time employee in industry, while the other studies in a chosen professional engineering field.

While the program extends the time required to earn a degree by one year, the student may obtain as much as 20 months of experience and earn a significant portion of college expenses. Participants are selected from students who are progressing satisfactorily toward a degree and have completed at least one semester in the chosen curriculum. Applications for the program are accepted any time after the student is enrolled in the College of Engineering and final selection is made through formal employment interviews with the participating companies.

## **Support Services**

### **Center for Effective Teaching**

The Center for Effective Teaching is organized to further the college's goal of excellence in teaching. The center sponsors several programs to enhance teaching, including specialized training for young engineering educators, seminars in educational methods and techniques for all engineering faculty, student evaluation of undergraduate teaching, and monetary awards for excellence in teaching. The center is funded by private endowment and also helps in the financing of specialized teaching aids, teaching reference materials, and educational research.

The center's activities are coordinated by an advisory committee of students and faculty from the College of Engineering.

### **Engineering Experiment Station**

Gale G. Simons, Associate Dean for Research and Director

The College of Engineering is committed to the concept that good teaching and good research complement each other to the benefit of the student, the public, and the faculty member. The experiment station is

the division of the college responsible for the administration of research.

The research faculty of the experiment station is composed of members of all departments of the college. Researchers from the Engineering Experiment Station work closely with those from the Agricultural Experiment Station and with others from within the university on projects of mutual concern.

The activities of the Engineering Experiment Station are funded by state appropriations and by grants and contracts from governmental agencies and private industries. The annual research budget is more than \$8 million. Research now being carried on includes: hydrogen fuel research, solar energy applications, wind energy studies, fermentation systems, fluidized bed technology, signal processing, gasification of biomass, transportation, buckling behavior of concrete shells, image enhancement, bioengineering, optimizing for comfort and energy use, human physiological responses to thermal stresses, manufacturing, energy conservation, heat transfer augmentation during two-phase flow, effects of room and control systems dynamics on energy consumption, combustion kinetics, radiation dosimetry, robotics, hazardous substances, lighting, artificial intelligence, water resources and quality, and electrical power.

### **Institute for Environmental Research**

Byron W. Jones, Director

Elizabeth A. McCullough, Associate Director

The Institute for Environmental Research serves as a focal point for interdisciplinary research on thermal environmental engineering and the thermal interaction between people and their thermal environment.

The institute is administered by the College of Engineering and research is administered through the Engineering Experiment Station. It works in cooperation with academic departments from throughout the university. Faculty and students from these departments participate in the institute's research programs, use the facilities for their own research, and utilize the facilities for specialized graduate courses and seminars. Research funding is primarily from contracts with private companies and government agencies.

Research facilities are available for controlling and measuring thermal environmental parameters over a range of conditions, for measuring thermal characteristics of clothing, and for measuring human physiological variables.

Major facilities include: environmental chambers ranging in size from 40 to 280 square feet and with operating temperatures ranging from -30 to 150 degrees F.; thermal manikins for measuring clothing insulation; hot plates for measuring the thermal resistance of fabric or insulation systems; and an infrared thermal imaging system for measuring human body, clothing, or building surface temperature profiles.

### **Center for Hazardous Substance Research**

Larry E. Erickson, Director  
Stanley C. Grant, Associate Director

The Center for Hazardous Substance Research is the regional headquarters for the Environmental Protection Agency's Great Plains and Rocky Mountain Hazardous Substance Research Center. The center provides a focal point for research and research communication. Specific goals and objectives are to: (1) provide leadership and foster the conduct of hazardous substance research, (2) have a point of contact for industrial and governmental officials with hazardous waste research concerns, (3) develop a professional staff of faculty members who can conduct contract and grant research for industry and government, (4) maintain safe and proper environment for the conduct of hazardous and toxic substance research, (5) furnish well-equipped laboratories for hazardous substance research, (6) generate opportunities for research training of students in the area of hazardous substance research, and (7) enhance the climate for economic development in Kansas for the waste processing industry.

### **Institute for Systems Design and Optimization**

L. T. Fan, Director

The Institute for Systems Design and Optimization promotes interdisciplinary research, teaching, and communications in systems engineering.

The institute is administered through the College of Engineering and the Engineering Experiment Station and provides channels of communication between disciplines throughout the university in engineering systems design.

Specific objectives of the institute include interdisciplinary research; systems seminars and conferences; preparation of research proposals; and providing assistance in recruiting of graduate students, post-doctoral students, and faculty.

### **Center for Energy Studies**

N. Dean Eckhoff, Director

The center conducts interdisciplinary studies and provides leadership training in the planning, design, and operation of fuel production processes, power generation, and transportation and utilization systems, and in policy matters involving the management of energy resources.

The center carries out basic as well as mission-oriented studies on problems related to energy resources and power production, disseminates the results of these studies through seminars and publication of reports, and provides information to students and personnel from government and industry to upgrade their professional competence.

### **Center of Excellence, Advanced Manufacturing Institute**

Farhad Azadivar, Director

The Advanced Manufacturing Institute assists in Kansas economic development through research, technology transfer, and technical assistance. AMI supports interdisciplinary research in advanced manufacturing technologies by faculty from the College of Engineering and other K-State colleges. Emphasis is on computer-integrated and intelligent manufacturing systems, intelligent processing of engineered materials, computer vision, and image processing.

AMI supports cooperative research with industry to develop and transfer new technology from the laboratory to commercial producers. The institute also assists Kansas companies in expanding services, designing new products, and increasing productivity. A major component of AMI is the Integrated Design, Manufacture, and Assembly Lab.

### **Office of Radiation Protection Research and Information**

Gale G. Simons, Director

The Office of Radiation Protection Research promotes and advances the progress of radiation-protection engineering. Major areas of emphasis encompass both basic and applied research as well as public information.

To meet the general criteria for selection as a research project, the scope of investigation must feature at least one of the following topics and must address issues of public health and welfare or economic impact: (1) radioactive materials that occur naturally in our environment, (2) radionuclides produced artificially, and (3) machines and instruments that either produce radionuclides or emit radiation during their operation.

### **Center for Transportation Research and Training**

Eugene R. Russell, Sr., Director

The center conducts interdisciplinary research and training in the planning, design, and operation of rural and urban transportation systems.

The center carries out mission-oriented research concerning national, regional, state, and local transportation problems; disseminates the results of research through publication of reports and seminars for university, industry, and government representatives to assure that the results can and will be applied to the solution of practical transportation problems; and provides training to students and personnel from the transportation community to upgrade their professional competence.

In performing the stated missions of the center, systems analysis and synthesis techniques will be emphasized, and the safety, aesthetic, and environmental aspects of transportation systems will not be neglected.

### **Institute for Computational Research in Engineering**

H. S. Walker, Co-Director

R. G. Akin, Co-Director

The institute promotes engineering research, development, and service for computer-oriented activities. The interdisciplinary aspects of these activities are stressed with emphasis upon simulation by computer modeling.

The institute is administered through the College of Engineering and provides a university-wide center for information concerning computational engineering. Other functions of the institute include the preparation of research proposals; the dissemination of information through conferences, workshops, and reports; and the encouragement of creative uses of computers.

### **Nuclear Reactor Facility**

Richard E. Faw, Director

K-State has a TRIGA Mark II pulsing nuclear reactor and a well-equipped neutron activation analysis laboratory within its Department of Nuclear Engineering. The reactor, which is licensed for steady-state operation to 250 kilowatts and pulsed operation to 250 megawatts, is used for teaching and research by many departments. The reactor is used in part for radiation effects studies and for neutron activation analysis, an analytical technique that is essentially nondestructive and offers sensitivities better than one part per billion for some elements. Neutron activation analysis finds application in diverse fields

such as diagnostic medicine, plant improvement studies, nutrition studies, age dating of geological specimens, forensics, toxicology, and metabolic studies.

### Kansas Industrial Extension Service

Richard B. Hayter, Director

The Kansas Industrial Extension Service uses the facilities of the College of Engineering to assist Kansas industries. Functions of the KIES include direct technical assistance, preparation and distribution of special publications, and continuing education. Farrell Library, Linda Hall Library in Kansas City, various computer information retrieval systems, and other informational sources can be used. The laboratory and computer facilities and the faculty of the college can also be used to provide answers to technical questions.

Short courses, conferences, seminars, and workshops are arranged to provide continuing education for technical people, including practicing engineering and manufacturing personnel. Specialized courses can be developed in response to a request by any Kansas industry.

### Kansas Energy Extension Service

Richard B. Hayter, Director

The Kansas Energy Extension Service is a technical assistance program for small energy consumers ranging from residential to small business and industry. KEES is a program of the Kansas Energy Office operated through Kansas State University with assistance from the other Regents institutions. It is a joint effort of the College of Engineering and the Cooperative Extension Service.

The technical outreach of the KEES is directed toward four program areas: residential, agricultural, institutional, and small business and industry. Assistance is offered through short courses, technical publications, and direct responses to inquiries including on-site visits. Recommendations for reducing energy consumption and assistance with alternate energy systems are offered.

### College of Engineering Research Council

Donald E. Rathbone, Governor  
Gale G. Simons, Director

The College of Engineering Research Council is a quasiprivate organization developed under the KSU Research Foundation. The council serves mainly College of Engineering researchers.

It is an organization, essentially parallel to the Engineering Experiment Station, which handles proposals or projects that have

an industrial involvement. Many of the proposals or projects are interdisciplinary, conducted either within the college or between the college and other colleges and departments at K-State.

Certain elasticities have been built into the organization to better handle industrial contracts. These tractable areas include flexibility in contract negotiations (patents, proprietary information, etc.), and simplified procurement procedures.

## General Engineering

Donald E. Rathbone, Dean

### Undergraduate credit

**DEN 120. Minority Engineering Enrichment Seminar.** (3) I. Introduction to the academic and intellectual demands of an engineering curriculum from a multicultural perspective. Develop group cohesiveness and an attitude of mutual support by engaging in collaborative learning. Help students acquire effective study methods, analyze/compare learning/teaching styles, prepare for and improve examination performance, promote optimum utilization of campus resources, develop leadership and communication skills and enhanced self-esteem. Credit may not be applied towards an engineering degree.

**DEN 160. Engineering Concepts.** (2) I, II. An introduction to engineering and engineering design. Problems involving the basic concepts of engineering science are considered. Two class periods a week. Pr.: Two high school units of algebra, one high school unit of geometry, and one-half high school unit of trigonometry.

**DEN 200. Kansas State Engineer Journalism.** (1-2) I, II. Editorial and business staff work on the *Kansas State Engineer*. Pr.: Junior classification and consent of dean.

**DEN 201. Amateur Radio Theory I.** (1) I. Theory and practice of amateur ("ham") radio operation. Basics of radio electronics, antennas, FCC regulations, Morse code; successful completion of the course should ensure passing the FCC Novice class examination. Credit may not be applied toward an engineering degree. One hour rec. and one hour Morse code lab a week.

**DEN 202. Amateur Radio Theory II.** (1) II. Theory and practice of amateur ("ham") radio operation. More basics of radio electronics, antennas, FCC regulations, Morse code; successful completion of the course should ensure passing the FCC General class examination. Credit may not be applied toward an engineering degree. One hour rec. and one hour Morse code lab a week. Pr.: DEN 201 or FCC Novice class license.

**DEN 299. Honors Seminar in Engineering.** (1) I, II. Selected topics of general interest. May be taken twice for credit by engineering honor students starting in the second semester of the freshmen year.

**DEN 380. Principles of Solar Energy Conversion and Utilization.** (3) I. Solar radiation; solar collectors; engineering principles of solar house space heating, cooling, and water heating; conversion of solar energy into mechanical power and electricity; solar engines; application of solar energy in industrial processes; calculations of efficiency of solar energy conversion processes; cost analysis of various solar applications. Three hours rec. a week. Pr.: PHYS 113.

**DEN 399. Honors Colloquium in Engineering.** (1) II. Selected topics of general interest. Open to students in the engineering honors program for one semester.

**DEN 400. Career Management for Engineers.** (1) I, II. A seminar course which considers the basic factors in professional career management; career paths and strategies; important factors for success. One hour rec. a week. Pr.: Junior or senior standing in the College of Engineering.

**DEN 420. Introduction to Alternative Energy Sources.** (3) II. Introduction to solar, geothermal, wind, tidal, thermal sea gradients, breeder reactor, and fusion energy sources. Concepts, devices, potential, economics, and status of each energy source. Introduction to the all-electric economy. Three hours rec. a week. Open to all nonengineering and first- and second-year engineering students.

**DEN 425. Introduction to Energy and Environmental Technology.** (2) I, II. An introductory course for nonengineering students. An introduction to the technology employed in analyzing energy and pollution control processes. The course emphasizes energy problems, control of water and air pollution, food and land use problems, and material recycling concepts. Not open to engineering students. Two hours lec. a week.

**DEN 450. Impact of Technology on Society.** (3) I, II. A study of social, economic, and environmental problems as a function of technology. Study of effect of various significant technological developments on present society and parallels with present developments. Study of current problems, detection of causes, and analysis of solutions. Implications for the future; governmental, industrial, and individual responsibility in detection of potential problems and methods of control or solution. Three hours rec. a week. Sophomore standing or above.

**DEN 499. Honors Research in Engineering.** (1) I, II. Individual research problem selected with approval of faculty advisor. Open to seniors in the engineering honors program for two semesters. Written report is presented at end of second semester.

**DEN 550. Engineering Law.** (3) I, II. An introduction to concepts of law pertinent to engineering practice. These include contracts, torts, products liability, business associations, engineering licensing, real and personal property law, commercial law, and taxes. Three hours rec. a week. Pr.: Junior standing.

**DEN 582. Natural Resources/Environmental Sciences Project (NRES).** (3) I, II. A comprehensive project in NRES. Requires integration of information and understanding acquired in NRES secondary major courses. Students must prepare and present written and oral reports. Three hours rec. a week. Pr.: ENGL 415, SPCH 105. Pr. or conc.: 15 hours of approved courses in NRES secondary major. Cross listed with DAS 582 and GENAG 582.

**DEN 740. Applied Linear Analysis.** (3) I. The application of linear analysis to engineering problems, including derivations of equations, exact and approximate solutions of systems representable by matrix algebraic, differential, and integral equations. Concepts of characteristic, impedance, transfer, and influence functions. Three hours rec. a week. Pr.: MATH 240.

## Agricultural Engineering

Stanley J. Clark, Head

Professors Chung,\* Clark,\* Kuhlman,\* Mangels,\* Murphy, Powell, Schrock,\* Spillman,\* and Steichen;\* Associate Professors Baugher, Black, Harner,\* Heber,\* Rogers, Slocombe,\* TenEyck, and Thierstein; Assistant Professors Barnes, Flores,\* Huang,\* Taylor, and Zhang;\* Adjunct Professor Steele;\* Adjunct

Associate Professors Chang\* and Hagen;\* Adjunct Assistant Professors Martin and Wagner;\* Emeriti: Professors Fairbanks, Holmes, Jepsen, Larson, and Wendling; Associate Professors Schindler and Stevenson.

Agricultural engineering is the field that applies engineering science and technology, as well as biological sciences, to food and fiber production, processing, and distribution systems. Agricultural engineers provide an essential link between agriculture, which is largely biological, and engineering, which uses physical science to solve practical problems. Engineering fundamentals are applied to achieve the goal of a safe and stable food supply while considering human and environmental factors. Agricultural engineers develop new practices and processes for the production of grains, forages, and animals and their conversion into food and other products for use by man. Two curriculum options are available.

### General option with area of specialization

The general curriculum outlined for agricultural engineering provides the basic requirements for the option. The 15 hours of technical electives allow students to specialize in the technical areas of agricultural engineering. These areas are power and machinery, grain handling and processing, soil and water, and structures and environment. Students can acquire an environmental specialization by selecting appropriate technical and social science electives. Students are not required to choose a specialization to complete the general option. Lists of approved technical electives for each specialty are available from the agricultural engineering office.

### Food engineering option

Students pursuing the food engineering option can fulfill the requirements for a B.S. in agricultural engineering by following the food engineering option outline. Inherent in this program is the basic background of agricultural engineering with emphasis in food preparation, processing, and storage.

### Agricultural technology management

Description and curriculum outline are listed in the College of Agriculture section of this catalog.

### Curriculum in agricultural engineering (AGE)

Bachelor of science in agricultural engineering  
135 hours required for graduation  
Accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology

### General option

#### Freshman

##### Fall semester

ENGL 100	Expository Writing	3
CHM 210	Chemistry I	4
MATH 220	Analytic Geometry and Calculus I	4
AGE 200	Agricultural Engineering Analysis I	1
SPCH 105	Public Speaking IA	2
AGE 020	Agricultural Engineering Assembly	0
	Humanities or social science electives	3
		<b>17</b>

##### Spring semester

ENGL 120	Expository Writing II* or	3
	Elective	3
MATH 221	Analytic Geometry and Calculus II	4
ECON 110	Principles of Macroeconomics	3
CHM 230	Chemistry II	4
AGE 220	Agricultural Engineering Analysis II	1
ME 212	Engineering Graphics I	2
AGE 020	Agricultural Engineering Assembly	0
		<b>17</b>

#### Sophomore

##### Fall Semester

MATH 222	Analytic Geometry and Calculus III	4
PHYS 213	Engineering Physics I	5
BIOL 198	Principles of Biology	4
KIN 101	Principles of Physical Fitness	1
AGE 020	Agricultural Engineering Assembly	0
	Humanities or social science electives	3
		<b>17</b>

##### Spring semester

MATH 240	Elementary Differential Equations	4
PHYS 214	Engineering Physics II	5
AGE 500	Properties of Biological Materials	2
AGE 320	Agricultural Engineering Analysis III	1
CE 333	Statics	3
AGE 020	Agricultural Engineering Assembly	0
		<b>15</b>

#### Junior

##### Fall semester

AGE 510	Environmental Design of Agricultural Buildings	3
ME 513	Thermodynamics I	3
ME 512	Dynamics	3
CE 533	Mechanics of Materials	3
CE 534	Mechanics of Materials Lab	1
AGRON 305	Soils	4
AGE 020	Agricultural Engineering Assembly	0
		<b>17</b>

##### Spring semester

AGE 512	Functional Analysis of Agricultural Machinery	3
AGE 566	Design of Agricultural Structures	3
AGE 520	Energy Use and Control in Agricultural Systems	3
AGE 551	Hydrology	2
ME 571	Fluid Mechanics	3
ENGL 415	Written Communications for Engineers	3
AGE 020	Agricultural Engineering Assembly	0
		<b>17</b>

#### Senior

##### Fall semester

AGE 536	Agricultural Engineering Design I	3
AGE 575	Fundamentals of Agricultural Process Engineering	3
EECE 510	Circuit Theory I	3
	Humanities or social science electives	3
	Technical electives	6
AGE 020	Agricultural Engineering Assembly	0
		<b>18</b>

##### Spring semester

AGE 530	Soil and Water Engineering	3
AGE 581	Professional Practice in Agricultural Engineering	1
	Humanities or social science electives	4
	Technical electives	9
AGE 020	Agricultural Engineering Assembly	0
		<b>17</b>

\*Expository Writing II is optional if prerequisites for Written Communication for Engineers (ENGL 415) are met from Expository Writing I. Elective is restricted to technical elective, humanities or social science elective, or ROTC.

Humanities and social science electives are to be selected from the approved list and need not be taken in the order listed in the curriculum (two courses must be 400 level or above).

Technical electives are to be chosen with the advice and approval of the faculty advisor and department head.

The engineering science requirements will be satisfied by the required courses in this curriculum.

### Food engineering option

#### Freshman

##### Fall semester

ENGL 100	Expository Writing I	3
CHM 210	Chemistry I	4
MATH 220	Analytic Geometry and Calculus I	4
AGE 200	Agricultural Engineering Analysis I	1
SPCH 105	Public Speaking IA	2
	Humanities or social science elective	3
AGE 020	Agricultural Engineering Assembly	0
		<b>17</b>

##### Spring semester

ENGL 120	Expository Writing II* or	3
	Elective	3
CHM 230	Chemistry II	4
MATH 221	Analytic Geometry and Calculus II	4
ECON 110	Principles of Macroeconomics	3
AGE 220	Agricultural Engineering Analysis II	1
KIN 101	Principles of Physical Fitness	1
AGE 020	Agricultural Engineering Assembly	0
		<b>16</b>

#### Sophomore

##### Fall semester

MATH 222	Analytic Geometry and Calculus III	4
PHYS 213	Engineering Physics I	5
BIOL 198	Principles of Biology	4
CHM 350	General Organic Chemistry	3
AGE 020	Agricultural Engineering Assembly	0
		<b>16</b>

##### Spring semester

MATH 240	Elementary Differential Equations	4
PHYS 214	Engineering Physics II	5
CE 530	Statics and Dynamics	4

CHE 314	Introduction to Process Analysis . . .	3
AGE 320	Agricultural Engineering Analysis III . . . . .	1
AGE 020	Agricultural Engineering Assembly . . . . .	0
		17

**Junior****Fall semester**

CHE 520	Chemical Engineering Thermodynamics I . . . . .	2
BIOL 455	General Microbiology . . . . .	4
CHM 585	Physical Chemistry I . . . . .	3
BIOCH 521	General Biochemistry . . . . .	3
AGE 575	Fundamentals of Agricultural Process Engineering . . . . .	3
Technical elective . . . . .		1
AGE 020	Agricultural Engineering Assembly . . . . .	0
		16

**Spring semester**

CHE 521	Chemical Engineering Thermodynamics II . . . . .	3
ME 571	Fluid Mechanics . . . . .	3
AGE 512	Functional Analysis of Agricultural Machinery . . . . .	3
AGE 500	Properties of Biological Materials . .	2
AGE 625	Thermal Processing Operations in Food Engineering . . . . .	2
ASI 411	Introduction to Food Chemistry . . . .	3
AGE 630	Food Process Engineering Lab . . . . .	1
AGE 020	Agricultural Engineering Assembly . . . . .	0
		17

**Senior****Fall semester**

EECE 510	Circuit Theory I . . . . .	3
ENGL 415	Written Communication for Engineers . . . . .	3
CHE 550	Chemical Reaction Engineering . . . .	3
AGE 510	Environmental Design of Agricultural Buildings . . . . .	3
AGE 536	Agricultural Engineering Design I . . . . .	3
Humanities or social science electives . . . . .		3
AGE 020	Agricultural Engineering Assembly . . . . .	0
		18

**Spring semester**

AGE 520	Energy Use and Control in Agricultural Systems . . . . .	3
AGE 635	Food Plant Design . . . . .	3
AGE 581	Professional Practice . . . . .	1
CHE 626	Bioseparation . . . . .	2
Design technical elective . . . . .		2
Humanities or social science elective . . . . .		7
AGE 020	Agricultural Engineering Assembly . . . . .	0
		18

\*Expository Writing II is optional if prerequisites for Written Communication for Engineers (ENGL 415) are met from Expository Writing I. Elective is restricted to technical elective, humanities or social science elective, or ROTC.

Humanities and social science electives are to be selected from the approved list and need not be taken in the order listed in the curriculum (two courses must be 400 level or above).

Technical electives are to be chosen with the advice and approval of the faculty advisor and department head.

The engineering science requirements will be satisfied by the required courses in this curriculum.

**Agricultural engineering courses**

**AGE 020. Agricultural Engineering Assembly.** (0) I, II. Presentation of professional problems and practices by students, faculty, and professionals associated with

the career of agricultural engineering. One hour lec. a month.

**Undergraduate credit**

**AGE 200. Agricultural Engineering Analysis I.** (1) I. Engineering approach to problem solving, computer use in agricultural engineering, solving and plotting calculus problems on the computer, differential leveling, and topographic mapping. Three hours lab a week. Pr. or conc.: MATH 220.

**AGE 220. Agricultural Engineering Analysis II.** (1) II. Mathematical modeling for engineering analysis; concepts of systems, control space, and computer applications in agricultural engineering. Three hours lab a week. Pr.: AGE 200. Pr. or conc.: MATH 221.

**AGE 320. Agricultural Engineering Analysis III.** (1) II. Solving and plotting solutions of differential equations with agricultural engineering applications. Introduction to computer-aided graphics and design. Three hours lab a week. Pr.: AGE 220. Pr. or conc.: MATH 240.

**AGE 499. Honors Research in Agricultural Engineering.** (Var.) I, II. Individual research problem selected with approval of faculty advisor. Open to students in the College of Engineering honors program. A report is presented orally and in writing during the last semester.

**Undergraduate and graduate credit in minor field**

**AGE 500. Properties of Biological Materials.** (2) II. Characterization of biological material properties that affect the design and analysis of material handling equipment and processes. Physical, electrical, thermal, mechanical, aerodynamic, hygroscopic, and rheological properties of grain and other agricultural products will be examined. One hour rec. and three hours lab a week. Pr.: PHYS 213.

**AGE 510. Environmental Design of Agricultural Buildings.** (3) I. Theory and application of psychometrics, air dilution, and heat and mass transfer; study of animal's interaction with its environment; computer-aided design and analysis of environmental control systems for plants and animals. Two hours rec. and three hours lab a week. Pr.: AGE 320 or IE 372. Pr. or conc.: ME 513.

**AGE 512. Functional Analysis of Agricultural Machinery.** (3) II. Kinematics, power transmission, and basic hydraulics as applied to tillage, planting, and harvest machinery. Two hours rec. and three hours lab a week. Pr.: ME 512.

**AGE 520. Energy Use and Control in Agricultural Systems.** (3) II. Energy and material balances, process analysis and efficiency, fuel properties, electric motor and engine performance measurement, alternative energy sources, and energy system analysis. Two hours rec. and three hours lab a week. Pr. or conc.: ME 513.

**AGE 530. Soil and Water Engineering.** (3) II. Principles and measures for controlling storm water runoff and soil erosion; design of water handling structures for land drainage, flood protection, and irrigation; agricultural surveying. Two hours rec. and three hours lab a week. Pr.: AGE 551, AGRON 305; Pr. or conc.: ME 571.

**AGE 536. Agricultural Engineering Design I.** (3) I. Analysis and design of agricultural machines and equipment. Two hours rec. and three hours lab a week. Pr.: AGE 512. Pr. or conc.: CE 533.

**AGE 551. Hydrology.** (2) I, II. A study of the sources of supply and movement of underground and surface waters. Two hours rec. a week. Pr.: PHYS 113 or 213. Same as CE 551.

**AGE 566. Design of Agricultural Structures.** (3) II. Application of statics and strength of materials to the design and analysis of light-frame structures of wood, steel, and concrete; estimation of wind, snow, grain, and soil loads; stress analysis of beams, columns, frames, trusses, and foundations. Three hours rec. a week. Pr.: CE 533.

**AGE 575. Fundamentals of Agricultural Process Engineering.** (3) I. Application of basic science and engineering fundamentals for the analysis and design of agricultural processes. Two hours rec. and three hours lab a week. Pr. or conc.: CHE 314 or ME 571.

**AGE 581. Professional Practice in Agricultural Engineering.** (1) II. Professional attitudes and ethics. Postdegree career planning and social responsibilities. One hour rec. a week. Pr.: Senior standing.

**Undergraduate and graduate credit**

**AGE 620. Problems in Agricultural Engineering.** (Var.) I, II, S. Problems in the design, construction, or application of machinery or power in agriculture, structures, modern conveniences, and rural electrification. Pr.: Approval of instructor.

**AGE 625. Thermal Processing Operations in Food Engineering.** (2) II, in odd years. Analysis of thermal processing operations such as dehydration, drying, evaporation, canning, freezing, and freeze drying. Two hours rec. a week. Pr.: CHE 531 or AGE 575.

**AGE 630. Food Process Engineering Laboratory.** (I) II, in odd years. Laboratory studies of food processing unit operations and applications with emphasis on heat and mass transfer operations. Three hours lab a week. Pr.: AGE 575 or CHE 531. Pr. or conc.: AGE 625.

**AGE 635. Food Plant Design.** (3) II. Synthesis and design of different food processing plants such as cereal, dairy, fruit, and vegetable. Two hours rec. and three hours lab a week. Pr. or conc.: AGE 625.

**AGE 636. Agricultural Engineering Design II.** (Var.) II. Fabrication, evaluation, and refinement of a prototype machine or device designed in AGE 536. Pr.: AGE 536.

**AGE 640. Design of Control Systems for Agricultural Machines and Processes.** (3) II. Fundamentals of control engineering with primary emphasis on automatic controls for agricultural machinery and processes. Control system analysis and design. Computer-based applications. Two hours of rec. and three hours lab a week. Pr.: EECE 510 or 519 and MATH 240.

**AGE 700. Agricultural Process Engineering.** (3) II. Theory, equipment, and design techniques in processing agricultural products. Two hours rec. and three hours lab a week. Pr.: AGE 575.

**AGE 705. Irrigation and Drainage.** (3) II. Design and operative problems involved in irrigation or drainage of agricultural land. Two hours rec. and three hours lab a week. Pr.: AGE 551 and AGRON 305. Pr. or conc.: ME 571.

**AGE 710. Advanced Farm Power and Machinery.** (3) I. Analytical study of design, construction, and operating characteristics of tractors and selected farm machines. Two hours rec. and three hours lab a week. Pr.: AGE 536.

**AGE 780. Measurement Systems.** (3) II. Theory and application of measurement systems with emphasis on environments and processes related to soils, plants, and animals. Two hours rec. and three hours lab a week. Pr.: EECE 510 or 519.

## Architectural Engineering/ Construction Science

Charles L. Burton, Head

Professors Bissey,\* Burton,\* and Jones;\* Associate Professors Goddard, Knostmen,\* and Hayter;\* Assistant Professors Goodman and Waters; Instructors Bell, Bluhm,

Imel, Moser, Riblett, and Schlagek; Emeriti: Professors Dahl, Hodges, Lindley, Mingle, and Thorson; Associate Professor Blackman.

### Construction science and management

See the description following the architectural engineering curriculum.

### Architectural engineering

The architectural engineering program is planned for students who are particularly interested in the engineering aspects of building design. Architectural engineers must be sympathetic with the practical, functional, and aesthetic possibilities of contemporary materials, and with mechanical, electrical, and structural systems. As important members of building design teams, they must be able to create designs that will answer the economic, safety, and aesthetic requirements of a project. They must have a feeling of the total design.

### Curriculum in architectural engineering (ARE)

Bachelor of science in architectural engineering

162 hours required for graduation

Accredited by the Engineering Accreditation

Commission of the Accreditation Board for Engineering and Technology

#### Freshman

##### Fall semester

ENVD 205	Graphics I	2
ENGL 100	Expository Writing I	3
MATH 220	Analytic Geometry and Calculus I	4
CHM 210	Chemistry I	4
CNS 200	History of Building and Construction	3
KIN 101	Principles of Physical Fitness	1
ARE 020	Architectural Engineering Seminar	0
		<b>17</b>

##### Spring semester

ENVD 206	Graphics II	2
CNS 320	Construction Materials	2
MATH 221	Analytic Geometry and Calculus II	4
CHM 230	Chemistry II	4
ENGL 120	Expository Writing II* or	
	Humanities or social science electives	3
NE 385	Engineering Computational Techniques	2
ARE 020	Architectural Engineering Seminar	0
		<b>17</b>

#### Sophomore

##### Fall semester

ART 190	Drawing I	2
CNS 321	Construction Techniques and Detailing	3
PHYS 213	Engineering Physics I	5
MATH 222	Analytic Geometry and Calculus III	4
SPCH 105	Public Speaking I	2
ARE 020	Architectural Engineering Seminar	0
		<b>16</b>

##### Spring semester

CNS 325	Construction Drawing	3
CE 333	Statics	3
PHYS 214	Engineering Physics II	5

MATH 240	Elementary Differential Equations	4
ARE 310	Computer Applications in Architectural Engineering	1
ARE 020	Architectural Engineering Seminar	0
		<b>16</b>

#### Junior

##### Fall semester

ME 512	Dynamics	3
CE 533	Mechanics of Materials	3
CE 534	Mechanics of Materials Lab	1
ECON 110	Principles of Macroeconomics	3
ENGL 415	Written Communications for Engineers	3
ARE 532	Lighting Systems Design	2
ARE 020	Architectural Engineering Seminar	0
		<b>15</b>

##### Spring semester

ARE 537	Acoustic Systems	2
ART 100	Design I	2
CE 537	Introduction to Structural Analysis	4
ARE 534	Thermal Systems	3
CE 212	Elementary Surveying Engineering	3
GEOL 100	Introduction to Geology	3
ARE 020	Architectural Engineering Seminar	0
		<b>17</b>

#### Senior

##### Fall semester

ARE 411	Architectural Engineering Design I	3
ME 513	Thermodynamics	3
EECE 519	Electric Circuits and Control	4
ARE 524	Theory of Structures II	3
	Complementary elective	3
ARE 020	Architectural Engineering Seminar	0
		<b>16</b>

##### Spring semester

ARE 523	Timber Structures	2
ARE 412	Architectural Engineering Design II	3
ARE 528	Theory of Structures III	3
ARE 533	Building Electrical Systems	3
ME 571	Fluid Mechanics	3
	Humanities or social science elective	3
ARE 020	Architectural Engineering Seminar	0
		<b>17</b>

#### Fifth year

##### Fall semester

	Free elective	3
ARE 536	Sanitation Systems	3
CE 522	Soil Mechanics I	3
ARE 540	Building Mechanical Systems	3
	Complementary elective	5
ARE 020	Architectural Engineering Seminar	0
		<b>17</b>

##### Spring semester

ARE 595	Senior Project	5
ARE 539	Architectural Engineering Management	3
	Complementary elective	3
	Humanities or social science elective	3
ARE 020	Architectural Engineering Seminar	0
		<b>14</b>

\*Expository Writing II is optional if prerequisites for Written Communication for Engineers (ENGL 415) are met from Expository Writing I.

Humanities and social science electives are to be selected from the approved list and need not be taken in the

order listed in the curriculum (two courses must be 400 level or above).

Electives are to be selected and approved after consultation with the student's faculty advisor.

Computer Applications in Architectural Engineering (ARE 310) is to be taken by the fourth semester.

### Construction science and management

The construction science and management program prepares students to be professional constructors, managers of personnel resources, financial resources, materials, and machines. The curriculum is an engineering-based management program designed to produce technically competent managers of construction. Entering students should have a background in mathematics and physics.

The program prepares graduates to execute the designs created by engineers and architects. Graduates may enter fields of general, heavy and highway, utility, mechanical, or electrical construction. Their education provides the fundamental engineering and management skills necessary for success in any of the above areas.

Constructors work in many settings. For example, as a principal in a small construction firm, a constructor may engage in many of the activities in management, whereas a constructor in a large firm may concentrate exclusively on only one or two of the activities. Most students in the program intend to enter building, heavy/highway, or utility construction fields. Other roles, such as construction education, will normally require an advanced degree and/or professional experience.

Through construction education, students attain a level of construction knowledge that would otherwise require decades of practical experience to develop. With this level of knowledge, graduates typically move rapidly into upper management positions in construction organizations.

### Curriculum in construction science and management (CNS)

Bachelor of science in construction science and management

133 hours required for graduation

Accredited by the American Council for Construction Education

#### Freshman

##### Fall semester

CNS 200	History of Building and Construction	3
ENGL 100	Expository Writing	3
MATH 220	Analytic Geometry and Calculus I	4
ENVD 205	Graphics I	2
SPCH 105	Public Speaking IA	2
KIN 101	Principles of Physical Fitness	1
CNS 016	Construction Seminar	0
		<b>15</b>

##### Spring semester

CE 212	Elementary Surveying Engineering	3
ENVD 206	Graphics II	2

ENGL 120	Expository Writing II*	3
or		
Humanities or social science elective		3
NE 385	Engineering Computational Techniques	2
PHYS 113	General Physics I	4
CNS 320	Construction Materials	2
CNS 016	Construction Seminar	0
		16

**Sophomore****Fall semester**

CNS 321	Construction Techniques and Detailing	3
CE 231	Statics A	3
CNS 250	Site Construction	3
GEOL 100	Introductory Geology	3
ECON 110	Principles of Macroeconomics	3
CNS 016	Construction Seminar	0
		15

**Spring semester**

CNS 310	Computer Applications in Construction Science	1
CNS 325	Construction Drawing	3
CE 331	Strength of Materials	3
CE 332	Strength of Materials Lab	1
PHYS 114	General Physics II	4
ACCTG 231	Accounting for Business Operations	3
Humanities or social science electives		3
CNS 016	Construction Seminar	0
		18

**Junior****Fall semester**

ARE 522	Theory of Structures I	3
ARE 537	Acoustic Systems	2
CNS 535	Electrical Service and Installation	3
CNS 540	Construction Methods and Equipment	3
Humanities or social science elective		3
Management elective		3
CNS 016	Construction Seminar	0
		17

**Spring semester**

CNS 523	Timber Construction	2
CNS 534	Heating and Air Conditioning	3
CNS 536	Water Supply and Sanitation	3
ENGL 415	Written Communication for Engineers	3
MANGT 390	Business Law I	3
Management elective		3
CNS 016	Construction Seminar	0
		17

**Senior****Fall semester**

CNS 524	Steel Construction	3
CNS 541	Construction Estimating	3
CNS 542	Construction Management I	3
Management or professional elective		3
Management or professional elective		3
Humanities or social science electives		3
CNS 016	Construction Seminar	0
		18

**Spring semester**

CNS 528	Concrete and Masonry Construction	3
CNS 543	Construction Management II	3
CE 322	Soil and Foundation Construction	3
Professional electives		5
Free electives		3
CNS 016	Construction Seminar	0
		17

\*Expository Writing II is optional if prerequisites for Written Communication for Engineers (ENGL 415) are met from Expository Writing I.

Humanities and social science electives are to be selected from the approved list and need not be taken in the

order listed in the curriculum (two courses must be 400 level or above).

Management and professional electives are to be selected from approved list.

Technical Calculus I and II may be taken in lieu of Analytic Geometry and Calculus I and free elective.

Computer Applications in Construction Science (CNS 310) must be taken by the end of the fourth semester.

**Architectural engineering courses**

**ARE 020. Architectural Engineering Seminar.** (0) I, II. Presentation of professional problems and practices by students, faculty, and professionals associated with the career of architectural engineering. One hour lec. a month.

**Undergraduate credit**

**ARE 100. Architectural Engineering Orientation.** (2) II. Introduction to architectural engineering; emphasis on relationship of architectural engineering to the building industry. Two hours lec. a week.

**ARE 310. Computer Applications in Architectural Engineering.** (1) I, II. Applications of computer techniques to the solution of problems in architectural engineering. One hour rec. and one hour lab a week. Pr.: MATH 220 and NE 385.

**ARE 411. Architectural Engineering Design I.** (3) I. Principles and elements of design; synthesis of structural, mechanical, electrical, sanitary, and construction systems, considering interrelationship in performance and economics. Nine hours lab a week. Pr.: ART 100, 190, CNS 325.

**ARE 412. Architectural Engineering Design II.** (3) II. Continuation of Architectural Design I. Nine hours lab a week. Pr.: ARE 411.

**ARE 499. Honors Research in Architectural Engineering.** (Var.) I, II. Individual research problem selected with approval of faculty advisor. Open to students in the College of Engineering honors program. A report is presented orally and in writing during the last semester.

**Undergraduate and graduate credit in minor field**

**ARE 522. Theory of Structures I.** (3) I, II. Bar stresses in trusses; solid and framed arches; mathematical and graphical solution of stresses and deflections in beams under static and moving loads. Six hours a week. Pr.: CE 331.

**ARE 523. Timber Structures.** (2) I, II. Analysis and design of timber structures using solid and laminated materials. Two hours rec. a week. Pr.: CE 537.

**ARE 524. Theory of Structures II.** (3) I. Analysis and design of metal structures; emphasis on buildings. Two hours rec. and three hours lab a week. Pr.: CE 537.

**ARE 528. Theory of Structures III.** (3) II. Design of reinforced concrete building frames; footings, columns, and floor systems, attention being given to costs and economical design. Two hours rec. and three hours lab a week. Pr.: CE 537.

**ARE 532. Lighting Systems Design.** (2) I. Study of human needs in lighting, lighting sources, lighting systems design and application. Two hours rec. a week. Pr.: PHYS 114 or 214.

**ARE 533. Building Electrical Systems.** (3) II. Study of basic design of building electrical systems including circuit design, power distribution and service equipment, communications systems, and special electrical systems. Three hours rec. a week. Pr.: EECE 519.

**ARE 534. Thermal Systems.** (3) I, II. Study of man's physiological needs, principles of heat transfer, principles of building thermal balance, comfort systems, and

space-use relationships involving heating, ventilating, and cooling as integral parts of architectural engineering design. Three hours a week. Pr.: PHYS 214 and CNS 321.

**ARE 535. Lighting Systems.** (3) I, II. Design of building electrical systems including basic lighting, circuit design, and distribution with emphasis on the National Electrical Code. Three hours rec. a week. Pr.: CNS 321. Pr. or conc.: EECE 519.

**ARE 536. Sanitation Systems.** (3) I, II. Stream and water pollution, sewage disposal systems, building piping systems, space relationships, equipment requirements as related to architectural design, structural systems, construction materials, and techniques. Three hours a week. Pr.: PHYS 213 and CNS 321.

**ARE 537. Acoustic Systems.** (2) I, II. Hearing and the ear, sound generation, acoustical correction, noise reduction, and sound transmission all as integral parts of architectural design. Two hours a week. Pr.: PHYS 113 or 213.

**ARE 539. Architectural Engineering Management.** (3) I, II. General business and management procedures. Drawings, specifications, and conceptual estimating. Contracts, bonds, liability, arbitration, and insurance. Project financing. Pr.: ARE 412.

**ARE 540. Building Mechanical Systems.** (3) II. Study of heat gain using computers, pump laws, fan laws, various types of HVAC air systems, chilled water systems, heat pump systems, refrigeration, introduction to mechanical system controls. Pr.: ARE 534 or CNS 534. Three hours rec. a week.

**ARE 595. Senior Project.** (5) I, II. Student working individually with laboratory support will prepare and present a project of appropriate scope and complexity with emphasis on structural, mechanical, acoustical, and electrical requirements. Fifteen hours lab a week. Pr.: ARE 412, 523, 524, 528, 534, 535, 536, and 537.

**ARE 596. Senior Project II.** (2) II. Continuation of ARE 595. Pr.: ARE 595.

**Undergraduate and graduate credit**

**ARE 620. Problems in Architectural Engineering.** (Var.) I, II, S. A study of specific design problems under the direct supervision of a member of the architectural engineering faculty. Pr.: Approval of the department head.

**ARE 634. Building Thermal System Design.** (3) I, II. Design and specifications of selected thermal and mechanical systems for structures. The course uses all the modern techniques of thermal/mechanical system design for buildings. Two hours rec. and three hours lab a week. Pr.: ARE 534 or CNS 534.

**ARE 635. Electrical System Design.** (3) I, II. Complete design and specifications of electrical systems for a selected structure. The course uses the National Electrical Code in conjunction with all the modern techniques of electrical system design for buildings. Two hours rec. and three hours lab a week. Pr.: ARE 535 or CNS 535.

**ARE 724. Advanced Sanitation Systems.** (3) I. Water quality and treatment, pressure control, and hydraulics in domestic water and waste systems. Three hours rec. a week. Pr.: ARE 536 or CNS 536.

**ARE 731. Advanced Lighting Design.** (3) I. Design of all types of building lighting including exterior and site lighting. Calculations and layout utilizing zonal cavity, point by point, and computer-assisted lighting calculations methods. Three hours rec. a week. Pr.: ARE 635.

**ARE 740. Environmental Control Systems in Buildings.** (3) II. Electric, electronic, and pneumatic control systems to optimize energy usage and environmental comfort in buildings. Three hours rec. a week. Pr.: ARE 634 and 635.

**ARE 742. Communications and Energy Management Systems Design.** (3) II. Detailed design and analysis of special electrical systems for buildings including, but not limited to, energy management, fire alarm, and communication systems. Three hours rec. a week. Pr.: ARE 635.

**ARE 780. Theory of Structures IV.** (3) II. Continuation of Theory I, II, and III, with special emphasis on the complete problem of the structure as a whole. Three hours a week. Pr.: CE 537 or ARE 522 and 523, 524, and 528.

## Construction science and management courses

### Undergraduate credit

**CNS 016. Construction Seminar.** (0) I, II. Presentation of professional problems and practices by students, faculty, contractors, architects, and various organizations associated with the building industry. One hour lec. a month.

**CNS 200. History of Building and Construction.** (3) I, II. An introduction to the art and science of building. Historical review from ancient to contemporary including related construction methods, equipment, and systems.

**CNS 210. Introduction to Construction Programming.** (3) I, II. Application of digital computer techniques to the solution of elementary problems in construction science and architecture. Pr.: MATH 150. Four hours a week.

**CNS 250. Site Construction.** (3) I, II. Study of site construction problems and procedures, site survey and investigations, review of site plans, construction layouts, earthwork calculations; computer applications. Pr.: ENVD 206, NE 385, CE 212. Four hours a week.

**CNS 310. Computer Applications in Construction Science.** (1) I, II. Applications of computer techniques to the solution of problems in construction science. One hour rec. and one hour lab a week. Pr.: MATH 211 or 220 and NE 385.

**CNS 320. Construction Materials.** (2) I, II. Study and analysis of construction materials, their properties, selection, and use. Two hours rec. a week. Pr.: ENVD 205.

**CNS 321. Construction Techniques and Detailing.** (3) I, II. Study of construction methods and procedures in the assembly of building materials. Nine hours lab a week. Pr.: ENVD 206, CNS 320.

**CNS 325. Construction Drawings.** (3) I, II. Production of a set of construction drawings. Emphasis on construction procedures. Introduction to shop drawings. Nine hours lab a week. Pr.: CNS 321.

**CNS 499. Honors Research in Construction Science.** (Var.) I, II. Individual research problem selected with approval of faculty advisor. Open to students in the College of Engineering honors program. A report is presented orally and in writing during the last semester.

### Undergraduate and graduate credit in minor field

**CNS 523. Timber Construction.** (2) I, II. Principles of design, fabrication, and erection of timber structures including both solid and laminated materials. Two hours rec. a week. Pr.: ARE 522.

**CNS 524. Steel Construction.** (3) I, II. Principles of design, fabrication, and erection of structural steel in conformance with codes. Two hours lec. and three hours lab a week. Pr.: ARE 522.

**CNS 528. Concrete and Masonry Construction.** (3) I, II. Principles of design, fabrication, and erection of concrete and masonry structures. Two hours lec. and three hours lab a week. Pr.: ARE 522.

**CNS 534. Heating and Air Conditioning.** (3) I, II. Principles of designing, applying, installing, and estimating heating and air conditioning systems for

buildings. Three hours rec. a week. Pr.: PHYS 113 and CNS 321.

**CNS 535. Electrical Service and Installation.** (3) I, II. Basic design and construction of building electrical, lighting, and distribution systems with emphasis on the National Electrical Code and installation. Three hours rec. a week. Pr.: PHYS 114 and CNS 321.

**CNS 536. Water Supply and Sanitation.** (3) I, II. Principles and practices of sanitation and water supply in buildings including code requirements and estimating. Pr.: PHYS 113 and CNS 321.

**CNS 540. Construction Methods and Equipment.** (3) I, II. Practical problems encountered in the erection of buildings and use of construction equipment. Pr.: CNS 250 and 321.

**CNS 541. Construction Estimating.** (3) I, II. Principles, theories, and methods of building estimating. Nine hours lab a week. Pr.: CNS 325 and 540.

**CNS 542. Construction Management I.** (3) I, II. General business and management procedures of construction contracting; human relations and communications. Pr.: CNS 540.

**CNS 543. Construction Management II.** (3) I, II. Construction safety; project planning and scheduling techniques. Computer applications. Pr.: NE 385, CNS 541, and 542.

**CNS 544. Problems in Construction Science.** (Var.) I, II, S. A study of specific design problems under the direct supervision of a member of the construction science faculty. Pr.: Junior standing.

**CNS 545. Construction Problems.** (2) I. Analysis of form-work design for standard and unusual wall and floor shapes. Analysis of temporary construction structures. Study of concrete placement techniques, construction failures, advanced construction techniques, time-motion studies, and equipment management. Pr.: CNS 540, 523, 325. Pr. or conc.: CNS 524.

**CNS 638. Mechanical and Electrical Estimating.** (2) I, II. Techniques of mechanical and electrical building systems estimating. Procedures for evaluating relative costs of different systems. Two three-hour labs a week. Pr.: ARE 534 and 535 or CNS 534 and 535.

## Chemical Engineering

L. T. Fan,\* Head

Professors Akins,\* Erickson,\* Fan,\* Glasgow,\* Kyle,\* Matthews,\* and Walawender;\* Associate Professor Schlup;\* Assistant Professor Edgar; Adjunct Assistant Professor Huang;\* Emeriti: Professors Bates and Honstead.

Chemical engineers contribute to society through the useful application of knowledge and understanding of chemistry, physics, and mathematics. Chemical engineers can expect to participate in many decisions crucial to the preservation and improvement of society, especially in energy and food production, resource management, and the specification and design of pollution control processes.

The chemical engineering curriculum is best suited to highly motivated students with strong abilities in chemistry, physics, and mathematics. The first two years are

devoted to a study of the pure sciences and essential communication skills. In the last two years emphasis is placed upon the application of these sciences through the study of transport processes, separation techniques, thermodynamics, reaction engineering, process dynamics, and systems design.

### Dual degree program

The Department of Chemical Engineering offers a five-year dual degree program in chemistry/chemical engineering. The program may be pursued entirely at K-State, requiring a minimum of 150 credit hours, or a portion of the requirements may be completed at other colleges. In particular, a formal cooperative program exists between K-State and Pittsburg State University in which students spend the first three years at PSU and the last two at K-State. Graduates of this program are especially well suited for work in chemical industries or for graduate study in either field. Other dual degree programs also are available.

### Chemical engineering options

While students must satisfy the engineering science requirements in selecting technical electives, they are encouraged to do so with their career goals in mind. If a student wishes to emphasize a particular area, such as biochemical, food, computer and systems, materials, energy, or environmental engineering, lists of recommended technical electives are available in the department office. The Secondary Majors section of this catalog describes opportunities for chemical engineering students interested in business administration, pre-medicine, pre-law, mathematics, physics, and chemistry. Students should consult with their academic advisor in selecting their technical electives.

### Curriculum in chemical engineering (CHE)

Bachelor of science in chemical engineering  
134 hours required for graduation  
Accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology

#### Freshman

Fall semester	
ENGL 100	Expository Writing I* . . . . . 3
CHM 210	Chemistry I . . . . . 4
MATH 220	Analytic Geometry and Calculus I . . . . . 4
ECON 110	Principles of Macroeconomics I . . . . . 3
SPCH 105	Public Speaking IA . . . . . 2
KIN 101	Principles of Physical Fitness . . . . . 1
CHE 015	Engineering Assembly . . . . . 0
	<b>17</b>

#### Spring semester

ENGL 120	Expository Writing II* . . . . . 3
	<b>or</b>
Elective . . . . .	3
CHM 230	Chemistry II . . . . . 4
CHM 271	Chemical Analysis . . . . . 4

MATH 221	Analytic Geometry and Calculus II	4
Elective		3
CHE 015	Engineering Assembly	0
		<b>18</b>

**Sophomore****Fall semester**

MATH 222	Analytic Geometry and Calculus III	4
PHYS 213	Engineering Physics I	5
CHM 531	Organic Chemistry I	3
CHE 316	Chemical Engineering Computational Techniques I	1
Elective		3
CHE 015	Engineering Assembly	0
		<b>16</b>

**Spring semester**

MATH 240	Elementary Differential Equations	4
PHYS 214	Engineering Physics II	5
CHM 550	Organic Chemistry II	3
CHE 314	Introduction to Process Analysis	3
CHM 532	Organic Chemistry Lab	2
CHE 015	Engineering Assembly	0
		<b>17</b>

**Junior****Fall semester**

CHM 585	Physical Chemistry I	3
CHM 586	Physical Chemistry I Lab	2
CHE 520	Chemical Engineering Thermodynamics I	2
CHE 530	Transport Phenomena I	3
Elective		6
CHE 015	Engineering Assembly	0
		<b>16</b>

**Spring semester**

CHM 595	Physical Chemistry II	3
ENGL 415	Written Communication for Engineers*	3
CHE 522	Chemical Engineering Lab I	2
CHE 521	Chemical Engineering Thermodynamics II	3
CHE 531	Transport Phenomena II	3
Elective		3
CHE 015	Engineering Assembly	0
		<b>17</b>

**Senior****Fall semester**

CHE 516	Chemical Engineering Computational Techniques II	1
CHE 532	Chemical Engineering Lab II	2
CHE 560	Separational Process Design	3
CHE 550	Chemical Reaction Engineering	3
CHE 570	Chemical Engineering Systems Design I	2
Elective		6
CHE 015	Engineering Assembly	0
		<b>17</b>

**Spring semester**

CHE 542	Chemical Engineering Lab III	3
CHE 561	Chemical Process Dynamics and Control	3
CHE 571	Chemical Engineering Systems Design II	4
Elective		6
CHE 015	Engineering Assembly	0
		<b>16</b>

\*Expository Writing II is optional if prerequisites for Written Communication for Engineers (ENGL 415) are met from Expository Writing I.

Thirty hours of electives are required and they are to be selected in consultation with the student's advisor. Fifteen of these hours are to be selected from the approved list of humanities and social sciences (two courses must be 400 level or above). Nine hours must satisfy the engineering science requirements, and the remaining six hours are selected to enhance the

student's professional development. All electives must have the approval of the department head and technical electives must meet the engineering science requirements.

**Chemical engineering courses**

**CHE 015. Engineering Assembly.** (0) I, II.

**Undergraduate credit**

**CHE 314. Introduction to Process Analysis.** (3) I, II, S. An introduction to the basic concepts of chemical engineering. Three hours rec. a week. Pr. or conc.: MATH 240 and CHE 316.

**CHE 316. Chemical Engineering Computational Techniques I.** (1) I, II, S. Introduction to the application of digital computers to chemical engineering problems. Three hours lab a week. Pr. or conc.: MATH 221.

**CHE 350. Engineering Materials.** (2) I, II. Structures of metals, ceramics, glasses, polymers, semiconductors, and composites. Mechanical, electrical, and magnetic properties. Multiphase equilibrium and modification of properties through changes in microstructure. Two hours rec. a week. Pr.: CHM 230. Pr. or conc.: PHYS 213.

**CHE 352. Engineering Materials I.** (3) I, II. Structure of metals, ceramics, glasses, polymers, semiconductors, and composites. Mechanical, electrical, and magnetic properties. Multiphase equilibrium and modification of properties through change in microstructure. Two hours rec. a week and three hours lab a week. Pr.: CHM 230. Pr. or conc.: PHYS 213.

**CHE 356. Corrosion.** (1) I, II. An introductory survey of corrosion mechanisms and prevention. Emphasis is on the corrosion of metals. One hour rec. a week. Pr.: CHE 350 or 352.

**CHE 499. Honors Research in Chemical Engineering.** (Var.) I, II. Individual research problem selected with approval of faculty advisor. Open to students in the College of Engineering honors program. A report is presented orally and in writing during the last semester.

**Undergraduate and graduate credit in minor field**

**CHE 516. Chemical Engineering Computational Techniques II.** (1) I. Application of digital computers to chemical engineering problems. Three hours of lab a week. Pr.: CHE 316 or conc.: CHE 550 and 560.

**CHE 520. Ch.E. Thermodynamics I.** (2) I. A study of the first and second laws of thermodynamics, real gases, heat of solution and reaction. Two hours rec. a week. Pr. or conc.: CHE 314 and CHM 585.

**CHE 521. Ch.E. Thermodynamics II.** (3) II. A continuation of the study of the second law, thermodynamic analysis of processes, phase equilibrium, chemical reaction equilibrium. Three hours rec. a week. Pr.: CHE 520.

**CHE 522. Chemical Engineering Laboratory I.** (2) II. Laboratory experiments on momentum and heat transfer. Five hours lab a week. Pr.: CHE 520 and 530.

**CHE 530. Transport Phenomena I.** (3) I. A unified treatment of the basic principles of momentum, energy, and mass transport. Three hours rec. a week. Pr. or conc.: CHE 314.

**CHE 531. Transport Phenomena II.** (3) II. Continuation of Transport Phenomena I with special emphasis on mass transfer. Three hours rec. a week. Pr.: CHE 530.

**CHE 532. Chemical Engineering Laboratory II.** (2) I. Laboratory experiments on heat and mass transfer. Five hours lab a week. Pr.: CHE 521 and 531.

**CHE 542. Chemical Engineering Laboratory III.** (3) II. Laboratory experiments on classical unit operations, e.g., distillation, absorption, extraction, and on chemical kinetics and process dynamics. Eight hours lab a week. Pr.: CHE 550, 560, and 561.

**CHE 550. Chemical Reaction Engineering.** (3) I. Applied chemical kinetics and catalysis including the analysis and design of tubular, packed bed, stirred tank, and fluidized bed chemical reactors. Three hours rec. a week. Pr.: CHE 521 and 531. Conc.: CHE 516.

**CHE 560. Separational Process Design.** (3) I. Development of the basic theory and design of separational processes such as distillation, gas absorption, liquid extraction, adsorption, and ion exchange. Three hours rec. a week. Pr.: CHE 521 and 531. Conc.: CHE 516.

**CHE 561. Chemical Process Dynamics and Control.** (3) II. A study of the unsteady state behavior and control of chemical processes. Three hours rec. a week. Pr.: CHE 550.

**CHE 570. Chemical Engineering Systems Design I.** (2) I. Basic concepts of process economics with application to the design of chemical processes. Two hours rec. a week. Pr. or conc.: CHE 550 and 560.

**CHE 571. Chemical Engineering Systems Design II.** (4) II. Basic concepts of process optimization with application to the synthesis and design of chemical processing systems. Emphasis will be on the solution of comprehensive systems design problems. Two hours rec. and six hours lab a week. Pr.: CHE 550, 560, 561, and 570.

**CHE 580. Problems in Chemical Engineering or Materials Science.** (Var.) I, II, S. An introduction to chemical engineering research. Pr.: Approval of department head.

**Undergraduate and graduate credit**

**CHE 626. Bioseparations.** (2) II, in even years. Study of separations important in food and biochemical engineering such as leaching, extraction, expression, absorption, ion exchange, filtration, centrifugation, membrane separation, and chromatographic separations. Two hours rec. a week. Pr.: CHE 531 or AGE 575.

**CHE 648. Processing of Composite Materials.** (3) I, II. Principles of composite materials, including ceramic, metal, and polymer matrix composites; properties and processing of fibers; role of interfaces in composites; basic concepts in mechanics, failure, and testing of composite materials. Three hours lec. a week. Pr.: CHE 350 or 352.

**CHE 650. Hazardous Waste Engineering Seminar.** (1) I, II, S. Topics in hazardous materials management and control, waste reduction and minimization, hazardous substance tracking, and hazardous waste engineering. One hour rec. a week. Pr.: CHM 230.

**CHE 653. Ceramic Materials.** (3) I, II. Structure and bonding in glasses and ceramics; phase equilibria and transformation kinetics; defects and microstructure within ceramic materials; mechanical, thermal, optical, electrical, and magnetic properties of ceramics and glasses. Three hours rec. a week. Pr.: CHE 350 or 352.

**CHE 661. Processing of Materials for Solid State Devices.** (3) I, II. Structure, properties, and processing of materials for solid state devices. Crystal growth, epitaxy, oxidation, diffusion, lithography, and etching as applied to device fabrication. Three hours rec. a week. Pr.: CHE 350 or 352.

**CHE 664. Electrochemical Engineering.** (3) I, II. Thermodynamics, electrode kinetics, and transport phenomena of electrochemical systems. Three hours rec. a week. Pr.: CHE 521 and 531.

**CHE 681. Engineering Materials II.** (3) I, II, S. The structure and bonding in crystalline and amorphous materials; crystallography; thermodynamic stability in materials; equilibrium diagrams and the phase rule; rate theory and kinetics of solid-state transformations; mechanical behavior of engineering materials; dislocations; failure mechanisms. Three hours lec. a week. Pr.: CHE 350 or 352.

**CHE 682. Surface Phenomena.** (2) I, II, S. Principles and applications of interfacial phenomena, including

capillarity, colloids, porosity, adsorption, and catalysis. Two hours rec. a week. Pr.: CHE 520.

**CHE 715. Biochemical Engineering.** (3) I. The analysis and design of biochemical processing systems with emphasis on fermentation kinetics, continuous fermentations, aeration, agitation, scale up, sterilization, and control. Three hours rec. a week. Pr. or conc.: CHE 550.

**CHE 725. Biotransport Phenomena.** (3) I, II. Principles of transport phenomena applied to biological and physiological processes. Membrane transport processes, circulatory system transport phenomena, transport and distribution of drugs. Pr.: CHE 530.

**CHE 735. Chemical Engineering Analysis I.** (3) I, II, S. The mathematical formulation of problems in chemical engineering using partial differential equations, vector and tensor notation. Solution of these problems by graphical, numerical, and transform methods. Three hours rec. a week. Pr.: CHE 530.

**CHE 745. Analysis of Physiological Processes.** (3) II. Principles of process and systems analysis applied to problems in biology and medicine. Analysis of mixing in-flow systems, principles and applications of tracer analysis, analysis of kinetic and adsorption processes. Pr.: CHE 550.

## Civil Engineering

Stuart E. Swartz, Head

Professors Cooper,\* Hu,\* Koelliker,\* Mathews,\* Russell,\* Snell,\* and Swartz;\* Associate Professor Stokes;\* Assistant Professors Banks, Hossian,\* Melhem,\* Reddi,\* and Tracy;\* Emeriti: Professors McCormick, Morse, Smith, and Williams.

Civil engineering is the engineering of constructed facilities and systems. Because civil engineering is broad in scope, many civil engineers develop specialties within the broad field. The civil engineering department offers two options within the B.S. in civil engineering degree.

### General option

The general option allows the student to pursue a B.S. in civil engineering degree in a broader general program or, if a specific career objective has been identified, to concentrate on one or more areas within the general option. The following areas of concentration are available:

**Water resources**—design and construction of reservoirs, canal systems, and dams for flood control, irrigation, power, and water supply.

**Geotechnical**—foundations for structures, earth embankments, retaining walls and bulkheads, and pavements for highways and airports.

**Environmental**—protection of public health and environmental quality through planning and designing facilities for water treatment and distribution; wastewater, solid and hazardous wastes collection, treatment, and disposal; and air pollution control.

**Transportation**—planning, design, and construction of highways, railways, airports, and urban mass transit systems.

**Structures**—design and construction of a variety of buildings and bridges, as well as the structural framing of aircraft, ships, and space vehicles.

### Construction engineering option

This option allows students to obtain a B.S. in civil engineering while preparing more specifically for employment in the construction industry.

Students choosing the construction engineering option can fulfill the requirements for a B.S. in civil engineering by following the course curriculum listed for civil engineering as well as the following selection of option electives:

DEN 450	Engineering Law	3
CE 641	Civil Engineering Materials	3
	Construction option elective	1-4
CE 680	Economics of Design and Construction	3
ACCTG 231	Accounting for Business Operations	3
ACCTG 241	Accounting for Investing and Financing	3

### Curriculum in civil engineering (CE)

Bachelor of science in civil engineering  
134 hours required for graduation  
Accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology

#### Freshman

<b>Fall semester</b>		
MATH 220	Analytic Geometry and Calculus I	4
CHM 210	Chemistry I	4
ENGL 100	Expository Writing I*	3
ECON 110	Principles of Macroeconomics I	3
ME 212	Engineering Graphics I	2
KIN 101	Principles of Physical Fitness	1
		<b>17</b>

#### Spring semester

MATH 221	Analytic Geometry and Calculus II	4
CHM 230	Chemistry II	4
ENGL 120	Expository Writing II*	3
	<b>or</b>	
Option elective		3
NE 385	Engineering Computational Techniques	2
GEOL 100	Introductory Geology	3
CE 015	Engineering Assembly	0
		<b>16</b>

#### Sophomore

<b>Fall semester</b>		
MATH 222	Analytic Geometry and Calculus III	4
PHYS 213	Engineering Physics I	5
Option elective		3
SPCH 105	Public Speaking IA	2
CE 212	Elementary Surveying Engineering	3
CE 015	Engineering Assembly	0
		<b>17</b>

#### Spring semester

MATH 240	Elementary Differential Equations	4
PHYS 214	Engineering Physics II	5
CE 333	Statics	3
Option elective		4

CE 380	Computer Applications in Civil Engineering	1
CE 015	Engineering Assembly	0
		<b>17</b>

#### Junior

<b>Fall semester</b>		
CE 411	Route Location and Design	4
ME 512	Dynamics	3
ME 513	Thermodynamics I	3
CE 551	Hydrology	2
CE 553	Hydrologic Methods Lab	1
CE 533	Mechanics of Materials	3
CE 534	Mechanics of Materials Lab	1
CE 015	Engineering Assembly	0
		<b>17</b>

#### Spring semester

CE 537	Introduction to Structural Analysis	4
ME 571	Fluid Mechanics	3
CE 522	Soil Mechanics I	3
CE 563	Environmental Engineering Fundamentals	3
ENGL 415	Written Communication for Engineers*	3
CE 015	Engineering Assembly	0
		<b>16</b>

#### Senior

<b>Fall semester</b>		
CE 015	Engineering Assembly	0
Option elective		6
Civil engineering electives		6
Humanities or social science electives		6
		<b>18</b>

#### Spring semester

CE 015	Engineering Assembly	0
CE 585	Civil Engineering Project	3
Civil engineering elective		3
Humanities or social science electives		7
Option elective		3
		<b>16</b>

\*Expository Writing II is optional if prerequisites for Written Communication for Engineers (ENGL 415) are met from Expository Writing I.

Humanities and social science electives are to be selected from the approved list and need not be taken in the order listed in the curriculum (two courses must be 400 level or above).

Option electives are to be selected in consultation with the student's faculty advisor to satisfy the requirements of the concentration the student has chosen. One course from either the engineering materials or circuits, fields, and electronics engineering science group is required.

Civil engineering electives are to be selected from the list approved by the department.

### Civil engineering courses

**CE 015. Engineering Assembly.** (0) I, II.

### Undergraduate credit

**CE 212. Elementary Surveying Engineering.** (3) I, II. Coordinates, directions, distances, and elevation. Traverses. Boundary surveys. Leveling. National rectangular coordinate systems. Property descriptions: public land subdivision and metes and bounds. Topographic surveys. Surveying, planning, and estimating. One hour lec. and six hours lab a week. Pr.: MATH 150.

**CE 231. Statics A.** (3) I, II. Composition and resolution of forces; equilibrium of force systems; application of the principles of statics to problems, including force analyses of simple structures. Centroids; moments of inertia. Three hours rec. a week. Pr.: PHYS 113 and MATH 220 or conc.: MATH 211.

**CE 322. Soil and Foundation Construction.** (3) II. The origin, distribution, and predictable variation of soil; soil testing and mechanics as applied to practical problems; soil investigations; foundation types, application and construction; ground water, drainage, and dewatering; earth moving including stable cuts in embankments. Not open to engineering students. Two hours rec. and three hours lab a week. Pr. or conc.: GEOL 100.

**CE 331. Strength of Materials A.** (3) I, II. Behavior of materials subjected to tension, compression, shear, and bending; design of beams and columns. Three hours rec. a week. Pr.: CE 231.

**CE 332. Strength of Materials A Laboratory.** (1) I, II. Tests to determine the physical properties of various structural materials. Analysis and interpretation of test data. Three hours lab a week. Pr.: ENGL 120 or 100 with grade of A or B, and one course in graphics. Pr. or conc.: CE 331.

**CE 333. Statics.** (3) I, II, S. Composition and resolution of forces; equilibrium of force systems; application of general laws of statics to engineering problems, including use of vector algebra, friction and force analyses of simple structures, cables, and machine elements; center of gravity; moments of inertia. Three hours rec. a week. Pr.: MATH 221 and PHYS 213.

**CE 380. Computer Applications in Civil Engineering.** (1) I, II. Application of computer techniques to problems in civil engineering, including programming and software packages. One hour rec. and two hours lab a week. Pr.: MATH 221 and NE 385.

**CE 411. Route Location and Design.** (4) I, II. Transportation systems; highway location and the geometric design of streets and highways considering the driver-vehicle-roadway system characteristics; curves and earthwork; surveying pertaining to the alignment of highways and railways. Two hours rec. and six hours lab a week. Pr.: CE 212, MATH 221, and PHYS 213.

**CE 499. Honors Research in Civil Engineering.** (Var.) I, II. Individual research problem selected with approval of faculty advisor. Open to students in the College of Engineering honors program. A report is presented orally and in writing during the last semester.

## Undergraduate and graduate credit in minor field

**CE 522. Soil Mechanics I.** (3) I, II. Identification, classification, and engineering properties of soils; theory and application of consolidation, compressibility, and strength of soils; ground water retention and movement; slope stability and lateral earth pressures; stress distribution in soil. Two hours rec. and three hours lab a week. Pr.: CE 533.

**CE 528. Foundation Engineering.** (3) I. Prediction of soil variation; soil investigations; stress distribution and bearing capacity; dewatering analysis and procedures; retaining structures and lateral earth pressures; shallow foundations, pile foundations; underpinning and grouting. Two hours rec. and three hours lab a week. Pr.: CE 522. Pr. or conc.: CE 544.

**CE 530. Statics and Dynamics.** (4) I, II. A shortened combined course in (1) statics, including a study of force systems, free-body diagrams, and problems in equilibrium, friction, centroids, and moments of inertia; and (2) dynamics, including a study of the kinematics and kinetics of particles and rigid bodies using the methods of force-mass acceleration, work-energy, and impulse-momentum. Four hours rec. a week. Pr.: MATH 222 and PHYS 213.

**CE 533. Mechanics of Materials.** (3) I, II. Elementary theories of stress and strain, behavior of materials, and applications of these theories and their generalizations to the study of stress distribution, deformation, and instability in the simple structural forms which occur most frequently in engineering practice. Three hours rec. a week. Pr.: CE 333 or 530. Pr. or conc.: MATH 222.

**CE 534. Mechanics of Materials Laboratory.** (1) I, II. Determination of selected mechanical properties of several engineering materials, including iron-carbon alloys, aluminum alloys, concrete, wood, and plastics; relationship between structure and mechanical properties of these materials; elementary problems in experimental stress analysis and structural behavior; test procedures, instrumentation, and interpretation of results. One hour lab instruction and two hours lab a week. Pr. or conc.: CE 533.

**CE 537. Introduction to Structural Analysis.** (4) I, II. Elastic analysis of determinate and indeterminate beams, frames, and trusses; construction of shear and moment diagrams and influence lines; calculation of deflections using conjugate beam and virtual work; solution of indeterminate structures by consistent deformation, slope-deflection, moment distribution, and matrix stiffness method; with microcomputer applications. Four hours rec. a week. Pr.: CE 533. Pr. or conc.: CE 380.

**CE 542. Structural Engineering in Steel.** (3) II. Introduction to design of steel structures. Theoretical, experimental, and practical bases for proportioning members and their connections. Two hours rec. and three hours lab a week. Pr.: CE 537.

**CE 544. Structural Engineering in Concrete.** (3) I. A study of the theories of reinforced concrete and of its characteristics as a construction material; design of reinforced concrete structures. Two hours rec. and three hours lab a week. Pr.: CE 537.

**CE 551. Hydrology.** (2) I, II. A study of the sources of supply and movement of underground and surface waters. Two hours rec. a week. Pr.: PHYS 113 or 213. Cross-listed with AE 551.

**CE 552. Hydraulic Engineering.** (3) II. Applications of the principles of fluid mechanics to control and use of water; reservoir, dam, and spillway design; enclosed conduit and open-channel design; hydraulic machinery and hydro-power development; principles of fluid measurement; laboratory-flow and velocity metering, hydraulic models, pipe losses, open-channel flow. Two hours rec. and three hours lab a week. Pr.: ME 571. Pr. or conc.: CE 551.

**CE 553. Hydrologic Methods Laboratory.** (1) I, II. Application of hydrologic methods in design; precipitation data analysis; evapotranspiration; streamgauging; hydrograph generation and flood routing; rainfall and flood frequency analysis; design of multipurpose reservoirs; ground water flow analysis and water well design. Three hours lab a week. Pr. or conc.: CE 551 and NE 385.

**CE 563. Environmental Engineering Fundamentals.** (3) I, II. Basic physical, chemical, and biological concepts and their applications to the protection of the environment with emphasis on techniques used in water and wastewater treatment. Two hours rec. and three hours lab a week. Pr.: CHM 230 and MATH 222.

**CE 565. Water and Wastewater Engineering.** (3) II. Design of water supply and waste treatment control facilities, including collection, storage, treatment, and distribution systems. Two hours rec. and three hours lab a week. Pr.: CE 563, PHYS 214, ME 571.

**CE 570. Transportation Planning.** (3) Intersession. Fundamentals of transportation planning. Historical development and current status of techniques used in travel demand forecasting; trip generation, trip distribution, mode choice, and traffic assignment. Current microcomputer models and applications. Pr.: CE 380 or equivalent and junior standing.

**CE 572. Highway Engineering and Management.** (3) I. Applications of the principles of highway planning, design, and capacity analysis techniques to analyze, design, and maintain street and highway systems. Assessment of the impact of activity center development or redevelopment on the surrounding surface transportation system. Two hours rec. and three hours lab a week. Pr.: CE 411 and 522.

**CE 585. Civil Engineering Project.** (1-3) I, II. A comprehensive civil engineering project. Requires integration of skills acquired in civil engineering elective courses. Students must prepare and present written and oral design reports. One hour rec. and two three-hour labs a week. Pr.: ENGL 415 and 6 hours of CE electives. Pr. or conc.: Six additional credit hours of CE electives.

## Undergraduate and graduate credit

**CE 641. Civil Engineering Materials.** (3) I. Properties and behavior of structural metals, timber, portland cement concrete, and bituminous concrete; standard specifications and methods of test; inspection and control; long-term protection and durability. Two hours rec. and three hours lab a week. Pr.: CE 534 and ENGL 415. Pr. or conc.: either CE 528 or 542 or 544.

**CE 675. Traffic Engineering I.** (3) II. Driver, vehicle, and roadway characteristics; speed and volume studies; congestion and accident studies; signs, signals, and pavement marking as traffic control devices; parking studies, screenline and corridor analyses; highway and intersection capacity. Two hours rec. and three hours lab a week. Pr.: CE 572.

**CE 680. Economics of Design and Construction.** (3) II. Selection of alternative engineering design and construction solutions through study of unit cost determination, cost estimating, and financing procedures. Introduction to construction scheduling. Three hours rec. a week. Pr.: Senior standing in engineering or graduate standing for nonengineering majors.

**CE 686. Regional Planning Engineering.** (3) I. Engineering problems involved in regional planning; the design and location of streets and highways, water supply and sanitary facilities, drainage and public utilities; rights-of-way and easement. Two hours rec. and three hours lab a week. Pr.: Senior standing in engineering or graduate standing in regional and community planning.

**CE 722. Soil Mechanics II.** (3) I. Review of identification, classification, and engineering properties of soils; stress distribution in the soil; advanced study of strength and compressibility of soil, and of soil moisture and ground water movement. Three hours rec. a week. Pr.: CE 522.

**CE 724. Advanced Soil Testing for Engineering Purposes.** (3) II. Physical characteristics and classification of soil materials; consolidation and compressibility tests; unconfined, direct, and triaxial shear tests. One hour rec. and six hours lab a week. Pr.: CE 522.

**CE 728. Advanced Foundation Engineering.** (3) II. Advanced studies of soil investigations; analysis and design of retaining structures, shallow foundations, pile foundations, and dewatering systems; analysis and repair of failed structures; legal aspects of foundation engineering. Two hours rec. and three hours lab a week. Pr.: CE 544 and 528.

**CE 730. Advanced Mechanics of Materials.** (3) I. Introduction to advanced problems in the elastic regime. Biaxial stress and strain, theories of failure, flexure, torsion, membrane theory of shells, beams on elastic foundations, thick cylinders and rotating disks, energy methods, and buckling. Three hours rec. a week. Pr.: CE 533 and MATH 240.

**CE 732. Advanced Structural Analysis I.** (3) I. Classical methods of analysis of statically indeterminate structures; deflections and influence lines for indeterminate structures; analysis of space frames and trusses. Three hours rec. a week. Pr.: CE 537.

**CE 733. Advanced Structural Analysis II.** (3) II. Application of matrix methods of analysis to complex structures; selected topics in structural analysis. Three hours rec. a week. Pr.: CE 537.

**CE 735. Numerical Solutions in Structural Mechanics.** (3) I. In alternate years. Theory of finite element, finite difference, numerical integration and other numerical

techniques, and application to problems in structural mechanics. Three hours rec. a week. Pr.: CE 537.

**CE 736. Energy Methods in Engineering Mechanics.** (3) II. In alternate years. The principle of virtual work, minimum potential energy; theorem of complementary energy; Castigliano's theorems; application of statically determinate and indeterminate beams, curved beams, and frames; extension of energy principles of statics to dynamic problems. Three hours rec. a week. Pr.: CE 533.

**CE 737. Elastic Stability.** (3) II. In alternate years. Bending of prismatic bars under simultaneous action of axial and lateral loads; buckling of centrally compressed bars; buckling of compressed rings and curved bars; lateral buckling of beams. Three hours rec. a week. Pr.: CE 533 and MATH 240.

**CE 742. Advanced Steel Design.** (3) II. Plastic design of steel structures; stability problems in plastic design; design of complex steel structures. Three hours rec. a week. Pr.: CE 542.

**CE 743. Advanced Reinforced Concrete Theory.** (3) II. Advanced theories and methods of design and analysis of reinforced concrete structures. Three hours rec. a week. Pr.: CE 544.

**CE 744. Prestressed Concrete Design.** (3) I. The study of prestressing methods and their application to the design of concrete structures. Three hours rec. a week. Pr.: CE 544.

**CE 751. Hydraulics of Open Channels.** (3) I. Properties of open-channel flow; types of open channels; conservation of mass, momentum, and energy; critical, uniform, and gradually varied flow; design of erodible channels; rapidly varied flow. Three hours rec. a week. Pr.: CE 552.

**CE 752. Advanced Hydrology.** (3) II. Review of basic principles; point and regional rainfall and flood frequency analyses; hydrologic and hydraulic flood routing; drainage and flood control facilities design; hydrologic modeling and simulation; flood plain analysis and planning. Three hours rec. a week. Pr.: CE 551.

**CE 761. Environmental Engineering Chemistry.** (3) I. Basic concepts of chemical reaction kinetics and equilibria, acid-base chemistry, complex formation, precipitation and dissolution processes, and applications to environmental engineering; organic compounds in the environment. Three hours rec. a week. Pr.: CE 563 or consent of instructor.

**CE 762. Water Treatment Systems.** (3) II. Drinking water quality and health effects; in-depth study of physical and chemical principles in water treatment unit operations, and their application to plant design. Three hours rec. a week. Pr.: CE 565, 761, or consent of instructor.

**CE 763. Water Supply and Wastewater Collection.** (3) II. Alternate years. Analysis and design of water distribution systems, pump stations, and storage systems; flow measurement devices; analysis and design of wastewater collection systems and pump stations. Three hours rec. a week. Pr.: CE 552, 565, or consent of instructor.

**CE 766. Wastewater Engineering I: Biological Processes.** (3) I. Principles of biological treatment of wastewater and sludge; application to the design of facilities for organics and nutrient removal; sludge handling, treatment, and disposal. Three hours rec. a week. Pr.: CE 565 or permission of instructor.

**CE 767. Wastewater Engineering II: Physical and Chemical Processes.** (3) II. In alternate years. Physical and chemical principles in the removal of suspended solids, organics, and nutrients using sedimentation, filtration, chemical precipitation, oxidation, adsorption, ion-exchange, and other processes. Three hours rec. a week. Pr.: CE 565, 761, or permission of instructor.

**CE 771. Urban Transportation Analysis.** (3) II. Origin-destination surveys, land-use inventories,

parking and transit studies; arterial street standards and operating characteristics, coordination of city planning. Two hours rec. and three hours lab a week. Pr.: CE 571 or consent of instructor.

**CE 773. Airport Design.** (3) II. On sufficient demand. Problems encountered in planning, design, construction, and maintenance of large airports. Two hours rec. and three hours lab a week. Pr.: CE 571.

**CE 774. Pavement Design.** (3) I. On sufficient demand. Methods of evaluating the load-carrying capacity of soil subgrade, subbase, and base courses; critical analysis of the methods of design for flexible and rigid pavements; methods of increasing the load-carrying capacity of highway and airport pavements. Two hours rec. and three hours lab a week. Pr.: CE 522.

**CE 790. Problems in Civil Engineering.** (Var.) I, II, S. Pr.: Approval of instructor.

## Electrical and Computer Engineering

David L. Soldan, Head

Professors Carpenter,\* Dillman,\* S. Dyer,\* Fowler,\* Gallagher,\* Hummels,\* Johnson,\* Lenhart,\* Lucas,\* Rathbone,\* and Soldan;\* Associate Professors Chandra,\* Devore,\* Dollar, R. Dyer,\* Harms,\* Morcos,\* Pahwa,\* and Rys,\* Assistant Professors Day, Fox,\* Gordon,\* and Hudson; Instructor Wakabayashi; Emeriti: Professors Cottom, Haft, Hunt, Kirmser, Koepsel, and Ward.

Electrical and computer engineers are involved in the design of electrically oriented systems for a range of applications in modern society. These systems or circuits range from miniature microprocessors through energy conversion systems to giant communication networks and super computers. Electrical or computer engineers are involved in every phase of the transmission, conversion, and processing of energy and information for useful purposes both in industry and in our homes.

Opportunities exist for baccalaureate degree holders to continue education at advanced degree levels or to enter such fields as medicine, law, or business administration.

The first two years of the electrical engineering and the computer engineering curricula are primarily mathematics and physical sciences. These two years prepare students for the advanced work to be undertaken in the junior and senior years. In the third year, students begin the study of fundamental concepts of electrical analysis and modeling. Together with experimental studies and techniques, the modeling forms an important aspect of laboratory work. In the fourth and final

year, understanding is broadened by the introduction of various aspects of systems and electrical or computer engineering design.

In the last three semesters of the electrical engineering curriculum, students may choose technical electives for a broad or specialized field of study. Specialized areas include bioengineering, communication systems, control systems, computers and digital systems, signal processing, electrical power systems, circuits and electronics, and advanced degree preparation.

The computer engineering curriculum leads to the bachelor of science in computer engineering. The curriculum retains much of the traditional electrical engineering program, but has been adjusted to place increased emphasis on the computer and related computing equipment. The curriculum includes preparation in both computer hardware and software. Emphasis is on the design of computers and computing systems and the related applications.

Through the four years, students are individually advised and counseled by the faculty. At various times during the year, engineers from industry are invited to speak to students on topics of current interest to the profession.

### Curriculum in electrical engineering (EE)

Bachelor of science in electrical engineering  
135 hours required for graduation  
Accredited by the Engineering Accreditation Commission of the Accreditation Board of Engineering and Technology

#### Freshman

Fall semester	
ENGL 100	Expository Writing I* . . . . . 3
SPCH 105	Public Speaking IA . . . . . 2
ECON 110	Principles of Macroeconomics . . . . . 3
CHM 210	Chemistry I . . . . . 4
MATH 220	Analytic Geometry and Calculus I . . . . . 4
	<b>16</b>

#### Spring semester

KIN 101	Principles of Physical Fitness . . . . . 1
CIS 200	Fundamentals of Computer Programming . . . . . 3
CIS 203	Fundamentals of Computer Programming Laboratory . . . . . 1
MATH 221	Analytic Geometry and Calculus II . . . . . 4
CHM 230	Chemistry II . . . . . 4
Humanities or social science electives	. . . . . 3
	<b>16</b>

#### Sophomore

Fall semester	
EECE 241	Introduction to Computer Engineering . . . . . 3
PHYS 213	Engineering Physics I . . . . . 5
MATH 222	Analytic Geometry and Calculus III . . . . . 4
CHE 350	Engineering Materials . . . . . 2
Humanities or social science electives	. . . . . 3
	<b>17</b>

#### Spring semester

EECE 510	Circuit Theory I . . . . . 3
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PHYS 214	Engineering Physics II	5
MATH 240	Elementary Differential Equations	4
CIS 208	C Language Laboratory	1
Humanities or social science electives		3
		<b>16</b>

**Junior****Fall semester**

EECE 501	Electrical Engineering Laboratory I	2
EECE 511	Circuit Theory II	3
EECE 525	Electronics I	3
STAT 510	Introduction to Probabilities and Statistics	3
CE 530	Statics and Dynamics	4
Humanities or social science electives		3
		<b>18</b>

**Spring semester**

EECE 502	Electrical Engineering Lab II	2
EECE 512	Linear Systems	3
EECE 526	Electronics II	3
EECE 557	Electromagnetic Theory I	4
EECE 581	Energy Conversion I	3
ENGL 415	Written Communication for Engineers*	3
		<b>18</b>

**Senior****Fall semester**

EECE 530	Control Systems Design	3
ME 513	Thermodynamics I	3
Option electives		6
Complementary electives		6
		<b>18</b>

**Spring semester**

EECE 590	Seminar	1
Option electives		3
Complementary electives		9
Humanities or social science electives		3
		<b>16</b>

\*The prerequisite for ENGL 415 is satisfied with an A or B in ENGL 100. Otherwise students must take ENGL 120, which, if necessary, may be substituted for 3 credit hours of complementary electives.

Humanities and social science electives are to be selected from the approved list and need not be taken in the order listed in the curriculum. (Two courses must be 400 level or above.)

Nine semester hours of option electives must be selected from electrical and computer engineering courses upon consultation with the student's faculty advisor.

Fifteen semester hours of complementary electives must be selected from an approved list of complementary electives upon consultation with the student's faculty advisor. The complementary electives may include a maximum of 6 semester hours from electrical and computer engineering courses (10 hours for honors students.)

In fulfillment of the 24 semester hours of option and complementary electives, at least one course must be selected from the approved list of senior-level design/laboratory courses.

**Electrical engineering options****General**

In the general option a set of specializations is possible. Students are expected to select a set of interrelated courses which that allow concentration in one area. Examples of such areas are communication systems, digital systems, circuits and electronics, instrumentation, solid state devices, microwaves, control systems, signal and image processing, and electrical power systems.

**Bioengineering**

Students pursuing the option of bioengineering can fulfill the requirements for a B.S. in electrical engineering by following the outlined core curriculum listed for electrical engineering. A listing of courses that support the life science component of the bioengineering option follows:

CHM 531	Organic Chemistry I	3
CHM 532	Organic Chemistry Lab	2
CHM 550	Organic Chemistry II	3
BIOCH 521	General Biochemistry	3
BIOL 198	Principles of Biology	4
BIOL 240	Structure and Function of the Human Body	5
BIOL 505	Comparative Anatomy of Vertebrates	4
BIOL 526	Human Physiology	3
AP 530	Anatomy and Physiology	4

The selected courses from the above list will be used as complementary electives in the electrical engineering curriculum. As a minimum, students should select a physiology course and, if possible, additional electives in the chemistry area.

**Computer engineering (CMPEN)**

Bachelor of science in computer engineering  
135 hours required for graduation  
Accredited by Engineering Accreditation Commission of the Accreditation Board of Engineering and Technology.

**Freshman****Fall semester**

ENGL 100	Expository Writing*	3
KIN 101	Principles of Physical Fitness	1
CHM 210	Chemistry I	4
MATH 220	Analytic Geometry and Calculus I	4
CIS 200	Fundamentals of Computer Programming	3
CIS 203	Fundamentals of Computer Programming Laboratory	1
		<b>16</b>

**Spring semester**

SPCH 105	Public Speaking IA	2
ECON 110	Principles for Macroeconomics	3
MATH 221	Analytic Geometry and Calculus II	4
EECE 241	Introduction to Computer Engineering	3
CIS 208	C Language Laboratory	1
Humanities or social science elective		3
		<b>16</b>

**Sophomore****Fall semester**

PHYS 213	Engineering Physics I	5
MATH 222	Analytic Geometry and Calculus III	4
CIS 300	Algorithms and Data Structures	3
EECE 444	Computer Engineering Lab I	1
Humanities or social science elective		3
		<b>16</b>

**Spring semester**

PHYS 214	Engineering Physics II	5
MATH 240	Elementary Differential Equations	4
MATH 510	Discrete Mathematics	3
EECE 510	Circuit Theory I	3
Humanities or social science elective		3
		<b>18</b>

**Junior****Fall semester**

CIS 500	Analysis of Algorithmic and Data Structures	3
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EECE 511	Circuit Theory II	3
EECE 525	Electronics I	3
STAT 510	Introductory Probability and Statistics I	3
EECE 641	Design of Digital Systems I	3
EECE 501	Electrical Engineering Lab I	2
		<b>17</b>

**Spring semester**

EECE 512	Linear Systems	3
EECE 557	Electromagnetic Theory I	4
EECE 636	Introduction to Computer Graphics	3
EECE 649	Computer Design I	3
EECE 544	Computer Engineering Lab II	2
Humanities or social science elective		3
		<b>18</b>

**Senior****Fall semester**

CE 530	Statics and Dynamics	4
EECE 645	Digital Electronics	3
ENGL 415	Written Communication for Engineers*	3
EECE 631	Microcomputer Systems Design	3
Humanities or social science elective		3
		<b>16</b>

**Spring semester**

EECE 530	Control Systems Design	3
EECE 590	Seminar	1
CIS 520	Operating Systems I	3
Complementary electives		11
		<b>18</b>

\*The prerequisite for ENGL 415 is satisfied with an A or B in ENGL 100. Otherwise students must take ENGL 120, which, if necessary, may be substituted for 3 credit hours of complementary electives.

Humanities and social science electives are to be selected from the approved list and need not be taken in the order listed in the curriculum. (Two courses must be 400 or above.)

Complementary electives must include an approved engineering science course in either engineering materials, thermodynamics, or flow and rate processes.

**Electrical and computer engineering courses****Undergraduate credit**

**EECE 241. Introduction to Computer Engineering.** (3) I, II, S. Simple coding schemes, Boolean algebra fundamentals, elements of digital building blocks such as gates, flip-flops, shift registers, memories, etc., basic engineering aspects of computer architecture and elements of machine language. Three hours rec. a week. Pr. or conc.: CIS 200.

**EECE 444. Computer Engineering Laboratory I.** (1) I, II. Laboratory experience in design, construction, and debugging of simple digital systems and subsystems. Three hours lab a week. Pr.: EECE 241.

**EECE 499. Honors Research in Electrical and Computer Engineering.** (Var.) I, II. Individual research problem selected with approval of faculty advisor. Open to students in the College of Engineering honors program. A report is presented orally and in writing during the last semester.

**Undergraduate and graduate credit in minor field**

**EECE 501. Electrical Engineering Laboratory I.** (2) I, II. Electrical engineering laboratory experiments on topics selected from and correlated with the concurrent or prerequisite courses. Three hours lab a week. Pr.: EECE 241 and 510. Pr. or conc.: EECE 511 and 525.

**EECE 502. Electrical Engineering Laboratory II.** (2) I, II. Continuation of Electrical Engineering Laboratory I. Three hours lab a week. Pr.: EECE 501, 511, and 525. Pr. or conc.: EECE 526.

**EECE 510. Circuit Theory I.** (3) I, II, S. An introduction to linear circuit theory; analysis of linear circuits containing resistance, inductance, and capacitance. Three hours rec. a week. Pr.: CIS 200, MATH 222, and PHYS 213.

**EECE 511. Circuit Theory II.** (3) I, II, S. Analysis of electric circuits using differential equations, state equations, transform techniques and linear algebra. Three hours rec. a week. Pr.: PHYS 214, MATH 240, and EECE 510.

**EECE 512. Linear Systems.** (3) I, II. An introduction to linear system fundamental concepts and analytical methods. Analytical concepts presented are signal representation and classification, statistical parameters, convolution, Fourier analysis signal sampling, and discrete transforms. Three hours rec. a week. Pr.: EECE 511, STAT 510, and CIS 208.

**EECE 519. Electric Circuits and Control.** (4) I, II. Principles of direct-current circuits and machines, alternating-current circuits and machines, electronics, and application to instrumentation and control. Four hours rec. a week. Not open to EECE students. Pr.: PHYS 214.

**EECE 525. Electronics I.** (3) I, II. Fundamentals of electronic components, devices, and circuits. Three hours rec. a week. Pr.: EECE 510 or 519 or ET 530.

**EECE 526. Electronics II.** (3) I, II. Continuation of Electronics I. Three hours rec. a week. Pr.: EECE 511 and 525.

**EECE 530. Control Systems Design.** (3) I, II. Modeling, analysis, and design of control systems. Three hours rec. a week. Pr.: EECE 512.

**EECE 544. Computer Engineering Laboratory II.** (2) I, II. Practical aspects of digital systems design, including the design and operation of small computer systems. Three hours lab a week. Pr.: EECE 444 and 501. Pr. or conc.: EECE 557 and 649.

**EECE 557. Electromagnetic Theory I.** (4) I, II. Vector analysis, electrostatics, magnetostatics, Faraday's Law, Maxwell's Equations, transmission lines, and applications. Four hours rec. a week. Pr.: PHYS 214 and EECE 510.

**EECE 571. Introduction to Biomedical Engineering.** (1) I. Introduction to quantitative analysis techniques as applied to the study of physiological systems and their associated biological signals. One hour rec. a week. Pr.: MATH 222.

**EECE 581. Energy Conversion I.** (3) I, II. Energy conversion principles and their application to electric energy converters operating in the static and the dynamic mode. Three hours rec. a week. Pr.: EECE 510. Pr. or conc.: EECE 557.

**EECE 589. Circuits and Machines Lab.** (2) I, II. Practical aspects of electrical circuits, transformers, and electrical motors and generators. One hour lec. and two hours lab a week. Not open to EECE students. Pr.: EECE 519.

**EECE 590. Seminar.** (1) I, II. Preparation and oral presentation of a written technical report. One hour rec. a week. Pr.: ENGL 415.

## Undergraduate and graduate credit

**EECE 603. Advanced Electrical Engineering Laboratory.** (2) I, II. A project-oriented laboratory in which a small group of students works with a faculty member in a special area of interest. Projects usually involve design, measurement methods, or experimental work. May be repeated once. Pr.: EECE 502.

**EECE 624. Power Electronics.** (3) I. Theory and application of semiconductor devices to the control and conversion of electric power, control of DC and AC machines, design of electronic power circuits such as inverters, controlled rectifiers, and choppers using diodes, diacs, thyristors, triacs, and power transistors. Three hours rec. a week. Pr.: EECE 581 and 512. Pr. or conc.: EECE 526.

**EECE 625. Integrated Circuits Engineering.** (3) II. An introduction to the major processes used in the design and fabrication of integrated circuits. Two hours rec. and three hours lab a week. Pr.: Consent of instructor.

**EECE 627. Communication Electronics.** (3) I. An introduction to analog communication systems. Includes amplitude modulation (AM) and frequency modulation (FM) by analog signals and the determination of signal-to-noise ratio in AM and FM systems. Design of simple oscillators, modulators, mixers, and detectors. Three hours rec. a week. Pr. or conc.: EECE 512.

**EECE 628. Electronic Instrumentation.** (3) I, II. Applications of electronics in the design of analog and digital systems for the measurement of physical variables and in the transduction of these variables into a useful form for both recording and control. Two hours rec. and three hours lab a week. Pr.: EECE 502 and 526.

**EECE 631. Microcomputer Systems Design.** (3) I, II. Engineering application of microcomputers to instrumentation, control, and communications. Two hours rec. and three hours lab a week. Pr.: EECE 241, 525 or equiv., and CIS 200.

**EECE 632. Engineering Applications of Microcomputer Systems.** (3) I. Elements of digital building blocks and number systems. Computer systems organization, memories, microcomputer fundamentals. Applications of microcomputer systems. Not available for students with credit for EECE 241. Two hours rec. and three hours lab a week. Pr.: PHYS 214; high-level programming language.

**EECE 636. Introduction to Computer Graphics.** (3) I, II. An introduction to the hardware and software aspects of graphics generation. Programming assignments will provide practical experience in implementing and using standard graphics primitives and user interfaces. Three hours rec. a week. Pr.: CIS 208 and 300.

**EECE 641. Design of Digital Systems I.** (3) I, II. Design of combinational and sequential circuits, computer subsystems, and peripheral interfaces. Emphasis is placed on nonideal digital device phenomena, electromagnetic interference, radio frequency interference, shielding, and timing. Three hours rec. a week. Pr.: EECE 444 and 510, CIS 200.

**EECE 642. Design of Digital Systems II.** (3) On sufficient demand. Hardware aspects pertaining to special purpose counters, computer input-output devices, A-D and D-A conversion, magnetic memory devices and systems, clocks, and interfacing. Three hours rec. a week. Pr.: EECE 645 and 641.

**EECE 645. Digital Electronics.** (3) I, II. The characteristics and performance of the major contemporary digital logic families. Three hours rec. a week. Pr.: EECE 525 and 557.

**EECE 647. Digital Filtering.** (3) I. Difference equation characterization of digital filters, transient and steady-state analysis of digital filters using the Z-transform, spectral analysis of digital signals, design and implementation of digital filters. Three hours rec. a week. Pr.: EECE 512.

**EECE 649. Computer Design I.** (3) I, II. Basic concepts of computer design. Arithmetic and logic unit design for fixed and floating point operations. Hardwired and microprogrammed control design with emphasis placed on instruction sets and addressing modes. Memory system design including virtual memory organization, caches, and associative memories. I/O design methods, interrupt mechanisms, DMA and I/O processors are covered. Three hours rec. a week. Pr.: EECE 641.

**EECE 659. Wave Guides, Antennas, and Propagation.** (3) On sufficient demand. Applications of Maxwell's equations to boundary value problems, guided transmission, cavities, radiation, and propagation. Three hours rec. a week. Pr.: EECE 557.

**EECE 661. Digital Communication Systems.** (3) II. An introduction to digital communication systems including modulation, transmission, demodulation, and random noise. Principles of optimum digital receiver design and evaluation of receiver performance are included. Three hours rec. a week. Pr.: EECE 512.

**EECE 662. Design of Communication Circuits.** (3) I, II. The design and performance testing of common communication circuits. Topics include tuned amplifiers, impedance matching, oscillators, filters, transmission lines, and phase locked loops. Two hours rec. and three hours lab a week. Pr.: EECE 526 and 502.

**EECE 663. Digital Error Control Coding.** (3) II. An introduction to the subject of error-correcting and error-detecting codes, both block and convolutional. Emphasis is placed on practical means of encoding and decoding the most commonly used codes such as Hamming, BCH, and Reed-Solomon codes. Three hours rec. a week. Pr.: EECE 241, STAT 510, and CIS 208.

**EECE 670. Engineering Applications of Machine Intelligence.** (3) II. Study concepts and applications of machine intelligence in functional models of engineering systems. Develop, as a term project, an expert system simulation/model for an engineering system that runs on a personal computer and develop the supporting documentation. Two hours rec. and three hours lab a week. Pr.: CIS 535.

**EECE 681. Wind Engineering.** (3) II. Wind characteristics, turbine performance, synchronous and asynchronous electrical loads, siting, economics, and wind farm design. Three hours rec. a week. Pr.: ME 512 or CE 530; and EECE 525 or 519.

**EECE 682. Energy Conversion II.** (3) On sufficient demand. Continuation of EECE 581. Three hours rec. a week. Pr.: EECE 581.

**EECE 683. Power Devices.** (3) II. The design of systems for the control and measurement of large voltages and currents, using power MOSFETs, other solid state switches, resonant transformers, Hall effect sensors, optoisolators, and fiber optics. Two hours rec. and three hours lab a week. Pr.: EECE 501, 525, and 581.

**EECE 685. Modeling, Computer Simulation, and Design of Electric Power Systems.** (3) I. A comprehensive study of modeling of the electric power system components and computer simulation of interconnected power systems in steady state. Vector-matrix descriptions are emphasized. Three hours rec. a week. Pr.: EECE 581.

**EECE 686. Fault Analysis and Protection of Electric Power Systems.** (3) II. Analysis of symmetrical and unsymmetrical faults on power systems using symmetrical components technique. Study of protective relaying for protection of power systems against faults. Vector-matrix descriptions and computer solutions are emphasized. Three hours rec. a week. Pr.: EECE 581.

**EECE 690. Problems in Electrical and Computer Engineering.** (Var.) I, II, S.

**EECE 694. Optoelectronics.** (3) I. Applied geometric and physical optics, optical radiation, and the interaction of light and matter. The theory and application of photodetectors, lasers, and other photoemitters. Introduction to fiber optical waveguides, sensors, and systems. Three hours rec. a week. Pr.: EECE 525, 557, and CHE 350.

**EECE 696. VLSI Circuit Design.** (3) I. Study of silicon NMOS and CMOS technologies in contemporary very large scale integrated circuits. The complete design of the circuit and lithographic masks on the Computer Aided Design (CAD) station. Two hours rec. and three hours lab a week. Pr.: EECE 241 and 525.

**EECE 728. Mixed Signal Measurements.** (3) On sufficient demand. Signal classification, noise and uncertainty, TRMS conversion, quantization and

ADCs, repetitive sampling and signal recovery techniques, vector voltmeters, basic network analyzers. Three hours rec. a week. Pr.: EECE 512 or graduate standing.

**EECE 730. Control Systems Analysis and Design.** (3) II. Use of classical analysis techniques for control system compensation. State space control theory fundamentals are presented in addition to an introductory treatment of several major systems areas. Three hours rec. a week. Pr.: EECE 530 or ME 640. Same as ME 730.

**EECE 731. Advanced Microcomputer System Design.** (3) II. Design and engineering applications of 16 and 32 bit microprocessors. Utilization of peripheral and co-processor chips. Two hours rec. and three hours lab a week. Pr.: EECE 631.

**EECE 736. Discrete-Time and Computer-Control Systems.** (3) I. Analysis and design of discrete-time, sampled-data, and computer-control systems using discrete-state equations and Z-transforms. Three hours rec. a week. Pr.: EECE 526, 530, and 581.

**EECE 742. Data Communications.** (3) I, in odd years. The design and testing of popular local area networks for computers. Topics include topologies, media, signalling and modulation, testing, system design and installation. Emphasis on physical and data link layers of the Open System Interface (OSI) model. Three hours rec. a week. Pr.: EECE 512 or CIS 500.

**EECE 746. Fault Diagnosis in Digital Systems.** (3) II, in even years. Hazards, fault detection in combinational circuits, and sequential machines using path sensitizing and fault-matrix methods, state table analysis, etc.; system reliability through logical redundancy. Three hours rec. a week. Pr. or conc.: EECE 641 or 631.

**EECE 747. Digital Signal Processing Laboratory.** (3) II. Digitization of analog signals; demonstration of aliasing problems; spectral analysis of digital signals using Fourier and other signal representation techniques; digital filtering problems; applications related to biomedical and speech data. Two hours lec. and three hours lab a week. Pr.: EECE 512. Pr. or conc.: EECE 647.

**EECE 749. Computer Design II.** (3) I. Study of alternate computer hardware structures. Investigation of engineering tradeoffs in implementation of alternative instruction sets and computing structures. Emphasis will be placed on a quantitative approach to cost/performance evaluations including simulation of hardware structures. Three hours rec. a week. Pr.: EECE 649.

**EECE 758. Electromagnetic Theory II.** (3) On sufficient demand. Continuation of EECE 557. Three hours rec. a week. Pr.: EECE 557.

**EECE 771. Control Theory Applied to Bioengineering.** (3) II. Development of mathematical models used in the study and analysis of physiological control systems providing techniques for varying pertinent biological parameters. Three hours rec. a week. Pr. or conc.: EECE 530 or ME 640, and a basic physiology course.

**EECE 772. Theory and Techniques of Bioinstrumentation.** (3) I. Theoretical aspects of biological signals, electrodes, transducers, and processing equipment with emphasis on the acquisition and recording of the responses to electrical potentials, pressure, and flow measurements. Three hours rec. a week. Pr.: EECE 771 or consent of instructor.

**EECE 773. Bioinstrumentation Laboratory.** (1) I. Practical experience with and evaluations of laboratory and clinical techniques related to electrodes, transducers, and monitoring equipment. Emphasis is on instrumentation for the respiratory, cardiovascular, and nervous systems. Three hours lab a week. Pr.: Conc. enrollment in EECE 772 and AP 773.

**EECE 791. Matrix Methods Applied to Electrical Engineering.** (3) On sufficient demand. Applications of matrices and linear vector spaces to electrical systems. Three hours rec. a week. Pr.: EECE 512.

**EECE 795. Solid State Electronic Devices.** (3) I, on demand. Introduction to quantum mechanics, crystal structures, and the semiconductor material properties. Diodes, bipolar transistors, and field effect transistor structures. Analysis of second order effects in real transistors. Three hours rec. a week. Pr.: EECE 525, 557, and CHE 350.

## Engineering Technology

John M. Ulrich, Head

Professors Hoppe and Ulrich; Associate Professors Dawes, Delker, DeVault, Hague, and Pacey; Assistant Professor Hightower.

### Area coordinators

Electronic engineering technology  
J. DeVault

Mechanical engineering technology  
J. Ulrich

Nuclear reactor technology  
R. Hightower

Engineering technology is a rapidly growing program that offers excellent career opportunities. As members of the engineering team graduates work with engineers, scientists, and craftsmen in coordinated efforts relating to the design, development, and manufacture of products and systems needed by society.

While the primary responsibility of the engineer is the creation of new designs, the technologist is involved more in routine design and development; liaison and supervision of craftsmen and technicians; and technical sales and service.

The emphasis of the technology program is less theoretical than that for the engineering student. There are more lab courses with an emphasis on hardware and applications.

All areas of specialization are accredited by the Technology Accreditation Commission of the Accreditation Board of Engineering and Technology, except nuclear reactor technology.

### Engineering technology (ET)

Bachelor of science in engineering technology  
126 semester hours required for graduation

#### Core courses (64 hours)

Communications (11)	
ENGL 100	Expository Writing I . . . . . 3
ENGL 120	Expository Writing II . . . . . 3
ENGL 415	Written Communication for Engineers . . . . . 3
SPCH 105	Public Speaking IA . . . . . 2
Physical science (12 hours)	
CHM 210	Chemistry I . . . . . 4
PHYS 113	General Physics I . . . . . 4
PHYS 114	General Physics II . . . . . 4

Mathematics and statistics (15 hours)	
MATH 100	College Algebra . . . . . 3
MATH 150	Plane Trigonometry . . . . . 3
MATH 210	Technical Calculus I . . . . . 3
MATH 211	Technical Calculus II . . . . . 3
STAT 320	Elements of Statistics . . . . . 3

Engineering technology (10 hours)	
ME 212	Engineering Graphics I . . . . . 2
NE 385	Engineering Computational Techniques . . . . . 2
ET 415	Computer Applications in Engineering Technology . . . . . 2
ET 431	Electrical Circuit Technology I . . . . . 4

KIN 101	Principles of Physical Fitness . . . . . 1
ECON 110	Principles of Macroeconomics . . . . . 3
Humanities or social science electives . . . . . 12	

### Electronic engineering technology

This program provides the essential background for a career in one of the many areas of the electrical and electronic industries, including liaison and supervision of craftsmen and technicians, routine design and development, production, quality control maintenance, and technical sales.

#### Area of specialization (62 hours)

Required courses (43 hours)	
IE 241	Production Processes . . . . . 3
ET 410	Properties of Engineering Materials . . . . . 2
ET 430	Electronic Fabrication Lab . . . . . 1
ET 436	Digital Logic Systems I . . . . . 4
ET 531	Electrical Circuit Technology II . . . . . 4
ET 533	Electronic Devices and Systems . . . . . 4
ET 536	Digital Logic Systems II . . . . . 4
ET 537	Electronic Measurements . . . . . 4
ET 538	Digital Peripherals and Interfacing . . . . . 4
ET 539	Electronic Communications . . . . . 4
ET 541	Electronic Design Lab . . . . . 2
ET 542	Electric Motors and Controls . . . . . 4
ME 560	Engineering Economics . . . . . 3

Technical electives . . . . . 15-10	
Management electives . . . . . 3-8	
Free elective . . . . . 1	

### Mechanical engineering technology

Continued industrial growth has resulted in an increasing need for technically trained personnel. The mechanical engineering technologist, a vital member of the engineering team, applies practical approaches to problems in many technical areas.

#### Area of specialization (62 hours)

Required courses (49 hours)	
CE 231	Statics A . . . . . 3
CE 331	Strength of Materials A . . . . . 3
CE 332	Strength of Materials A Lab . . . . . 1
ET 410	Properties of Engineering Materials . . . . . 2
ET 411	Properties of Engineering Materials Lab . . . . . 1
ET 512	Mechanics of Fluids . . . . . 3
ET 514	Energy Conversion Technology . . . . . 3
ET 532	Instrumentation and Measurement Technology . . . . . 3
ET 534	Automatic Control Technology . . . . . 3
ET 540	Industrial Microprocessing . . . . . 3
ET 560	Kinematics and Mechanisms . . . . . 3
ET 561	Machine Design . . . . . 3
ET 562	Mechanical Design Lab I . . . . . 2
ET 563	Mechanical Design Lab II . . . . . 2
ET 569	Mechanical Equipment Lab . . . . . 2

IE 241	Production Processes	3
ME 217	Engineering Graphics II	3
ET 511	Dynamics A	3
ME 560	Engineering Economics	3
Technical electives		6
Management electives		6
Free electives		1

## Nuclear reactor technology

This program provides the education necessary for careers associated with assisting engineers in the design, construction, inspection, maintenance, monitoring, and management of nuclear reactor power generation facilities. Primary employment positions are senior reactor operators and shift technical advisors. Other employment opportunities include similar responsibilities in medical and industrial facilities where radioactive materials are used.

### Area of specialization (62 hours)

Required courses (48 hours)

CE 231	Statics A	3
CE 331	Strength of Materials A	3
CHM 230	Chemistry II	4
ET 410	Properties of Engineering Materials	2
ET 436	Digital Logic Systems I	4
ET 480	Materials of Nuclear Reactor Systems	2
ET 481	Nuclear Reactor Technology I	3
ET 482	Nuclear Reactor Technology Analysis	3
ET 512	Mechanics of Fluids	3
ET 514	Energy Conversion Technology	3
ET 534	Automatic Control Technology	3
ET 537	Electronic Measurements	4
ET 583	Nuclear Reactor Technology II	3
ET 584	Radiation Detection and Monitoring	3
ET 585	Nuclear Reactor Thermal Technology	3
ET 586	Radiation Protection Technology	2
Technical electives		10
Management electives		3
Free elective		1

## Engineering technology courses

### Undergraduate credit

**ET 411. Properties of Engineering Materials Lab.** (1) I, II. Laboratory experiments supplementing ET 410. Pr. or conc.: ET 410.

**ET 415. Computer Applications in Engineering Technology.** (2) I, II. Applications of computer techniques to the solution of problems in engineering technology. Includes software package and programming applications. One hour lec. and one hour rec. a week. Pr.: MATH 100 and 150, or CIS 200 with a language lab.

**ET 430. Electronic Fabrication Laboratory.** (1) I, II. Laboratory experience in the layout, fabrication, and assembly of electronic circuits. Project-oriented with an emphasis on printed circuit boards. Three hours lab a week. Pr. or conc.: PHYS 114.

**ET 431. Electrical Circuit Technology I.** (4) I, II. DC and AC steady-state circuit analysis. Study of resistance, capacitance, and inductance. Basic magnetic circuits. Polyphase steady-state circuits. Brief study of AC machinery with emphasis on selection and applications. Three hours lec. and three hours lab a week. Pr.: ET 415. Pr. or conc.: PHYS 114 and MATH 211.

**ET 436. Digital Logic Systems I.** (4) II. Study of logic gates, combinational and sequential logic, Boolean algebra, Karnaugh maps, arithmetic systems, and

multiplexing. Three hours rec. and three hours lab a week. Pr.: NE 385.

**ET 480. Materials of Nuclear Reactor Systems.** (2) On sufficient demand. The properties and behavior of fuel and nonfuel materials used in nuclear reactor systems are considered. Selected nuclear fuel cycle topics are covered. Two hours rec. a week. Pr.: ET 410.

**ET 481. Nuclear Reactor Technology I.** (3) On sufficient demand. Introduction to nuclear and neutron physics, including: interaction of neutrons, gamma rays, and beta and alpha particles with matter; production of neutrons and the neutron life cycle; basic neutron diffusion principles; and the nuclear fuel cycle. Three hours rec. a week. Pr.: PHYS 114, STAT 320.

**ET 482. Nuclear Reactor Technology Analysis.** (3) I. Applied numerical analysis emphasizing solutions of elementary differential equations with a very strong emphasis on applications in nuclear reactor technology. Three hours rec. a week. Pr.: MATH 211 or equiv.

**ET 498. Problems in Engineering Technology.** Credit arranged. I, II, S. Pr.: Approval of instructor.

**ET 499. Honors Research in Engineering Technology.** (Var.) I, II. Individual research problem selected with approval of faculty advisor. Open to students in the College of Engineering honors program. A report is presented orally and in writing during the last semester.

### Undergraduate and graduate credit in minor field

Courses in engineering technology may not be taken for graduate credit by students in the College of Engineering.

**ET 511. Dynamics A.** (3) I. A study of kinematics and kinetics of particles and rigid bodies. Includes kinematic relations and dynamic principles. Emphasis will be placed on the application of dynamic equations. Computer solutions of dynamic problems will be included. Three hours rec. a week. Pr.: CE 231, MATH 211.

**ET 512. Mechanics of Fluids.** (3) I. Fluid properties, fluid statics. Fluid dynamics of high and low viscosity fluids including pipe flow, open-channel flow, flow about immersed objects, fluid machinery, and flow measurements. Three hours rec. a week. Pr.: PHYS 113.

**ET 514. Energy Conversion Technology.** (3) II. Introduction to energy conversion technology, energy, and power; thermodynamics, power cycles, and refrigeration. Three hours rec. a week. Pr.: CHM 110 or 210, and PHYS 113.

**ET 531. Electrical Circuit Technology II.** (4) II. Circuit analysis of power supplies, operational amplifiers, filters and oscillators including S-plane introduction. Fourier analysis, and transient response. Three hours rec. and three hours lab a week. Pr.: ET 533 and 537. Pr. or conc.: ENGL 415.

**ET 532. Instrumentation and Measurement Technology.** (3) II. Principles and application of instrumentation and measurement equipment. Two hours rec. and three hours lab a week. Pr.: ET 431.

**ET 533. Electronic Devices and Systems.** (4) I. Essential amplifier characteristics, elements, and analysis, including small signal and large signal units, device limitations, circuit configurations, and frequency response. Three hours rec. and three hours lab a week. Pr.: ET 431.

**ET 534. Automatic Control Technology.** (3) I. Application-oriented control systems technology including basic systems dynamics, regulatory, servo, computer control, and system specifications. Two hours rec. and three hours lab a week. Pr.: ET 431.

**ET 536. Digital Logic Systems II.** (4) I. Practical aspects of digital system design involving integrated and

discrete circuit switching behavior, system interfacing, I/O devices, and A-D and D-A conversion, memory devices, and system debugging. Three hours lec. and one three-hour lab a week. Pr.: ET 436.

**ET 537. Electronic Measurements.** (4) I. Operation and application of basic electronic measuring instruments including meters, oscilloscopes, potentiometers, bridges, spectrum analyzers, etc. Three hours rec. and three hours lab a week. Pr.: ET 431.

**ET 538. Peripherals and Interfacing.** (4) II. Hardware fundamentals of digital peripherals, such as mass memory and display devices, including communication standards. The emphasis will be on interfacing. Three hours rec. and three hours lab a week. Pr.: ET 533, 536, and 537.

**ET 539. Electronic Communications.** (4) I. Fundamental communication theory and circuitry including AM, FM, DSBSC, SSBSC, TDM, and pulse techniques. Generation, recovery, bandwidth, and applications are discussed. Three hours rec. and three hours lab a week. Pr. or conc.: ET 531.

**ET 540. Industrial Microprocessing.** (3) I. Introduction to Boolean algebra and digital logic circuits. Elements of microcomputers; memory elements, central processing unit, tri-stating, memory maps, buses. Machine and assembly language programming. Principles of machine control and A/D and D/A interfacing. Two hours rec. and three hours lab a week. Pr.: ET 431 or equiv. For engineering technology majors and nonengineering majors only.

**ET 541. Electronic Design Laboratory.** (2) I, II. Applications of the principles of the design process in executing design projects. Project will be developed by the instructor. Six hours of lab a week. Pr.: ET 430, 531, and 536.

**ET 542. Electric Motors and Controls.** (4) II. Essential characteristics of shunt, series, synchronous, induction, and stepper motors. Application-oriented control systems including the basic dynamics of both time continuous and discrete variable types. Three hours rec. and three hours lab a week. Pr.: ET 531 and 536.

**ET 543. Optical Electronics.** (3) I. Basic optical electronics including photometry, illumination, and radiance as they apply to electronic photoemitters, detectors, and light communication devices. Three hours rec. a week. Pr.: ET 533.

**ET 560. Kinematics and Mechanisms.** (3) II. Plane motion analysis and elementary synthesis of fourbar linkages and cams, gears, and gear trains. Two hours rec. and three hours lab a week. Pr.: ET 511.

**ET 561. Machine Design.** (3) I. Applications of statics, strength of materials, and kinematics to the design of machine components. Materials selection and fatigue loading are considered. Three hours rec. a week. Pr.: ET 560 and CE 331.

**ET 562. Mechanical Design Lab I.** (2) I. Application of the principles of the design process in solving design projects. Projects will be obtained from industry or developed by instructor. Six hours lab a week. Pr.: ME 217. Pr. or conc.: ET 561.

**ET 563. Mechanical Design Lab II.** (2) II. Continuation of Mechanical Design Lab I project with completion of detail design and drawings. Possibly building and testing components designed. Six hours lab a week. Pr.: ET 562.

**ET 569. Mechanical Equipment Laboratory.** (2) I, II. Experiments using a variety of mechanical devices and systems to demonstrate fundamental concepts in mechanics, fluid mechanics, thermodynamics, and heat transfer. Six hours lab a week. Pr.: ET 512, 514, and 532.

**ET 583. Nuclear Reactor Technology II.** (3) On sufficient demand. Theory of diffusion and slowing down of neutrons with application to subcritical and critical reactors; introduction to the time behavior of reactor systems. Three hours rec. a week. Pr.: ET 481.

**ET 584. Radiation Detection and Monitoring.** (3) On sufficient demand. Principles of operation of detectors used in the measurement and monitoring of ionizing radiation. Three hours rec. a week. Pr.: ET 480.

**ET 585. Nuclear Reactor Thermal Technology.** (3) On sufficient demand. Introduction to conduction, convection, and radiation heat transfer as applied to reactor cores and systems. Consideration of nuclear reactor safety and power reactor systems. Three hours rec. a week. Pr.: ET 481.

**ET 586. Radiation Protection Technology.** (2) On sufficient demand. A study of radiation protection environmental effects of radiation and an introduction to nuclear reactor shielding. Two hours rec. a week. Pr.: ET 584.

**ET 640. Food Processing Operations.** (5) II. A study of food processing unit operations and their applications with emphasis on heat and mass transfer operations such as drying, sterilization, freezing and thawing, extraction, and adsorption. Four hours rec. and three hours lab a week. Pr.: ET 440.

# Industrial Engineering

R. Michael Harnett,\* Head

Professors Azadivar,\* Harnett,\* Hwang,\* Konz,\* Lee,\* and Tillman;\* Associate Professors Kramer\* and Wilson; Assistant Professors Ben-Arieh,\* Chang,\* McCright,\* Rys,\* and Triantaphyllou;\* Emeritus: Professor D. Grosh; Associate Professor L. Grosh, Hansen, and Willems; Adjunct Professors Amos and Galitzer.

The curriculum in industrial engineering emphasizes the design, improvement, and installation of integrated systems of people, materials, and equipment. Studies in mathematical, physical, and social sciences are united with a modern approach to principles of engineering analysis and design to specify, predict, and evaluate the results of any industrial system. In addition, strong consideration is given to the economic and human factors involved in industrial operations. With the advent of the inexpensive microprocessor, computer-aided manufacturing has become a major thrust in manufacturing. This area has provided a new frontier for industrial engineering, and there is currently a manufacturing systems engineering option in the industrial engineering curriculum.

The use of newly developed techniques and fresh interpretations of more traditional approaches to industry's problems helps to keep the course and curriculum offerings current.

## Industrial engineering (IE)

Bachelor of science in industrial engineering  
134 hours required for graduation  
Accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology

### Freshman

#### Fall semester

MATH 220	Analytic Geometry and Calculus I ..	4
CHM 210	Chemistry I .....	4
ENGL 100	Expository Writing I* .....	3
ECON 110	Principles of Macroeconomics .....	3
Humanities or social science elective	.....	3
IE 015	Engineering Assembly .....	0
		<u>17</u>

#### Spring semester

MATH 221	Analytic Geometry and Calculus II .....	4
CHM 230	Chemistry II .....	4
NE 385	Engineering Computational Techniques .....	2
ME 212	Engineering Graphics I .....	2
KIN 101	Principles of Physical Fitness .....	1
Humanities or social science elective	.....	3
IE 015	Engineering Assembly .....	0
		<u>16</u>

### Sophomore

#### Fall semester

MATH 222	Analytic Geometry and Calculus III .....	4
PHYS 213	Engineering Physics I .....	5
ACCTG 231	Accounting for Business Operations .....	3
IE 201	Introduction to Industrial Engineering .....	3
Literature elective	.....	3
IE 015	Engineering Assembly .....	0
		<u>18</u>

#### Spring semester

MATH 240	Elementary Differential Equations .....	4
PHYS 214	Engineering Physics II .....	5
IE 242	Introduction to Manufacturing Engineering .....	3
IE 373	Computer Applications in Industrial Engineering .....	2
Restricted elective	.....	3
IE 015	Engineering Assembly .....	0
		<u>17</u>

### Junior

#### Fall semester

STAT 510	Introduction to Probability and Statistics I .....	3
IE 530	Industrial Project Evaluation .....	3
IE 623	Industrial Ergonomics .....	3
EECE 519	Electric Circuits and Controls .....	4
SPCH 421	Technical Speaking .....	3
IE 015	Engineering Assembly .....	0
		<u>16</u>

#### Spring semester

STAT 511	Introduction to Probability and Statistics II .....	3
IE 560	Introduction to Operations Research I .....	3
CHE 352	Engineering Materials I .....	3
CE 530	Statics and Dynamics .....	4
ENGL 415	Written Communication for Engineers* .....	3
IE 015	Engineering Assembly .....	0
IE 050	Industrial Plant Studies .....	0
		<u>16</u>

### Senior

#### Fall semester

IE 501	Industrial Management .....	3
IE 541	Statistical Quality Control .....	3
IE 633	Production Planning and Inventory Control .....	3
IE 643	Industrial Simulation .....	3
IE elective	.....	3
Humanities or social science elective	.....	3
IE 015	Engineering Assembly .....	0
		<u>18</u>

### Spring semester

IE 555	Industrial Facility Layout Design ...	3
IE electives	.....	6
IE Capstone Design elective	.....	4
Humanities or social science elective	.....	3
IE 015	Engineering Assembly .....	0
		<u>16</u>

\*The prerequisite for ENGL 415 is satisfied with an A or B in ENGL 100. Otherwise students must take ENGL 120, which, if necessary, may be substituted for 3 hours of restricted elective.

Humanities and social science electives are to be selected from the catalog list, need not be taken at the time shown in the curriculum, and must include two courses at or above the 400 level.

Literature elective must be selected from ENGL 262, 272, 320, 330, 340, or 390.

Restricted elective must be selected from engineering, mathematics or computer science, economics, statistics, ROTC, and business administration courses, or ENGL 120, if necessary.

IE Capstone Design elective must be either IE 580 or IE 590. Student must be within 35 hours of graduating at the time of registration.

Industrial engineering elective is any course in industrial engineering below 800.

## Manufacturing systems engineering option

The manufacturing systems engineering option should be of particular interest to those students preparing for a career in manufacturing.

Inherent in this program is the basic background of industrial engineering with an emphasis in manufacturing, particularly in computer-integrated manufacturing. Graduates of this program will have a strong background in the use of computers in integrating all phases of a manufacturing enterprise as well as the impact of other recent developments such as robotics. The first two years are very similar to the basic industrial engineering program.

134 hours required for graduation  
Accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology

### Freshman

#### Fall semester

MATH 220	Analytic Geometry and Calculus I ..	4
CHM 210	Chemistry I .....	4
ENGL 100	Expository Writing I* .....	3
ECON 110	Principles of Macroeconomics .....	3
Humanities or social science elective	.....	3
IE 015	Engineering Assembly .....	0
		<u>17</u>

#### Spring semester

MATH 221	Analytic Geometry and Calculus II .....	4
CHM 230	Chemistry II .....	4
NE 385	Engineering Computational Techniques .....	2
ME 212	Engineering Graphics I .....	2
KIN 101	Principles of Physical Fitness .....	1
Restricted elective	.....	3
IE 015	Engineering Assembly .....	0
		<u>16</u>

### Sophomore

#### Fall semester

MATH 222	Analytic Geometry and Calculus III .....	4
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PHYS 213	Engineering Physics I	5
SPCH 106	Public Speaking	3
IE 373	Computer Applications in IE	2
Literature elective		3
IE 015	Engineering Assembly	0
		<b>17</b>

**Spring semester**

MATH 240	Elementary Differential Equations	4
PHYS 214	Engineering Physics II	5
IE 242	Introduction to Manufacturing Engineering	3
CHE 352	Engineering Materials I	3
Humanities or social science elective		3
IE 015	Engineering Assembly	0
		<b>18</b>

**Junior****Fall semester**

STAT 510	Introduction to Probability and Statistics I	3
IE 530	Industrial Project Evaluation	3
IE 623	Industrial Ergonomics	3
EECE 519	Electric Circuits and Controls	4
CE 530	Statics and Dynamics	4
IE 015	Engineering Assembly	0
		<b>17</b>

**Spring semester**

STAT 511	Introduction to Probability and Statistics II	3
IE 560	Introduction to Operations Research I	3
IE 662	Computer Aided Manufacturing	3
ENGL 415	Written Communication for Engineers*	3
IE elective		3
Humanities or social science elective		3
IE 015	Engineering Assembly	0
IE 050	Industrial Plant Studies	0
		<b>18</b>

**Senior****Fall semester**

IE 541	Statistical Quality Control	3
IE 564	Product and Process Engineering	3
IE 633	Production Planning and Inventory Control	3
IE 643	Industrial Simulation	3
IE elective		3
IE 015	Engineering Assembly	0
		<b>15</b>

**Spring semester**

IE 555	Industrial Facility Layout Design	3
IE 580	Manufacturing Systems Design and Analysis	4
IE 685	Manufacturing Information Systems	3
IE elective		3
Humanities or social science elective		3
IE 015	Engineering Assembly	0
		<b>16</b>

\*The prerequisite for ENGL 415 is satisfied with an A or B in ENGL 100. Otherwise students must take ENGL 120, which, if necessary, may be substituted for 3 hours of restricted elective.

Humanities and social science electives are to be selected from the catalog list, need not be taken at the time shown in the curriculum, and must include two courses at or above the 400 level.

Literature elective must be selected from ENGL 262, 272, 320, 330, 340, or 390.

Restricted elective must be selected from engineering, mathematics or computer science, economics, statistics, ROTC, and business administration courses, or ENGL 120, if necessary.

**Industrial engineering courses**

**IE 015. Engineering Assembly.** (0) I, II. Assemblies are held once a month for practicing industrial engineers to make presentations to the students. Students are given an opportunity to interact with the visitors. The purpose is to provide an opportunity to learn about various companies and their products and operations. Required every semester.

**IE 050. Industrial Plant Studies.** (0) II. Trip to industrial centers for study of facilities of special interest to industrial engineering students. Pr.: Junior standing in industrial engineering.

**Undergraduate credit**

**IE 201. Introduction to Industrial Engineering.** (3) I. Introduction to the major functions of industrial engineers with emphasis on the analysis, design, and control of production systems. Two hours lec. and two hours lab a week. Pr.: NE 385.

**IE 241. Production Processes.** (3) I, II. A survey of basic manufacturing processes used in modern industry. Topics include measurement, metal machining, welding, casting, hot and cold press forming processes, heat treatment, powdered metals, plastics, and an introduction to automation. Hands-on experience in measurement, machining, welding, and casting. Two hours rec. and four hours lab a week. Not for industrial engineering majors. Pr.: ME 212.

**IE 242. Introduction to Manufacturing Engineering.** (3) I, II. A survey of basic manufacturing processes, including: measurement, casting, metal machining, welding, hot and cold press forming processes, heat treatment, powdered metals and plastic molding; and including hands-on experience. An introduction to design of manufacturing processes. Two hours rec. and four hours lab a week. Pr.: ME 212.

**IE 372. Computers and Data Processing.** (2) I, II, S. An introduction to computer programming using FORTRAN and computer solutions to engineering problems. Two hours rec. a week.

**IE 373. Computer Applications in Industrial Engineering.** (2) I, II. Use of operating system, file storage in mainframe as well as microcomputers; applications software in engineering economy, mathematical programming, statistical analysis, and management reporting systems. One hour lec. and three hours lab a week. Pr.: NE 385 or a previous course in computers.

**IE 499. Honors Research in Industrial Engineering.** (Var.) I, II. Individual research problem selected with approval of faculty advisor. Open to students in the College of Engineering honors program. A report is presented orally and in writing during the last semester.

**Undergraduate and graduate credit in minor field**

**IE 501. Introduction to Industrial Management.** (3) I, II. Basic functions in an industrial organization and their interrelationships; management considerations involving product, process, plant, and personnel. Three hours lec. a week.

**IE 530. Industrial Project Evaluation.** (3) II. The evaluation of industrial project alternatives by the construction and analysis of mathematical models. Basic concepts, with an emphasis on constrained and unconstrained deterministic and probabilistic evaluation methodology, data analysis, and replacement theory. Three hours rec. a week. Pr.: MATH 222 and IE 373.

**IE 541. Statistical Quality Control.** (3) I. Frequency distributions, normal, binomial, and Poisson distributions. Control charts on means, fraction defective, and number of defects. Dodge-Romig and Military Standard Sampling Plans. Three hours rec. a week. Pr.: STAT 511, IE 373 or equiv.

**IE 555. Industrial Facilities Layout and Design.** (3) II. Design of industrial facilities with emphasis on

manufacturing engineering and material handling. Two hours rec. and two hours lab a week. Pr.: IE 623.

**IE 560. Introduction to Operations Research I.** (3) I, II. A study of the methods of operations research including model formulation and optimization. Topics include: assignment/transportation problems, linear programming, network flows, simulation. Three hours lec. a week. Pr.: IE 373 and MATH 222. Pr. or conc.: STAT 510.

**IE 564. Product and Process Engineering.** (3) I. A study of the interrelationships between product design and production process selection. Emphasis is on the development of economic production systems for discrete products in a competitive manufacturing environment. Concepts of design for manufacture and assembly, tool engineering, and manufacturing systems design are included. Two hours lec. three hours lab per week. Pr.: CHE 352, IE 242. Pr. or conc.: IE 530.

**IE 575. Quantitative Techniques in Industrial Engineering.** (3) I, II. Problem formulation and conceptual models; application of finite mathematics and other techniques to problems of industrial engineering and management. Three hours rec. a week. Pr.: MATH 222.

**IE 580. Manufacturing Systems Design and Analysis.** (4) II. Comprehensive design and analysis of a manufacturing system; integration of the undergraduate industrial engineering and manufacturing engineering option courses. Two hours rec. and four hours lab a week. Pr.: IE 530, IE 623, IE 633. Pr. or conc.: IE 541.

**IE 590. Senior Design Project.** (4) II. A group design project requiring problem definition, analysis, and synthesis, as well as presentation of documented solutions. Activities include application of industrial engineering solutions to designing industrial, manufacturing, and service systems under the supervision of a faculty member. Four hours rec. a week. Pr.: IE 530, 623.

**Undergraduate and graduate credit**

**IE 601. Introduction to Systems Management.** (3) II. A general introduction to the formulation and mathematical solution of management and business problems. Includes the formulation of business and management problems and their solutions, utilizing optimization theory, finite mathematics, and statistical techniques. Taught at Fort Leavenworth only. Three hours rec. a week. Pr.: MATH 222 and consent of instructor.

**IE 603. Topics in Industrial Engineering.** (Var.) I, II, S. Case studies of industrial firms and recent developments in the fields of industrial engineering and management. Pr.: IE 501, 560, or consent of instructor.

**IE 605. Advanced Industrial Management.** (3) I. Managing groups of employees in engineering settings; theory of organization design; design engineering and technological organizations; professionalism and ethical considerations in engineering. Three hours lec. a week. Pr.: IE 501.

**IE 610. Occupational Safety Engineering.** (3) II. An overview of factors affecting safety in organizations, emphasizing analysis techniques and design strategies. Topics include occupational safety, accidents, fire protection, industrial hygiene, hazardous waste, toxicology, radiation safety, product liability, and federal standards. A project involving a hazard analysis and the design of solutions for a field location is required. Three hours lec. a week. Pr.: IE 242.

**IE 612. Hazardous Materials Management.** (2) I. All aspects from generation to final disposal will be studied, including: identifying hazardous materials, chemical safety, storing and shipping chemicals, and treatment and disposal of hazardous wastes. Two hours lec. a week. Pr.: CHM 230.

**IE 621. Numerical Control of Machine Tools.** (3) I. Translation of information on engineering drawings through programming to tape preparation; application

of computer programs to simplify control operations. Two hours rec. and three hours lab a week. Pr.: IE 242 and NE 385.

**IE 623. Industrial Ergonomics.** (3) I. Process analysis and charting; principles of motion economy and ergonomics; work stations and environments; micromotion analysis and an introduction to standard data systems. Two hours rec. and three hours lab a week. Pr.: IE 242.

**IE 625. Work Environments.** (3) II. Basic structure and performance of the human, viewed as a component in information processing and control systems. Effect of visual, auditory, toxic, and thermal environments. Two hours rec. and two hours lab a week. Pr.: IE 242.

**IE 633. Production Planning and Inventory Control.** (3) I. Principles, techniques, and applications of production planning and inventory control. Design of control systems. Three hours rec. Pr.: IE 242. Pr. or conc.: IE 560.

**IE 643. Industrial Simulation.** (3) I. Computer simulation modeling of industrial systems emphasizing the design, verification and validation of the models and the use of the model as a systems design tool. Three hours rec. Pr.: IE 560. Pr. or conc.: STAT 511.

**IE 651. Standard Data Systems.** (3) II. Taught off campus at Fort Leavenworth only. Microscopic and macroscopic standard data systems; commercial versions; company-developed plans; programmed standard data systems. Three hours rec. a week. Pr.: NE 385.

**IE 652. Ergonomics.** (3) I, II. The design process, work analysis techniques, principles of work organization, work station, and hand tools. Facilities management. Lighting, noise, and industrial hygiene. Time determination. Work standards. Taught at Fort Leavenworth only. Three hours rec. a week. Pr.: MATH 222 and consent of instructor.

**IE 660. Introduction to Operations Research II.** (3) I. Continuation of IE 560. Topics include decision theory, Markov processes, queueing theory, nonlinear programming, dynamic programming. Three hours lec. a week. Pr.: IE 560.

**IE 662. Computer Aided Manufacturing.** (3) II. Concepts in CAM, integrated control of machine tools and transport devices with production control. Concepts of CAM and automated assembly in small lot production environment. Two hours lec. and three hours lab a week. Pr.: IE 242 and IE 373 or equiv.

**IE 671. Topics in Automated Factory Concepts.** (3) II. Introduction to concepts of automation, automatic transfer lines, and CAD/CAM. Emphasis on robots and their role in automated factories. Concepts of group technology, computer-aided process planning. Automated material-handling equipment for automated factories. Three hours lec. a week. Pr.: IE 633 and 662.

**IE 672. Robotic Applications.** (3) II. History, development of the work environment for robots, their application, and implementation. Concepts of control and sensory feedback in robots are covered. Three hours lec a week. Pr.: IE 242 and NE 385.

**IE 685. Principles of Manufacturing Information Systems.** (3) II. Introduction to the theory and concepts of information for manufacturing. Design of manufacturing systems such as MRP, SFRS, CAD/CAM, etc. Concerns of integration and man-machine interface in manufacturing systems. Three hours lec. a week. Pr.: IE 633.

**IE 751. Applied Decision Theory.** (3) II, in alternate years. Bayes' theorem, Bayesian estimators, utility, loss function and risk, minimax strategies, elementary game theory. Three hours rec. a week. Pr.: STAT 511 or equiv.

## Mechanical Engineering

Professors Appl,\* Azer,\* Cogley,\* Gorton,\* Gowdy,\* Huang,\* Jones,\* Miller,\* Thompson,\* Turnquist,\* and Walker;\* Associate Professors Beek,\* Fenton,\* Krishnaswami,\* Swenson,\* and White;\* Assistant Professors Chapman\* and Hosni;\* Emeriti: Professors Ball, Crank, Dunean, Lindholm, Messenheimer, Nesmith, Pauli, Rohles, and Wood.

Mechanical engineering is a broad profession that traditionally comprises three primary subfields: energy, mechanisms and machinery, and controls. The work done by mechanical engineers includes the design, construction, and use of systems for the conversion of energy available from natural sources (water, fossil fuels, nuclear fuels, solar radiation) to other forms of useful energy (for transportation, heat, light, power); design and production of machines to lighten the burden of servile human work and to do work otherwise beyond human capability; processing of materials into useful products; and creative planning, development, and operation of systems using energy, machines, and resources; and manufacturing.

The curriculum includes engineering science courses in the sophomore and junior years and engineering application courses in the junior and senior years. Laboratory courses and humanities and social science electives are found throughout the curriculum.

The entire curriculum serves as preparation for the senior design laboratory, where a team of three to five students is assigned to work on a realistic engineering problem supplied by an industrial sponsor. This brief internship gives new mechanical engineering graduates the experience and confidence to move quickly into productive and satisfying careers.

Because of the broad and fundamental nature of the curriculum, mechanical engineering provides an excellent background for careers in such fields as law, medicine, social services, urban design, and business management.

### Individual programs

The electives in the curriculum provide the opportunity for students to develop skills of individual interest. Students with clear career objectives may be permitted to substitute appropriate courses for some of the required courses. For example, students interested in the aerospace industry can choose elective courses in propulsion, aerodynamics, aircraft stability and control, and composite materials. A special

interest in automobiles may prompt students to choose elective courses in internal combustion engines, machine vibrations, composite materials, and thermodynamic analysis. The combinations are extensive.

### Curriculum in mechanical engineering (ME)

Bachelor of science in mechanical engineering  
135 hours required for graduation  
Accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology

#### Freshman

##### Fall semester

CHM 210	Chemistry I	4
ENGL 100	Expository Writing I*	3
MATH 220	Analytic Geometry and Calculus I	4
SPCH 105	Public Speaking IA	2
Humanities or social science elective		3
ME 015	Mechanical Engineering Seminar	0
		<b>16</b>

##### Spring semester

CHM 230	Chemistry II	4
ENGL 120	Expository Writing II	3
	or	
Humanities or social science elective		3
MATH 221	Analytic Geometry and Calculus II	4
ME 212	Engineering Graphics I	2
ECON 110	Principles of Macroeconomics	3
ME 015	Mechanical Engineering Seminar	0
		<b>16</b>

#### Sophomore

##### Fall semester

MATH 222	Analytic Geometry and Calculus III	4
PHYS 213	Engineering Physics I	5
IE 241	Production Processes	3
NE 385	Computational Techniques	2
ME 217	Engineering Graphics II	3
MF 015	Mechanical Engineering Seminar	0
		<b>17</b>

##### Spring semester

MATH 240	Elementary Differential Equations	4
PHYS 214	Engineering Physics II	5
CHE 352	Engineering Materials I	3
CE 333	Statics	3
ME 400	Computer Applications in Mechanical Engineering	2
ME 015	Mechanical Engineering Seminar	0
		<b>17</b>

#### Junior

##### Fall semester

CE 533	Mechanics of Materials	3
EECE 519	Electric Circuits and Control	4
ME 512	Dynamics	3
ME 513	Thermodynamics I	3
ENGL 415	Written Communication for Engineers*	3
KIN 101	Principles of Physical Fitness	1
MF 015	Mechanical Engineering Seminar	0
		<b>17</b>

##### Spring semester

EECF 589	Circuits and Machines Lab	2
MF 523	Thermodynamics II	3
ME 533	Machine Design I	3
ME 535	Mechanical Engineering Lab I	3
ME 571	Fluid Mechanics	3
Humanities or social science elective		3
ME 015	Mechanical Engineering Seminar	0
		<b>17</b>

**Senior**

<b>Fall semester</b>		
ME 573	Heat Transfer .....	3
ME 583	Mechanical Engineering Lab II ....	2
ME 560	Engineering Economics .....	3
Technical electives .....		6
Humanities or social science elective .....		3
ME 015	Mechanical Engineering Seminar ..	0
		<b>17</b>

**Spring semester**

ME 563	Machine Design II .....	3
ME 575	Mechanical Engineering Design Lab .....	3
Technical electives .....		9
Humanities or social science elective .....		3
ME 015	Mechanical Engineering Seminar ..	0
		<b>18</b>

\*Expository Writing II is optional if prerequisites for Written Communication for Engineers (ENGL 415) are met from Expository Writing I.

Humanities and social science electives are to be selected from the approved list and need not be taken in the order listed in the curriculum. (Two courses must be 400 level or above.)

Of the 15 semester hours of technical electives shown above, one course must be chosen from approved course lists in each of the following areas: machine design/solid mechanics; thermal sciences; and automatic controls. Electives must be selected to ensure that a minimum of 16 design and 15 humanities and social science credits are included in the program of study. All electives are to be chosen with the advice and approval of the faculty advisor and department head.

**Mechanical engineering courses**

**ME 015. Mechanical Engineering Seminar.** (0) I, II. A monthly assembly of all undergraduates enrolled in the mechanical engineering curriculum for the purpose of exchanging information regarding academic, technical, social, ethical, and professional matters between students, faculty, and practicing professionals. One hour of lec. a month.

**Undergraduate credit**

**ME 212. Engineering Graphics I.** (2) I, II. Technical sketching, study of basic principles of projective geometry, multiview drawings, pictorials, reading and interpreting drawings, and creative or conceptual design on computers. Three hours lab and one hour rec. a week. Pr.: Plane geometry.

**ME 217. Engineering Graphics II.** (3) I, II. Advanced study and application of projective geometry principles, functional design, detail and assembly layouts, design of charts and graphs, and conceptual design on computers. Five hours lab and one hour rec. a week. Pr.: ME 212.

**ME 220. Graphics A.** (2) I. Technical sketching, pictorials, projection systems and the creation, reading and interpreting of multiview drawings, computer graphics. For non-engineering majors. Three hours lab and one hour rec. a week. Pr.: Plane Geometry.

**ME 390. Topics in Mechanical Engineering.** (Var.) I, II, 5. Topics selected in consultation with instructor. Intended for interdisciplinary studies or innovative studies in mechanical engineering. Pr.: Consent of instructor.

**ME 400. Computer Applications in Mechanical Engineering.** (2) I, II. The development and application of computer techniques to the problems of design and analysis in mechanical engineering, including computer programming. Two hours rec. a week. Pr.: MATH 221 and NE 385.

**ME 499. Honors Research in Mechanical Engineering.** (Var.) I, II. Individual research problem selected with approval of faculty advisor. Open to students in the College of Engineering honors program. A report is presented orally and in writing during the last semester.

**Undergraduate and graduate credit in minor field**

**ME 512. Dynamics.** (3) I, II, 5. Vector treatment of kinematics, Newton's Laws, work and energy, impulse and momentum, with applications to problems of particle and rigid body motion. Three hours rec. a week. Pr.: CE 333 and MATH 222.

**ME 513. Thermodynamics I.** (3) I, II, 5. Properties of the pure substance. The first and second laws of thermodynamics. Three hours rec. a week. Pr.: PHYS 213; MATH 222.

**ME 523. Thermodynamics II.** (3) I, II. Continuation of Thermodynamics I. Gas mixtures, psychrometry, generalized thermodynamic relations and reactive systems. Three hours rec. a week. Pr.: ME 513.

**ME 533. Machine Design I.** (3) I, II. Displacement, velocity, and acceleration analysis of machine elements—cams, gears, and other mechanisms. A brief introduction to dynamics of machines. Three hours rec. a week. Pr.: ME 512.

**ME 535. Mechanical Engineering Laboratory I.** (3) I, II. Theory and application of mechanical engineering measurements, instrumentation, and computer-based data acquisition. One hour rec. and six hours lab a week. Pr.: ME 400, 513, and EECE 519.

**ME 560. Engineering Economics.** (3) I, II. Economic analysis of problems as applied in engineering. Three hours rec. a week. Pr.: ECON 110, junior standing in engineering.

**ME 563. Machine Design II.** (3) I, II. Design and analysis of machine elements, such as shafting, springs, screws, belts, brakes, clutches, gears, and bearings, with emphasis on strength, rigidity, and wear qualities. Three hours rec. a week. Pr.: CE 533 and ME 533.

**ME 571. Fluid Mechanics.** (3) I, II, 5. Physical properties; fluid statics; dynamics of ideal and real fluids (for incompressible and compressible flow); impulse and momentum; laws of similitude; dimensional analysis; flow in pipes; flow in open channels; flow about immersed objects. Three hours rec. a week. Pr.: ME 512. Pr. or conc.: ME 513.

**ME 573. Heat Transfer.** (3) I, II. Fundamentals of conduction, convection, and radiation; principles of heat exchanger design and dimensional analysis. Three hours rec. a week. Pr.: ME 571, MATH 240.

**ME 575. Mechanical Engineering Design Laboratory.** (3) I, II. Application of the principles of the design process in the solution of engineering industrial-type problems with direct involvement of industry. Six hours lab a week. Pr. or conc.: ME 573 and 563.

**ME 583. Mechanical Engineering Laboratory II.** (2) I, II. Planning and executing experimental studies on mechanical and thermal systems; analysis of experimental results; oral and written reports. Six hours lab a week. Pr.: ME 535 and 571. Pr. or conc.: ME 573.

**Undergraduate and graduate credit**

**ME 620. Internal Combustion Engines.** (3) I. Analysis of cycles, design, and performance characteristics. Three hours rec. a week. Pr.: ME 523.

**ME 622. Environmental Engineering I.** (3) II. Psychrometry; heating-cooling system design; refrigeration basics. Three hours rec. a week. Pr. or conc.: ME 573.

**ME 628. Aerodynamics.** (3) I. A general introduction to aerodynamics including the analysis of lift, drag, thrust, and aircraft performance for subsonic aircraft. Three hours rec. a week. Pr.: ME 571 and MATH 240.

**ME 631. Aircraft and Missile Propulsion.** (3) II. Mechanics and thermodynamics of aircraft and missile propulsion systems; combustion; air-breathing jet engines; rockets; applied compressible flow; propellants; performance and design of propulsion systems. Three hours rec. a week. Pr.: ME 523, 571, and MATH 240.

**ME 633. Thermodynamics of Modern Power Cycles.** (3) I. The first and second law analysis of modern steam cycles for both fossil-fuel and nuclear-fuel installations. Cycle efficiency and factors affecting performance, such as cycle design, load factor, and auxiliaries. Thermal pollution resulting from steam cycles. Three hours rec. a week. Pr.: ME 513.

**ME 635. Dynamics of Flight—Stability and Control.** (3) II. Stability and control of aircraft and missiles. Development of the general equations of unsteady motion for six-degree-of-freedom machines. Stability derivatives solution and analysis of the linearized problem. Longitudinal and lateral normal modes. Pr.: ME 512. Pr. or conc.: ME 628 or consent of instructor.

**ME 640. Automatic Controls.** (3) I. Analysis of the dynamic behavior of mechanical, thermal, fluid, and electrical elements using basic physical laws. Transient and frequency response characteristics, stability and sensitivity analysis. Design of automatic control systems. Three hours rec. a week. Pr.: ME 535.

**ME 645. Fluid Control Systems.** (3) II. Study of hydraulic, pneumatic, and fluidic control systems and their application in industry. Analysis and modeling of system components including pumps, valves, and actuators. Design techniques for both feedback and nonfeedback systems. Laboratory demonstrations. Three hours rec. a week. Pr.: ME 535.

**ME 650. Introduction to Computer-Aided Design.** (3) I. Scope of computer-aided design, computer-aided design workstations, interactive programming, numerical methods and computer graphics in computer-aided design, applications to design problems, introduction to finite elements, and optimal design. Pr.: ME 400 and senior standing in engineering.

**ME 651. Introduction to Composites.** (3) II. The analysis and behavior of a laminate. Design, fabrication, and testing of elements made of various composite materials. Two hours rec. and three hours lab a week. Pr.: CE 533 and senior standing in engineering.

**ME 656. Machine Vibrations I.** (3) I, II. A general consideration of free and forced vibration in machines for various degrees of freedom; critical speed; vibration isolation. Three hours rec. a week. Pr.: ME 512 and MATH 240.

**ME 699. Problems in Mechanical Engineering.** (Var.) I, II, 5. Pr.: Approval of department head.

**ME 716. Intermediate Dynamics.** (3) II. General vector principles of the dynamics of particles and rigid bodies; applications to orbital calculations, gyro dynamics, and rocket performance; introduction to the energy methods of advanced dynamics. Three hours rec. a week. Pr.: ME 512 and MATH 240.

**ME 720. Intermediate Fluid Mechanics.** (3) I. A continuation of ME 571 in the study of general topics in fluid mechanics including viscous flow, compressible flow, turbulence, and boundary layer theory. Numerous applications utilizing computational fluid dynamics. Three hours rec. a week. Pr.: ME 571, MATH 240.

**ME 721. Thermal Systems Design.** (3) I. Thermal systems design including economics, simulation, and optimization. Includes heating, ventilating, and air conditioning (HVAC) design and control. Pr.: ME 573.

**ME 722. Environmental Engineering II.** (3) I, in even years. Characteristics of air conditioning compressors, condensers, evaporators; system characteristics; air conditioning system controls; refrigeration systems; acoustics. Three hours rec. a week. Pr.: ME 622.

**ME 730. Control Systems Analysis and Design.** (3) II. Use of classical analysis techniques for control system compensation. State space-control theory fundamentals are presented in addition to an introductory treatment of several major systems areas. Pr.: EECE 530 or ME 640. Same as EECE 730.

**ME 732. Robotic System Analysis.** (3) I, in even years. Modeling and static position and dynamic motion of a

serial link manipulator. Forward and inverse kinematics, differential motion, path description and generation, dynamic and static forces, dynamic formulations, and feedback control of joint actuators. Project work includes robot computer software development and lab exercises. Pr.: ME 512. Pr. or conc.: ME 640.

**ME 735. Geometric Modeling.** (3) II, in even years. Geometric aspects of computer graphics. Two- and three-dimensional homogeneous transformations; hidden line and surface removal; space curves and surfaces, including Bezier and B-spline methods; solid modeling; applications and current topics. Same as CIS 735. Pr.: ME 650 or CIS 636 or EECE 636.

**ME 736. Applied Elasticity.** (3) I. Analysis of stress and strain at a point in an elastic medium; two-dimensional problems in rectangular and polar coordinates; torsion of bars; energy principles; numerical methods. Three hours rec. a week. Pr.: CE 533.

**ME 738. Experimental Stress Analysis.** (3) II, in odd years. Experimental methods of investigating stress distributions. Photoelastic models, photoelastic coatings, brittle coatings, and resistance strain gauges applied to static and dynamic problems. Two hours rec. and three hours lab a week. Pr. or conc.: CE 533.

**ME 756. Machine Vibrations II.** (3) I, in even years. Advanced consideration of systems having free and forced vibrations, with particular reference to several degrees of freedom, distributed mass, generalized coordinates, and non-linear forms. Three hours rec. a week. Pr.: ME 656.

**ME 757. Kinematics.** (3) I, in odd years. Geometry of constrained motion applied to point paths, specific input-output relations, function generators, kinematic synthesis. Three hours rec. a week. Pr.: ME 533.

**ME 760. Engineering Analysis I.** (3) I. Methods of analysis employed in the solution of problems selected from various branches of engineering. Emphasis is on discrete systems. Three hours rec. a week. Pr.: MATH 240 and senior standing.

**ME 762. Finite Elements.** (3) I. The modeling of lumped parameter systems. Element formulation, assembly, and solution are covered in detail. Standard element families, solution methods, energy techniques, display of results using computer graphics, and applications in heat transfer, fluid, and structural mechanics. The student will develop a complete finite element program. Pr.: ME 400. Pr. or conc.: ME 573 or graduate standing.

**ME 773. Intermediate Heat Transfer.** (3) II. Conduction, convection, and radiation, mass transfer, phase change, heat exchangers, introductory numerical methods. Three hours rec. a week. Pr.: ME 573.

**ME 775. Optimal Mechanical Design.** (3) II, in odd years. The philosophy of optimal design; unconstrained minimization for single variable and multivariable cases; linear and quadratic programming; constrained nonlinear optimization; applications to design of structures, mechanisms, dynamic systems, components, control systems, etc. Pr.: ME 400, MATH 240, and senior standing in engineering.

## Nuclear Engineering

N. Dean Eckhoff,\* Head

Professors Donnert,\* Eckhoff,\* Faw,\* Merklin,\* Shultis,\* and Simons;\* Assistant Professors Hightower.

The curriculum leading to the B.S. in nuclear engineering prepares students for professional positions in industry, govern-

ment, and private practice. Through technical electives, students may organize a program suited to their particular needs and interests. Students may elect a program leading to specialized engineering practice or to postgraduate study in engineering, science, medicine, or law.

### Curriculum in nuclear engineering (NE)

Bachelor of science in nuclear engineering  
132 hours required for graduation  
Accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology

#### Freshman

##### Fall semester

NE 110	Nuclear Engineering Concepts	2
ENGL 100	Expository Writing I	3
CHM 210	Chemistry I	4
MATH 220	Analytic Geometry and Calculus I	4
KIN 101	Principles of Physical Fitness	1
ECON 110	Principles of Macroeconomics	3
		<hr/> 17

##### Spring semester

NE 385	Engineering Computational Techniques	2
CHM 230	Chemistry II	4
MATH 221	Analytic Geometry and Calculus II	4
SPCH 105	Public Speaking IA	2
	Humanities or social science elective	3
		<hr/> 15

#### Sophomore

##### Fall semester

CHE 350	Engineering Materials	2
PHYS 213	Engineering Physics I	5
MATH 222	Analytic Geometry and Calculus III	4
NE 415	Introduction to Engineering Analysis	3
	Humanities or social science elective	3
		<hr/> 17

##### Spring semester

PHYS 214	Engineering Physics II	5
NE 500	Applied Engineering Analysis	3
CE 530	Statics and Dynamics	4
	Humanities or social science elective	5
		<hr/> 17

#### Junior

##### Fall semester

NE 515	Nuclear Engineering Materials	3
EECE 519	Electric Circuits and Control	4
ME 513	Thermodynamics I	3
NE 505	Elements of Nuclear Engineering	3
	Technical elective	3
		<hr/> 16

##### Spring semester

NE 512	Principles of Radiation Detection	3
NE 520	Neutron and Particle Interactions I	2
ME 571	Fluid Mechanics	3
NE 602	Radiation Protection Engineering I	3
	Technical elective	3
	Humanities or social science elective	2
		<hr/> 16

#### Senior

##### Fall semester

ENGL 415	Written Communication for Engineers*	3
NE 630	Applied Reactor Theory	3
NE 647	Thermal Hydraulics Laboratory	1
NE 693	Radiation Shielding Design	3
ME 573	Heat Transfer	3

Technical electives	4
	<hr/> 17

##### Spring semester

NE 648	Reactor Operations Laboratory	2
NE 694	Nuclear Reactor Thermal Design	3
NE 696	Nuclear Systems Design	3
NE 697	Nuclear Engineering Design	2
	Technical electives	7
		<hr/> 17

\*Expository Writing II is optional if prerequisites for Written Communication for Engineers (ENGL 415) are met from Expository Writing I. If necessary, Expository Writing II may be substituted for 3 hours of technical electives.

Humanities and social science electives are to be selected from the approved list and need not be taken in the order listed in the curriculum. (Two courses must be 400 level or above.)

A technical elective program of study is chosen in consultation with the student's advisor and presented for approval to the department faculty.

### Nuclear engineering courses Undergraduate credit

**NE 110. Nuclear Engineering Concepts.** (2) I. A survey of nuclear engineering that acquaints students with the technical and professional activities and responsibilities of nuclear engineers. Two hours lec. a week.

**NE 385. Engineering Computational Techniques.** (2) I, II. Application of digital computer methods to the solution of engineering problems. Two hours lec. a week. Pr.: MATH 220 or 225.

**NE 415. Introduction to Engineering Analysis.** (3) I. Introduction to analytical, statistical, and numerical analysis, including computer programming, as applied to engineering. Three hours rec. a week. Pr.: MATH 211 or 221.

**NE 499. Honors Research in Nuclear Engineering.** (Var.) I, II. Individual research problem selected with approval of faculty advisor. Open to students in the College of Engineering honors program. A report is presented orally and in writing during the last semester.

### Undergraduate and graduate credit in minor field

**NE 500. Applied Engineering Analysis.** (3) II. Methods and applications of analytical, statistical, and numerical analysis in engineering, including computer programming. Three hours rec. a week. Pr.: NE 415.

**NE 501. Introduction to Nuclear Engineering.** (3) I, II, S. An overview course to acquaint non-nuclear engineers with introductory aspects of nuclear engineering. Three hours rec. a week. Pr.: Junior standing in engineering or physical sciences.

**NE 505. Elements of Nuclear Engineering.** (3) I. Introduction to radioactive decay, neutron reactions and interactions, radiation interaction with matter, and reactor physics. Three hours lec. a week. Pr.: MATH 221 and PHYS 213.

**NE 512. Principles of Radiation Detection.** (3) II. Operating principles and general properties of devices used in the detection and characterization of ionizing radiation. Two hours rec. and three hours lab a week. Pr.: NE 505.

**NE 515. Nuclear Engineering Materials.** (3) I. An investigation of the nuclear properties, metallurgy, the processing of nuclear materials, and the behavior of fuels and components in a radiation environment. Three hours lec. a week. Pr.: NE 505 and CHE 352.

**NE 520. Neutron and Particle Interactions I.** (2) II. Neutron interactions and associated cross sections of importance to nuclear reactor theory; fission and its application to reactor design; energetics of multiple neutron scattering and neutron thermalization. Two hours rec. a week. Pr.: NE 505.

**Undergraduate and graduate credit****NE 602. Radiation Protection Engineering I.** (3) II.

Basic principles and concepts of radiation protection. Analysis of radioactive-decay systematics, dose and risk concepts, description of natural and other sources of ionizing radiation, basic procedures of external and internal dose evaluation, waste storage and disposal. Three hours lec. a week. Pr.: NE 500 and 505. Pr. or conc.: NE 512.

**NE 620. Problems in Nuclear Engineering.** (Var.) I, II, S. Specific studies in current and advanced problems in various phases of nuclear engineering. Pr.: Consult head of department.

**NE 630. Applied Reactor Theory.** (3) I. Theory of diffusion and slowing down of neutrons with application to critical and subcritical nuclear reactors. Measurement of various reactor physics parameters. Three hours rec. a week. Pr.: NE 520.

**NE 635. Plasma Physics.** (3) I. Fundamental properties of plasmas; motion of ions and electrons in electromagnetic fields; plasmas as magneto-hydrodynamic fluids; plasma waves; diffusion phenomena in plasmas; electric resistivity of plasmas; equilibrium and plasma stability; kinetic theory of plasmas. Three hours rec. a week. Same as PHYS 635. Pr.: PHYS 532 or EECE 557, and PHYS 621.

**NE 647. Thermal Hydraulics Laboratory.** (1) I. A laboratory introduction to the fluid mechanics and heat transfer mechanisms in reactor cooling. Three hours lab a week. Pr. or conc.: ME 571.

**NE 648. Reactor Operations Laboratory.** (2) II. Licensing, nuclear safety, and reactor operations. Measurement of nuclear reactor parameters. One hour lec. and three hours lab a week. Pr.: NE 512 and 630.

**NE 675. Neutron and Particle Interactions II.** (2) II. Engineering approach to the quantum mechanics of the interaction of neutrons and other nuclear radiations with matter; theoretical methods for the evaluation of nuclear reaction cross sections required for engineering applications. Two hours rec. a week. Pr.: NE 500 and 520.

**NE 693. Radiation Shielding Design.** (3) I. Sources of radiation, kernel concepts, and application of diffusion and ray theory to shielding calculations and design, with applications principally in stationary nuclear reactor shielding. Three hours rec. a week. Pr.: NE 602. Pr. or conc.: NE 630.

**NE 694. Nuclear Reactor Thermal Design.** (3) II. Application of thermal-hydraulic principles to the design and analysis of nuclear power plants, with special emphasis on safety systems. Three hours rec. a week. Pr.: NE 630 and ME 573.

**NE 696. Nuclear Systems Design.** (3) II. Application of the principles of nuclear reactor kinetics and simulation linear stability of reactor systems, and noise analysis to nuclear reactor systems. Three hours rec. a week. Pr.: NE 630.

**NE 697. Nuclear Engineering Design.** (2) II. Individually prepared report on the solution of a design problem. Regulations and economics of nuclear power facilities. Two hours rec. a week. Pr.: NE 630.

**NE 750. Direct Energy Conversion.** (3) II. Principles and analysis of direct conversion phenomena, with special emphasis on direct conversion of nuclear energy including thermoelectric, thermoionic, photovoltaic, magneto-hydrodynamic, and electrochemical processes. Three hours rec. a week. Pr.: NE 647.

**NE 761. Radiation Measurement Systems.** (4) I. Principles of systems used to measure radiation. Applications to radiation monitoring, dosimetry, and spectroscopy. Three hours rec. and three hours lab a week. Pr.: NE 512.

**NE 762. Nuclear Instrumentation.** (4) II. Design and analysis of nuclear instrumentation. Application to nuclear reactor control, radiation dosimetry, and nuclear spectroscopy. Three hours rec. and three hours lab a week. Pr.: EE 510 or 519, and NE 512.

**NE 772. Radiation Effects on Materials I.** (3) I. General theory of radiation damage to solids. Specific effects of radiation on nuclear reactor components and materials of construction. Applications to nuclear reactor design. Three hours rec. a week. Pr.: NE 520.

**NE 774. Radiation Effects on Materials II.** (3) II. General theory of radiation effects on liquids and gases. Principles of radiation chemistry, photochemistry, and biophysics. Medical, agricultural, and industrial applications. Three hours rec. a week. Pr.: NE 520 or CHM 595.

**NE 799. Special Topics in Nuclear Engineering.** (Var.) On sufficient demand. Topical material of importance in nuclear engineering, such as thermonuclear reactions, numerical analysis, Monte Carlo methods in radiation transport, effects of nuclear explosions, etc. Pr.: Consent of head of department.

# Human Ecology

Barbara S. Stowe, Dean  
Virginia M. Moxley, Associate Dean for  
Academic Affairs  
Jean Segó, Assistant Dean for Academic  
Programs and Records  
Karen Pence, Assistant Dean for Advising  
and New Student Programs

119 Justin Hall  
532-5500  
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The College of Human Ecology provides the context for the study of people, their near environments, and especially the interaction between the two. Emphasis is placed on the design and management of environments and services that enhance human productivity and well-being.

Professional programs are offered through General Human Ecology and the four departments: Clothing, Textiles, and Interior Design; Foods and Nutrition; Hotel, Restaurant, Institution Management and Dietetics; and Human Development and Family Studies.

The bachelor of science degree is offered in each area of specialization and in general human ecology.

The College of Human Ecology offers activities and experiences that enhance professional development. These include field study (see department descriptions, below), participation in professional organizations and activities, and career planning.

## Degree programs

All undergraduate programs of study lead to a bachelor of science degree. The programs are listed in the table and described on the following pages.

Entering freshmen who are undecided about specific programs may be admitted to the major in general human ecology (HEGN). Entering transfer students who are undecided and nondegree seeking students should seek admission in human ecology, undeclared (HEUN). Special advisors help students explore available alternatives before they choose specific programs.

## General Requirements

### Bachelor of science degree

Each degree offered by the College of Human Ecology includes a minimum of 37 hours in general education; professional

and supporting courses in a specific option, including a minimum of 33 hours from departments within the college; and unrestricted electives as needed to total 125–130 hours.

The curricula for all programs consist of the following: general education, including courses from communications, the humanities, social, biological, and physical sciences, quantitative studies, and kinesiology; an area of specialization in a specific field of human ecology; supporting courses; at least 6 hours from two areas in the College of Human Ecology outside the professional area, as defined by the degree program; and unrestricted electives from any of the K-State departments.

Acceptance of courses to meet general education requirements varies among the colleges at the university. A listing of categories of applicable courses is available from the College of Human Ecology Dean's Office.

Basic curriculum requirements are listed below. See specific program descriptions for details.

#### General education courses (37 hours minimum)

Communications (8–9)	
ENGL 100	Expository Writing I . . . . . 3
ENGL 120	Expository Writing II . . . . . 3
SPCH 105	Public Speaking IA . . . . . 2
	or
SPCH 106	Public Speaking I . . . . . 3
Social science (9)	
ECON 110	Principles of Macroeconomics . . . . . 3
Two of the following:	
HDFS 110	Introduction to Human Development . . . . . 3
PSYCH 110	General Psychology . . . . . 3
SOCIO 211	Introduction to Sociology . . . . . 3
Humanities (6)	
Electives*	. . . . . 6
Sciences (7)	
Biological and physical sciences electives*	. . . . . 7
(One course must be taken from each area; one course must include a laboratory)	
Quantitative studies (6)	
MATH 100	College Algebra . . . . . 3
	or
A college-level calculus course . . . . . 3	
Any 3-hour introductory statistics course . . . . . 3	
	or
Any 3-hour computing literacy course . . . . . 3	
KIN 101	Principles of Physical Fitness . . . . . 1

**Human ecology courses . . . . . 6**  
At least 6 hours representing two different areas in the College of Human Ecology, outside the professional area as defined by the degree program.\*\*

**Professional and supporting courses (51–82 hours)**  
(See specific option/program.)

**Unrestricted electives (0–28 hours)**  
(See specific option/program.)

**Total hours for graduation . . . . . 125–130**

\*A listing of categories of courses applicable toward the general education requirements for human ecology programs is available from the college dean's office.

\*\*This does not apply to B.S. in human ecology or B.S. in human ecology and mass communications, since the professional areas contain courses from at least three departments.

## Transfer programs

Careful planning enables students to transfer courses from another college or university that will apply toward specific degree requirements at K-State. Students who plan to transfer should contact the College of Human Ecology Dean's Office to verify the transferability of courses and plan their transfer programs as soon as possible.

Two-plus-two articulated programs are available for selected programs at some Kansas community colleges.

The courses listed below may be transferred to the College of Human Ecology, although not all courses are required for every program. A list of required courses for each program is available from the college dean's office.

Courses required in all human ecology programs:	Credit hours*
Expository writing or English composition . . . . .	6
Public speaking . . . . .	2–3
General psychology and/or sociology . . . . .	3
Macroeconomics . . . . .	3
College algebra or college-level calculus (see specific program) . . . . .	3
Introductory statistics and/or computing literacy . . .	3
<b>Transferable courses; some may apply as electives if not required for specific program:</b>	
American government or political science . . . . .	3
Sociology and/or psychology . . . . .	3–6
Microeconomics . . . . .	
Civilization or world history . . . . .	3
Approved literature or modern language . . . . .	6
Design I . . . . .	2
Drawing I . . . . .	2
General chemistry or Chemistry I and II (see specific program) . . . . .	5–10
Organic chemistry . . . . .	5
Biology (with lab) . . . . .	4
Human growth and development (life span)** . . . . .	3
Food preparation and meal management . . . . .	4–6
Nutrition*** . . . . .	3
Family relations**** . . . . .	3
Child development**** . . . . .	3
Textiles (with lab)**** . . . . .	3

\*Credit hours given above apply to courses at K-State. Some transfer courses have more or fewer hours; substitutions or adjustments usually can be made for the difference in credit hours. A maximum of one-half of the hours required for the degree may be transferred from a two-year college; 125 to 130 hours are required for graduation from the College of Human Ecology. See list of required courses for major area of interest.

\*\*Students planning for degrees in clothing and textiles, interior design, foods and nutrition, dietetics, or hotel and restaurant management should take HDFS 110 after transferring to K-State.

\*\*\*Students planning for degrees in foods and nutrition, or dietetics, or certification in home economics

education should take FN 502 Principles of Nutrition after transferring to K-State.

\*\*\*\*Must be offered through a human ecology/home economics department for students preparing for certification in home economics education.

Programs	Degrees	Departments/areas
Apparel and textile marketing	Bachelor of science in clothing and textiles	Clothing, textiles, and interior design
Apparel design	Bachelor of science in clothing and textiles	Clothing, textiles, and interior design
Community health and nutrition	Bachelor of science in foods and nutrition	Foods and nutrition
Dietetics Coordinated program in dietetics General dietetics	Bachelor of science in dietetics	Hotel, restaurant, institution management and dietetics
Early childhood education	Bachelor of science in human development and family studies	Human development and family studies
Family life and human development Community services Family and consumer economics Family studies (pre-law) Life span human development Human development and family studies and social work*	Bachelor of science in human development and family studies	Human development and family studies
Food science	Bachelor of science in foods and nutrition	Foods and nutrition
General human ecology	Bachelor of science in human ecology	General human ecology
Home economics education teacher certification	Bachelor of science in human ecology	General human ecology
Hotel and restaurant management	Bachelor of science in hotel and restaurant management	Hotel, restaurant, institution management and dietetics
Human ecology and mass communications	Bachelor of science in human ecology and mass communications	General human ecology
Interior design	Bachelor of science in interior design	Clothing, textiles, and interior design
Nutrition and exercise sciences*	Bachelor of science in foods and nutrition	Foods and nutrition
Nutritional sciences (pre-medical, pre-dental, and medically related fields)	Bachelor of science in foods and nutrition	Foods and nutrition
Textiles	Bachelor of science in clothing and textiles	Clothing, textiles, and interior design

\*Dual degrees are awarded through the College of Arts and Sciences.

## Program Options

### Honors programs

Students with outstanding academic records are invited to participate in the human ecology honors program. High school students are selected according to their scores on the American College Test. Transfer and upper-class students with a 3.5 cumulative grade point average also are eligible. Advisors help honor students plan individual programs of study, which include honors courses, seminars, and independent study.

In the junior or senior year, students complete honors projects on topics of their choice. They develop these projects with human ecology faculty advisors and with the approval of the human ecology honors coordinator. This independent study may involve extensive reading in a selected area, field study, experience with a research project, or participation in an academic activity that will significantly increase the student's knowledge in an area of interest.

### Dual degree programs Kansas State University

Students interested in combining two degree programs must complete a mini-

imum of 150 hours and satisfy all requirements for both degrees. Students may earn dual degrees within the College of Human Ecology, or they may combine their degree in human ecology with a degree from a different college. The dean's office may be contacted for more information.

The College of Human Ecology participates in the intercollegiate programs in American ethnic studies, international studies, women's studies, and gerontology, described in the Secondary Majors section of this catalog.

### Manhattan Christian College

The College of Human Ecology cooperates

with Manhattan Christian College to provide dual degrees. Students may supplement their Christian service or other programs with a College of Human Ecology professional program. Those interested in dual degrees should contact the College of Human Ecology Dean's Office and Manhattan Christian College, Office of the Vice President for Academic Affairs. Joint advising is arranged for dual degree students. With careful planning during the first semester, most students can complete two degrees in five years, including study during the summers.

### Placement

The College of Human Ecology cooperates with the Career Planning and Placement Center to help students locate internships or field experiences and employment opportunities in their chosen field.

### Field study opportunities

Each department in the college offers field study experience for interested and qualified students. Students earn university credit while gaining pre-professional experience. University faculty and professionals in the field guide and supervise these experiences. The length of time devoted to a field study experience varies from one or two weeks to a complete semester. Some field experience programs provide students with financial compensation.

### Organizations and activities

Students participate in a wide range of professional activities sponsored by local and national organizations. Most subject areas within the college have a student organization to enhance the personal and professional development of members. Student associations funded by the Human Ecology College Council are:

- American Society of Interior Designers, Student Chapter
- Apparel and Textile Marketing Association
- Apparel Design Collective
- Foods and Nutrition Association
- Home Economics Education Association
- Human Development and Family Studies Association
- KSU Hospitality Management Society
- KSU Student Chapter of the American Association of Textile Chemists and Colorists
- KSU Student Chapter of the Professional Convention Management Association
- Student Dietetic Association

Undergraduate students may be elected or appointed to serve as members of the Human Ecology College Council, the official college student governing body. All students may participate in the College of

Human Ecology Open House, which is held as a part of All-University Open House.

The College of Human Ecology Ambassadors are a select group of students who serve as hosts for the college and promote college programs. CHE Ambassadors must meet scholarship requirements and participate in a training program to qualify for the CHE Ambassador program.

Qualified students are invited to join the Phi Upsilon Omicron and Kappa Omicron Nu honor societies.

### Family Center

Stephan Bollman, Director

The Family Center provides applied educational experiences for graduate and undergraduate students of the College of Human Ecology.

The center offers educational programs, consultation, and therapy for individuals and families. These services are provided by students who are supervised by College of Human Ecology faculty. Specific programs are offered in marriage and family therapy, family life education, and parent education.

Located north of Justin Hall on Campus Creek Road, the center is easily accessible to the students, faculty, and community.

### Sensory Analysis Center

Edgar Chambers, IV, Director

The Sensory Analysis Center in the Department of Foods and Nutrition has the only university-operated professional sensory panel in the United States. Sensory properties of products are analyzed for companies, government entities, and researchers on campus to provide information about characteristics that are important in product development. The Sensory Analysis Center helps students link theory with practical experience in the study of sensory perception and evaluation of products.

## Clothing, Textiles, and Interior Design

Mary Don Peterson, Head

Professors McCullough,\* Reagan,\* and Stowe; Associate Professors Corbin, Peterson,\* and White;\* Assistant Professors Annis,\* Huck,\* Minshall,\* Mohr, Munson,\* Potnis, Radcliffe,\* Schoenberger, and Villasi;\* Instructors Cannon, Hedrick, and McComas; Emeriti: Professors Brockman,\* Slinkman, and Tucker; Associate Professors Hill\* and J. Howe; Assistant Professors Craigie\* and Newby.

The Department of Clothing, Textiles, and Interior Design focuses on meeting human needs through the analysis, design, production, and evaluation of components in the near environment.

Programs leading to a bachelor of science degree are: apparel and textile marketing, apparel design, interior design, and textiles. Students are encouraged to participate in field experiences to further understand their chosen professions.

Facilities include well-equipped studios and laboratories for interior design, housing, apparel design and production, and textile analysis. An extensive historic textiles and costume collection, housed in a climate-controlled storage facility in Justin Hall, is available for study.

Students in all programs participate in field trips and study tours to design, production, and retail market centers across the U.S. and internationally. Student chapters of two professional organizations, the American Society of Interior Designers (ASID) and the American Association of Textile Chemists and Colorists (AATCC), offer opportunities for leadership and involvement.

### Apparel and textile marketing

Bachelor of science in clothing and textiles

The apparel and textile marketing program prepares students for careers in the production, distribution, and marketing of apparel and textile products. Professional courses are supplemented with study in business, including marketing, accounting, and management. During the junior or senior year, students complete an eight-week supervised field experience in textile production, retail, or manufacturing.

#### General education courses (41–46 hours)

ENGL 100	Expository Writing I	3
ENGL 120	Expository Writing II	3
SPCH 105	Public Speaking IA	2
	<b>or</b>	
SPCH 106	Public Speaking I	3
ECON 110	Principles of Macroeconomics	3
PSYCH 110	General Psychology	3
SOCIO 211	Introduction to Sociology	3
ECON 120	Principles of Microeconomics	3
	Approved economics course at 500 level or above (if STAT 350 and 351 are not taken)	3
HIST 102	Western Civilization: The Modern Era	3
	Biological science elective	3–4
CHM 110	General Chemistry	5
CIS 110	Introduction to Personal Computers	3
	<b>or</b>	
HDFS 120	Microcomputers in Human Services	3
MATH 100	College Algebra	3

STAT 350	Business and Economics Statistics I	3
	<b>and</b>	
STAT 351	Business and Economics Statistics II (if approved economics course at 500 level or above is not taken)	3
KIN 101	Principles of Physical Fitness	1
<b>Professional courses (44–45 hours)</b>		
CT 155	Fundamentals of Apparel Evaluation	3
CT 220	Fundamentals of Apparel Design and Production	3
CT 230	Apparel and Textile Marketing	3
CT 260	Textiles	3
CT 330	Clothing and Society	3
CT 430	Professional Development for Apparel and Textile Marketing	1
CT 435	Apparel and Textile Promotion	4
CT 450	Apparel and Textile Marketing Field Experience	5
	<b>or</b>	
MKTG 541	Retailing	3
	<b>and</b>	
MKTG 542	Sales Management	3
CT 520	Textile Merchandise Profit Analysis	3
CT 536	Merchandising Concepts	4
CT 545	Textile and Apparel Industry	3
CT 570	Textiles for Merchandising	3
CT 631	History of Costume from 1780 to Present	3
CT 635	Case Studies in Apparel and Textile Marketing	2
CT 650	Clothing and Textile Study Tour	1
<b>Supporting courses (26 hours)</b>		
HDFS 110	Introduction to Human Development	3
HDFS 400	Family Economics	3
ART 100	Design I	2
ACCTG 231	Accounting for Business Operations	3
MANGT 420	Management Concepts	3
MKTG 400	Marketing	3
MANGT 531	Personnel and Human Resources Management	3
	<b>or</b>	
PSYCH 560	Industrial Psychology	3
JMC 320	Principles of Advertising	3
	<b>or</b>	
JMC 325	Fundamentals of Public Relations	3
MKTG 450	Consumer Behavior	3
	<b>or</b>	
PSYCH 545	Consumer Psychology	3
<b>Unrestricted electives</b> 8–14		
<b>Total for graduation</b> 125		

## Apparel design

### Bachelor of science in clothing and textiles

The apparel design program provides students with the basic skills and competence required to enter the apparel industry, including garment design, fashion illustration, and pattern theory and development. The course work emphasizes commercial and industrial applications of design, and incorporates technology used in industry such as computer-aided apparel design. Students have access to the historic textile and costume collection for research and special projects.

#### General education courses (43–46 hours)

ENGL 100	Expository Writing I	3
ENGL 120	Expository Writing II	3

SPCH 105	Public Speaking IA	2
	<b>or</b>	
SPCH 106	Public Speaking I	3
ECON 110	Principles of Macroeconomics	3
ECON 120	Principles of Microeconomics	3
PSYCH 110	General Psychology	3
SOCIO 211	Introduction to Sociology	3
ART 195	Survey of Art History I	3
ART 196	Survey of Art History II	3
HIST 102	Western Civilization: Modern Era	3
	Biological science elective	3–4
PHYS 101	The Physical World I	3
	<b>and</b>	
PHYS 103	The Physical World I Lab	1
	<b>or</b>	
CHM 110	General Chemistry	5
MATH 100	College Algebra	3
CIS 110	Introduction to Personal Computers	3
	<b>or</b>	
HDFS 120	Microcomputers in Human Services	3
KIN 101	Principles of Physical Fitness	1
<b>Professional courses (58 hours)</b>		
CT 110	Apparel Construction	4
CT 220	Fundamentals of Apparel Design and Production	3
CT 230	Apparel and Textile Marketing	3
CT 260	Textiles	3
CT 300	Advanced Apparel Construction	4
CT 315	Fashion Drawing and Illustration	2
CT 330	Clothing and Society	3
CT 410	Theory of Pattern Design I	3
CT 420	Design by Draping	2
CT 500	Intermediate Apparel Design	3
CT 515	Theory of Pattern Design II	3
CT 540	Advanced Apparel Design	3
CT 545	Textile and Apparel Industry	3
CT 630	History of Costume to 1780	3
CT 631	History of Costume 1780 to Present	3
CT 650	Clothing and Textiles Study Tour	1
CT 550	Apparel Design Field Experience	12
	<b>or</b>	
Take three from the following courses:		
ECON 620	Labor Economics	3
ECON 640	Industrial Organization and Public Policy	3
ECON 681	International Trade	3
MANGT 202	Small Business Operations	3
MANGT 530	Industrial and Labor Relations	3
MANGT 630	Labor Relations Law	3
MKTG 450	Consumer Behavior	3
PSYCH 560	Industrial Psychology	3
	<b>and</b>	
CT 715	Advanced Pattern Design	3
	<b>or</b>	
CT 620	Textile Yarns and Fabrics	3
<b>Supporting courses (18 hours)</b>		
HDFS 110	Introduction to Human Development	3
	<b>or</b>	
HDFS 350	Family Relationships and Sex Roles	3
	<b>or</b>	
HDFS 400	Family Economics	3
FN 132	Basic Nutrition	3
ART 100	Design I	2
ART 190	Drawing I	2
ART 200	Design II	2
MANGT 420	Management Concepts	3
MKTG 400	Marketing	3
<b>Unrestricted electives</b> 6–9		
<b>Total for graduation</b> 128		

## Interior design

### Bachelor of science in interior design

The interior design program is a four-year, professional curriculum accredited by the Foundation for Interior Design Education Research (FIDER). It provides the competencies required to meet the qualifications for the professional title of interior designer.

Interior designers identify, research, and creatively solve problems related to the function of interior environments in order to enhance quality of life and protect public health, safety, and welfare. Interior designers perform services such as programming, design analysis, space planning, preparing drawings and documents, and jobsite inspection using specialized knowledge of aesthetics, furnishings, interior construction, building systems and components, building regulations, equipment, and materials.

The fine arts-based interior design program emphasizes the interaction between humans and their near environment, that is, the design of interior spaces that enhance user satisfaction, productivity, and safety at all stages of the life cycle. Specializations within the program include design for special needs, interior finishes and furnishings, contract documents, interior design history, and preservation and restoration.

Students are provided with the creative, aesthetic, and technical skills necessary to translate a design concept into three-dimensional reality. Students develop competencies in problem-solving, interior space planning, selection and specification of interior furnishings and finishes, effective graphic and verbal presentation skills, and execution of contract documents. Supervised internships and study tours in the United States and abroad, and participation in the student chapter of the American Society of Interior Designers, enhance the program.

#### General education courses (40–42 hours)

ENGL 100	Expository Writing I	3
ENGL 120	Expository Writing II	3
SPCH 105	Public Speaking IA	2
	<b>or</b>	
SPCH 106	Public Speaking I	3
ECON 110	Principles of Macroeconomics	3
PSYCH 110	General Psychology	3
SOCIO 211	Introduction to Sociology	3
ART 195	Survey of Art History I	3
ART 196	Survey of Art History II	3
HIST 101	Western Civilization: Rise of Europe	3
	Biological science elective	3–4
PHYS 101	The Physical World I	3
	<b>and</b>	
PHYS 103	The Physical World I Lab	1
	<b>or</b>	
PHYS 115	Descriptive Physics	4
MATH 100	College Algebra	3
CIS 110	Introduction to Personal Computers	2
KIN 101	Principles of Physical Fitness	1

**Professional courses (49–51 hours)**

CT 260	Textiles	3
IDH 210	Design and Behavior in the Interior Environment	3
IDH 215	Interior Design Graphics	3
IDH 310	Construction Methods and Materials for Interior Design and Housing	3
IDH 315	Advanced Interior Design Graphics	3
IDH 320	History of Interior Design I	3
IDH 345	Space and Activity Planning	3
IDH 360	History of Interior Design II	3
IDH 410	Housing and Its Environment	3
IDH 415	Computer-Aided Design and Drafting for Interior Design	2
<b>or</b>		
PLAN 630	Computer Applications in Planning and Design	1–3
IDH 435	Interior Design and Housing Systems	3
IDH 445	Interior Design Contract Documents Studio	3
IDH 530	Interior Design Practices and Procedures	3
IDH 545	Senior Interior Design Studio I	3
IDH 645	Senior Interior Design Studio II	3
IDH 650	Advanced Design and Behavior in the Interior Environment	3
IDH 651	Design for Exceptional Needs	3

**Professional electives (16 hours)**

Select from lists below		
Studio arts		4
Professional applications		6
Business		6

**Studio arts (4 hours)**

ART 205	Graphic Design Techniques	2
ART 220	Watercolor I	2
ART 230	Sculpture I	2
ART 245	Painting I	2
ART 260	Design in the Crafts	2
ART 265	Ceramics I	2
ART 270	Metalsmithing and Jewelry	2
ART 275	Weaving	2
LAR 510	Landscape Architectural Delineation Techniques	2

**Professional applications (6 hours)**

CT 435	Apparel and Textile Promotion	4
CT 680	Physical Analysis of Textiles	3
IDH 600	Internship	4
IDH 610	Housing for Special Needs	3
IDH 660	Kitchen and Utility Area Planning	3
IDH 680	Historic Fabric Design	3
IDH 710	Housing and Facilities Management Processes/Applications	3
IDH 760	Historic Preservation	3

**Business (6 hours)**

ACCTG 231	Accounting for Business Operations	3
FINAN 552	Real Estate	3
JMC 325	Fundamentals of Public Relations	3
MANGT 202	Small Business Operations	3
MANGT 390	Business Law I	3
MANGT 420	Management Concepts	3
MKTG 400	Marketing	3

**Supporting courses (15 hours)**

ARCH 301	Appreciation of Architecture	3
ART 100	Design I	2
ART 190	Drawing I	2
ART 200	Design II	2
HDFS 110	Introduction to Human Development	3
FN or HRIMD elective		3

**Unrestricted electives** 6–10**Total for graduation** 130**Textiles****Bachelor of science in clothing and textiles**

Students in the textiles program emphasize either textile science or textile chemistry by choosing the appropriate professional and supporting courses. The textile science emphasis is for students interested in the consumer aspects of the textile industry and includes quality control, fiber and fabric development, and textile testing. The textile chemistry emphasis incorporates course requirements for traditional chemistry majors, while providing students with a specialization in an applied field. Textile chemistry leads to careers in research and development with the textile industry.

**General education courses (44–48 hours)**

ENGL 100	Expository Writing I	3
ENGL 120	Expository Writing II	3
SPCH 105	Public Speaking IA	2
<b>or</b>		
SPCH 106	Public Speaking I	3
ECON 110	Principles of Macroeconomics	3
PSYCH 110	General Psychology	3
SOCIO 211	Introduction to Sociology	3
HIST 101	Western Civilization: Rise of Europe	3
Humanities elective 3		
Biological science elective 3–4		
CHM 210	Chemistry I	4
<b>and</b>		
CHM 230	Chemistry II	4
<b>and</b>		
CHM 271	Chemical Analysis	4
<b>or</b>		
CHM 220	Chemical Principles I	5
<b>and</b>		
CHM 250	Chemical Principles II	5
CIS 200	Fundamentals of Computer Programming	3
CIS 203	Fundamentals of Computer Programming Lab	1
STAT 320	Elements of Statistics	3
KIN 101	Principles of Physical Fitness	1

**Select Program I or II****Program I: Textile Science****Professional courses (31–33 hours)**

CT 260	Textiles	3
CT 350	Fiber Science	3
CT 545	Textile and Apparel Industry	3
CT 620	Textile Yarns and Fabrics	3
CT 680	Physical Analysis of Textiles	3
CT 746	Textile Dyeing and Printing	4
CT 747	Textile Finishes	3
CT 765	Chemical and Optical Analysis of Textiles	3
CT 650	Clothing and Textiles Study Tour	1–2

Clothing and textiles elective 3

CHM 350 General Organic Chemistry 3

**and**

CHM 351 General Organic Chemistry Lab 2

**or**

CHM 531 Organic Chemistry I 3

**and**

CHM 532 Organic Chemistry Lab 2

**Supporting courses (28 hours)**

FN 132	Basic Nutrition	3
HDFS 400	Family Economics	3
CT 330	Clothing and Society	3
MATH 100	College Algebra	3
<b>or</b>		
MATH	Math elective (200 level or above)	3

PHYS 115	Descriptive Physics	4
IDH 680	Historic Fabric Design	3
Three courses from the College of Business Administration 9		

**Unrestricted electives** 16–22**Total for graduation** 125**Program II: Textile Chemistry****Professional courses (40–43 hours)**

CT 260	Textiles	3
CT 350	Fiber Science	3
CT 545	Textile and Apparel Industry	3
CT 620	Textile Yarns and Fabrics	3
CT 746	Textile Dyeing and Printing	4
CT 747	Textile Finishes	3
CT 680	Physical Analysis of Textiles	3
CT 765	Chemical and Optical Analysis of Textiles	3

CT 650 Clothing and Textiles Study Tour 1–2

**or**

Clothing and textiles elective 3

CHM 531 Organic Chemistry I 3

CHM 532 Organic Chemistry Lab 2

CHM 550 Organic Chemistry II 3

CHM 551 Advanced Organic Lab 2

CHM 545 Chemical Separations 2

CHM 500 General Physical Chemistry 3

**or**

CHM 585 Physical Chemistry I 3

**Supporting courses (25 hours)**

FN 132	Basic Nutrition	3
HDFS 400	Family Economics	3
CT 330	Clothing and Society	3
MATH 220	Analytical Geometry and Calculus I	4
MATH 221	Analytical Geometry and Calculus II	4
PHYS 113	General Physics I	4
PHYS 114	General Physics II	4

**Unrestricted electives** 9–16**Total for graduation** 125**Clothing and textiles courses****Undergraduate credit**

**CT 110. Apparel Construction.** (4) I, II. Fabrication of apparel; theories and principles of pattern alteration and garment fit; construction methods as applied to woven and knitted fabrics; evaluation of workmanship in apparel; introduction to ready-to-wear apparel techniques and production. Two hours rec. and six hours lab a week.

**CT 155. Fundamentals of Apparel Evaluation.** (3) I, II. Evaluation of garment construction in ready-to-wear; fit, sizing, and alteration of ready-to-wear garments; evaluation of garment construction through sample development. Two hours lec. and two hours lab a week.

**CT 220. Fundamentals of Apparel Design and Production.** (3) I, II. Application of the elements and principles of design to apparel design; introduction to apparel production and the work of the apparel designer; basic fashion drawing and figure study. Two hours lec. and two hours rec. a week.

**CT 230. Apparel and Textile Marketing.** (3) II. Overview of the processes involved in the marketing of fashion goods.

**CT 260. Textiles.** (3) I, II. Fundamentals of textiles as related to the problems of the consumer. Two hours rec. and two hours lab a week. Pr.: Sophomore standing.

**CT 300. Advanced Clothing Construction.** (4) I. Advanced techniques and experimentation with diverse fabrics; couture techniques as applied to woven or knitted fabrics; industrial techniques as applied to structured (i.e., tailored) garments. Two hours rec. and six hours lab a week. Pr.: CT 110; and CT 260 or conc. enrollment.

**CT 315. Fashion Drawing and Illustration.** (2) I. In-depth study of the fashion figure and fashion drawing; fundamental fashion layout; development of stylized and mechanical figure and apparel drawings. Four hours lab a week; meets first half of semester. Pr.: ART 190; ART 200; CT 220; and CT 420 conc. enrollment.

**CT 330. Clothing and Society.** (3) I. Cultural, social, psychological, and economic aspects of clothing needs and practices of individuals and groups. Three hours lec. Pr.: SOCIO 211 or PSYCH 110.

**CT 350. Fiber Science.** (3) II. Introduction to structures and properties of fibers, including polymer science. Pr.: MATH 100 and CHM 350.

**CT 400. Tailoring.** (3) I. Beginning tailoring techniques applied in the construction of a coat or suit based on a commercial pattern. Six hours lab a week. Pr.: CT 300.

**CT 410. Theory of Pattern Design I.** (3) II. Introduction to basic principles and techniques used in the development, alteration, and styling of patterns through use of pattern drafting and flat pattern design. Pr.: CT 110.

**CT 420. Design by Draping.** (2) I. Principles and techniques of design by draping in muslin and fashion fabric. Four hours lab a week; meets second half of semester. Pr.: CT 300; and CT 315 conc. enrollment.

**CT 430. Professional Development for Apparel and Textile Marketing.** (1) II. Preparation for a six-week fashion marketing field experience. Exploration of the relationship between career goals and field experience. Interviewing for field experience placement. Pr.: CT 230 or conc. enrollment; major in CT option.

**CT 435. Apparel and Textile Promotion.** (4) II. Promotion of apparel and textile products including advertising, display, special events, and public relations. Pr.: CT 230 and JMC 320 or 325.

**CT 450. Apparel and Textile Marketing Field Experience.** (5) I. Supervised work experience in the apparel and textile industry. Pr.: CT 230, 430; ACCTG 231; junior or senior in CT option. 2.5 cumulative GPA, and 2.5 GPA in professional courses.

**CT 485. Problems in Apparel Design.** (Var.) I, II, S. Independent study. Pr.: Consent of instructor.

**CT 499. Problems in Clothing and Textiles.** (Var.) I, II, S. Independent study. Pr.: Consent of instructor.

## Undergraduate and graduate credit in minor field

**CT 500. Intermediate Apparel Design.** (3) II. Creation and analysis of designs for body types in the size ranges produced by the apparel industry, creation and modification of industrial patterns suitable for mass production, industrial construction and production techniques. Introduction to computer-aided apparel design. Six hours lab a week. Pr.: CT 315, 410, or 420, 515 or conc.; CIS 110 or HDFS 120.

**CT 515. Theory of Pattern Design II.** (3) II. Advanced techniques of pattern development; elementary application of pattern techniques to original designs; introduction to industrial uses of pattern design. Six hours lab a week. Pr.: CT 410.

**CT 520. Textile Merchandise Profit Analysis.** (3) II, S. Concepts, practices, and procedures for analyzing textile merchandise profit including the development of user skills in the application of various software packages for data analyses and decision making in apparel and textile marketing. Pr.: ACCTG 231; CIS 110 or HDFS 120; and MKTG 400 or conc. enrollment.

**CT 525. Pattern Drafting Techniques.** (3) Alternate S. Study of advanced pattern drafting techniques with emphasis on the bodice and pants for different figure types. Six hours lab a week. Pr.: CT 410.

**CT 536. Merchandising Concepts.** (4) I. Analysis of the elements, processes, and controls involved in fashion merchandising. Pr.: CT 230 and junior or senior standing.

**CT 540. Advanced Apparel Design.** (3) I. Analysis of high fashion from origin of the haute couture to contemporary designers; use of inspiration sources for executing original design solutions; development of design portfolio and resume; introduction to functional apparel design. Six hours lab a week. Pr.: CT 500 and senior standing.

**CT 545. Textile and Apparel Industry.** (3) I. Analysis of fiber, textile, and apparel production; industry structure; impact of government regulations on production. Pr.: ECON 110.

**CT 550. Apparel Design Field Experience.** (12) II. Preplanned and supervised off-campus work experience in the apparel industry. Pr.: CT 300 and 500; junior or senior standing in apparel design; 2.5 cumulative GPA; 3.0 GPA in professional course work; consent of instructor.

**CT 570. Textiles for Merchandising.** (3) I. Properties of fibers, yarns, fabrics, finishes, and dyes; emphasis on end-use performance of textiles. Pr.: CT 155 and 260.

## Undergraduate and graduate credit

**CT 600. Textile Analysis.** (3) Alternate S. Laboratory techniques used to characterize textile structures with emphasis on fiber, color, finish, care, and aging. Pr.: CT 260 and CHM 110. Not open to textile science majors.

**CT 620. Textile Yarn and Fabrics.** (3) II. Technological, structural, and functional aspects of yarns and fabrics. Pr.: CT 260.

**CT 630. History of Costume to 1780.** (3) II. Interrelationship of costume and social, cultural, political, and economic environments from antiquity to 1780 with emphasis on evolution of garment design and sources of costume information. Pr.: ART 195 and 196; or HIST 101.

**CT 631. History of Costume from 1780 to Present.** (3) II. Interrelationship of costume and social, cultural, political, and economic environments from 1780 to the present with emphasis on effects of the industrial revolution, dress reform movements, ready-to-wear development, and haute couture. Pr.: HIST 102.

**CT 635. Case Studies in Apparel and Textile Marketing.** (2) II. An integration of previous course work through the study of real-life and simulated problems in the apparel and textile marketing industries. Emphasis on decision making and strategic planning. Pr.: CT 230; MKTG 400; CT 520 or conc. enrollment.

**CT 650. Clothing and Textiles Study Tour.** (1-2) II, S. Supervised off-campus tour of facilities where textile products are designed, manufactured, tested, marketed, exhibited, and/or conserved. Pr.: CT 260 and 6 hours clothing and textiles.

**CT 680. Physical Analysis of Textiles.** (3) I. Theory, principles, and procedures in evaluating the physical properties of textile fibers, yarns, fabrics, and products for apparel, interior furnishings, and industrial uses. Two hours lec. and three hours lab a week. Pr.: CT 260.

**CT 710. Advanced Tailoring.** (3) II, alternate S. Construction of a garment, using different fabrics and custom tailoring techniques. Pr.: CT 400; and CT 410 or 420.

**CT 715. Advanced Pattern Design.** (3) I. Application of pattern design with emphasis on the development of patterns for original designs. Six hours lab a week. Can be repeated for credit. Pr.: CT 410.

**CT 730. Textile Conservation.** (3) I, alternate years. Scientific theories of textile conservation related to fiber degradation, storage, repair, cleaning, and exhibition

of historic items. Laboratory experience in solving conservation problems related to historic textiles. Two hours lec., two hours lab a week. Pr.: CHM 110 and CT 620 or IDH 680.

**CT 741. Polymer Science.** (3) I, in alternate years. Theory, application, and methods of structural analysis with emphasis on synthetic polymers. Pr.: CHM 350 and junior standing.

**CT 742. Textile Fibers.** (3) I. In-depth study of fibers. Two hours rec. and three hours lab a week. Pr.: CT 260 and CHM 351.

**CT 746. Textile Dyeing and Printing.** (4) II. In-depth study of color systems, colorimetry, physical and chemical properties of dyes, methods of dye-fiber association, and industrial dyeing and printing methods. Two hours lec. and six hours lab a week. Pr.: CT 350 or 742.

**CT 747. Textile Finishes.** (3) II. Theory, application, evaluation, and identification of finishes and auxiliary products which are applied to textile fibers, yarns, and fabrics. Two hours lec. and three hours lab a week. Pr.: CT 350 or 742.

**CT 760. Clothing and Textiles Seminar.** (Var.) I, II. Discussion of current developments in the field. May be taken more than one semester with consent of student's advisory committee. Pr.: Eight hours credit basic to field involved.

**CT 765. Chemical and Optical Analysis of Textiles.** (3) II, alternate years. Application of organic chemistry and optical analysis to fibers, dyes, and finishes. Two hours lec. and three hours lab a week. Pr. CT 350 or 742.

**CT 770. Practicum in Clothing and Textiles.** (Var.) I, II, S. Preplanned and supervised off-campus experience in business, industry, museums, government agencies, or the cooperative extension service. May be repeated up to 6 hours. Pr.: Twelve hours in clothing and textiles and consent of department head.

**CT 775. Experimental Textiles.** (Var.) On sufficient demand. Individual investigation into textile research. Pr.: CT 350 or 742; CT 620.

**CT 780. Problems in Clothing and Textiles.** (Var.) I, II, S. Work is offered in apparel designing, textiles, history of costume, clothing economics. Pr.: Senior or graduate standing; consent of instructor.

**CT 785. Problems in Apparel Design.** (Var.) I, II, S. Problems planned with the student to meet particular needs. Pr.: CT 500 or consent of instructor.

## Interior design and housing courses

### Undergraduate credit

**IDH 210. Design and Behavior in the Interior Environment.** (3) I, II. Developing awareness of aesthetic and behavioral relationships fundamental to interior design. Three hours lec. per week. Pr.: ART 100 and 3 hours of psychology or sociology.

**IDH 215. Interior Design Graphics.** (3) I, II. Development of graphic communication skills used by interior design professionals. Six hours studio a week.

**IDH 310. Construction Methods and Materials for Interior Design.** (3) I, II. Introduction to concepts, selection, and application of construction processes, materials, and finishes. Introduction to codes, working drawings, and model building. Two hours lec. and two hours lab per week. Pr.: IDH 215.

**IDH 315. Advanced Interior Design Graphics.** (3) I. Design presentation techniques for interiors: Perspectives, color rendering, and advanced drafting methods. Six hours studio a week. Pr.: IDH 210 and 215.

**IDH 320. History of Interior Design I.** (3) I. A historic survey of furniture, textiles, and the minor arts from antiquity to 1850. Progressive development of design and ornamentation characteristics as related to interiors. Pr.: ART 195; ART 196 or conc. enrollment; and HIST 101.

**IDH 345. Space and Activity Planning.** (3) I, II. Application of human factors, space standards, and floorplanning principles to limited-scale living and working environments. Six hours studio a week. Pr.: IDH 210 and 310.

**IDH 360. History of Interior Design II.** (3) II. A survey of modern design evolution in furniture, textiles, and the minor arts from 1850 to the present. Concepts, development, and application of modern technology to contemporary design and interiors. Pr.: HIST 101.

**IDH 410. Housing and Its Environment.** (3) I, II. Socioeconomic, political-legal, and consumer overview of housing. Includes individual, family, and public decisions related to residential alternatives, their acquisition, and housing and environmental standards. Three hours lec. a week. Pr.: Three hours sociology or economics.

**IDH 415. Computer-Aided Design and Drafting for Interior Design.** (2) I, II. Introduction to and application of microcomputer-aided design and drafting techniques used by interior design professionals. One hour lec. and two hours lab a week. Pr.: IDH 310, CIS 110.

**IDH 435. Interior Design and Housing Systems.** (3) I, II. Introduction to lighting, heating, ventilating, air conditioning, and acoustic systems; principles, performance requirements, and components related to function, behavior, and aesthetics. Three hours lec. a week. Pr.: PHYS 101 and 103 or PHYS 115; IDH 310.

**IDH 440. Home Appliance Design and Evaluation.** (3) I, II. Principles of design, operation, and care of appliances used in the home; methods of evaluating appliance performance; laboratory demonstrates application of principles. Two hours lec. and three hours lab a week.

**IDH 445. Interior Design Contract Documents Studio.** (3) I, II. Design and execution of working drawings and specifications for interior design projects. Six hours studio a week. Pr.: IDH 315, 415, 435, and admitted to the interior design major.

**IDH 499. Problems in Interior Design and Housing.** (Var.) I, II, S. Independent study. Pr.: Consent of instructor.

### Undergraduate and graduate credit in minor field

**IDH 500. Intermediate Interior Design Studio.** (3) S. Problem-solving in interior design. May substitute for Interior Design Studio IDH 445, IDH 545, or IDH 645. Students should plan to substitute this course for the next level studio in sequence. Pr.: IDH 315, 345, 435, and admitted to the interior design major.

**IDH 530. Interior Design Practices and Procedures.** (3) II. Ethics, business procedures, and professional development; contract services and administration; and preparation for job market entry as applied to the practice of interior design. Three hours lec. a week. Pr.: IDH 445 or conc. enrollment.

**IDH 545. Senior Interior Design Studio I.** (3) I. Designing solutions to environmental and behavioral problems related to non-residential interiors. Planning, space analysis, and coordination of furnishings, fixtures, materials, and equipment. Six hours studio a week. Pr.: IDH 530.

### Undergraduate and graduate credit

**IDH 600. Interior Design and Housing Internship.** (3-4) I, II, S. Supervised off-campus professional experience in appropriate design-related firms, government agencies, or the housing industry. Pr.: Senior standing; 2.2 cumulative GPA and 2.5 GPA in professional area; IDH 445.

**IDH 610. Housing for Special Needs.** (3) I. Comprehensive overview of housing concerns and issues related to older adults, the disabled, lower-income people, minorities, and other groups. Encompasses physical, economic, and social-cultural factors and the residential alternatives available to these populations. Three hours lec. a week. Pr.: IDH 410.

**IDH 625. Consumer and Energy Issues in Housing.** (3) II. An examination of current housing issues including conditions, regulations, finance, and policy as they relate to the consumer. Pr.: SOCIO 211, ECON 110, and IDH 410.

**IDH 630. Household Equipment Theory.** (3) I. Analytical study of appliance design, performance, and evaluation concepts for application in consumer decision-making. Not open to students with credit in IDH 440. Six hours rec. and lab a week. Pr.: Four hours lab science course.

**IDH 645. Senior Interior Design Studio II.** (3) II. Advanced design problems dealing with human activities in the living environment. Solutions for systems and products based on social, cultural, and behavioral functions. Aesthetic coordination and selection of furnishings, finishes, art, and accessories. Six hours studio a week. Pr.: IDH 530.

**IDH 650. Advanced Design and Behavior in the Interior Environment.** (3) I. The design of interior environments explored in an ecological, behavioral, and cultural context. Three hours lec. a week. Pr.: IDH 345.

**IDH 651. Design for Exceptional Needs.** (3) II. Problems encountered in designing interiors for children, the elderly, and the physically disabled. Pr.: IDH 410 and 445.

**IDH 660. Kitchen and Utility Area Planning.** (3) II. Functional and research basis for planning and arranging based on activity analysis, equipment, materials, lighting, and ventilation. Two hours lec. and two hours lab a week. Pr.: HDFS 460 or IDH 345 or ARCH 261.

**IDH 680. Historic Fabric Design.** (3) I. Interrelationships of fabric design and social, cultural, political, economic, and geographical environments from prehistoric times to present. Pr.: HIST 501 or 101; and CT 260.

**IDH 710. Housing and Facilities Management Processes/Applications.** (3) II. Application of theories, principles, and practices used in managing physical facilities and the residents or workers they house. Issues and problems encountered by professional managers in providing quality living or working environments within cost-effective operations. Three hours lec. a week. Pr.: IDH 410 and MANGT 420 or 720.

**IDH 740. Advance Household Equipment.** (3) II. Application of basic electrical, optical, refrigeration, heat transfer, psychometric, and detergent chemistry principles to the study of household equipment, with emphasis on techniques and instrumentation for consumer testing. Six hours rec. and lab a week. Pr.: IDH 440, PHYS 115, and senior or graduate standing.

**IDH 760. Historic Preservation and Restoration of Interiors.** (3) I. Principles, guidelines, and qualities of preservation and restoration of interiors. Research and application. Pr.: IDH 320 and 360; or CT 630 and 631; or ENVD 250 and 251.

**IDH 780. Interior Design and Housing Seminar.** (2-3) II. Analysis of current developments and issues. May be taken more than one semester with a maximum of 6 credit hours. Pr.: Eight hours of credit basic to field and consent of instructor.

**IDH 782. Problems in Interior Design and Housing.** (Var.) I, II, S. Problems planned with the student to meet particular needs. Pr.: Six hours of credit in IDH.

## Foods and Nutrition

Jane Raymond Bowers,\* Head

Professors Bowers,\* Clarke, Koo,\* Reeves,\* Setser,\* and Zayas;\* Associate Professors Chambers,\* Grunewald,\* Harbers,\* Holcomb,\* Penner,\* and Smith;\* Assistant Professor Aramouni,\* Peters, and Stroh; Emeriti: Professors Caul,\* Fryer,\* Newell,\* and Tinklin;\* Associate Professor Atkinson.

The programs in the Department of Foods and Nutrition focus on the physical, chemical, nutritional, and sensory properties of food; on the metabolism of nutrients; on nutrient requirements throughout the life span; and on issues related to diet and health.

The Department of Foods and Nutrition offers three programs leading to a bachelor of science degree in foods and nutrition: community health and nutrition, food science, and nutrition sciences.

A dual-degree program in nutrition and exercise sciences is offered jointly with the Department of Kinesiology. Students earn a B.S. in foods and nutrition and a B.S. from the College of Arts and Sciences.

Students in all programs gain valuable experience by completing field experiences with community and governmental agencies, food industries, and businesses. Students may also meet the academic requirements for membership in the American Dietetic Association (ADA).

Specialized laboratories for sensory analysis of food and food product development are available for research and instruction. The department has an animal laboratory that is fully accredited by the American Association for Accreditation of Laboratory Animal Care (AALAC). In cooperation with the College of Veterinary Medicine, animals housed and maintained in the laboratory receive veterinary care to comply with the current NIH guidelines. A Nutritional Status Assessment laboratory includes facilities for physical and dietary assessments.

### Community health and nutrition

Bachelor of science in foods and nutrition

Students in community health and nutrition are prepared to develop and implement nutrition and health programs through health agencies at the federal, state, and local levels. Nutritionists identify the physiological, cultural, social, economic, and environmental causes of malnutrition; determine which groups within the community (e.g., pregnant women, infants, or the elderly) have nutrition-related problems; develop community programs to

promote good health; and educate community members about nutritional practices. Students fulfill minimum academic requirements for membership in the American Dietetic Association.

**General education courses (62-65 hours)**

ENGL 100	Expository Writing I	3
ENGL 120	Expository Writing II	3
SPCH 105	Public Speaking IA	2
<b>or</b>		
SPCH 106	Public Speaking I	3
PSYCH 110	General Psychology	3
ECON 110	Principles of Macroeconomics	3
SOCIO 211	Introduction to Sociology	3
PHILO 130	Introduction to Ethics	3
Humanities elective		3
BIOCH 365	Elementary Biochemistry	3
BIOL 198	Principles of Biology	4
BIOL 455	General Microbiology	4
<b>or</b>		
HRIMD 650	Fundamentals of Public Health/ Food Safety	3
BIOL 240	Human Body	6
CHM 210	Chemistry I	4
CHM 230	Chemistry II	4
CHM 350	General Organic Chemistry	3
CHM 351	General Organic Chemistry Lab	2
MATH 100	College Algebra	3
<b>or</b>		
MATH 220	Analytic Geometry and Calculus I	4
STAT 330	Elementary Statistics for Social Science	3
<b>or</b>		
STAT 340	Biometrics I	3
CIS 110	Introduction to Personal Computers	3
<b>or</b>		
HDFS 120	Microcomputers in Human Services	3
KIN 101	Principles of Physical Fitness	1

**Professional courses (42 hours)**

FN 300	Food Preparation and Meal Management	4
FN 301	Food Trends, Legislation, and Regulation	3
FN 352	Concepts of Personal Health	3
FN 501	Food Science	3
FN 502	Principles of Nutrition	3
FN 610	Nutrition Throughout the Life Cycle	3
FN 630	Clinical Nutrition	4
FN 655	Community Health Programs	3
FN 660	Nutrition and Food Behavior	3
FN 680	Seminar in Foods and Nutrition	2
FN 700	Community Nutrition	3
FN 706	Practicum in Community Nutrition	3
HRIMD 440	Fundamentals of Quantity Food Production	5

**Supporting courses (14 hours)**

HDFS 110	Introduction to Human Development	3
HDFS 400	Family Economics	3
MANGT 420	Management Concepts	3
HRIMD 445	Organization and Management of Food Service Operations	3
HRIMD 482	Employee Development for the Hospitality Industry	2

**Unrestricted electives** ..... 4-7

**Total hours for graduation** ..... 125

**Food science**

Bachelor of science in foods and nutrition

Food scientists are concerned with all aspects of the food industry, from process-

ing the raw material to consumer acceptance of the finished product. Food scientists provide an ever-increasing variety of foods to meet high standards of safety, sanitation, and quality. Students in this program may emphasize consumer communications, nutrition, or sensory analysis. Positions are available in food marketing, technical sales, quality control, sensory analysis, product development, food styling, consumer education, advertising copywriting, or managing food operations in retail companies.

This program is approved by the Institute of Food Technologists (IFT) for having met the standards for undergraduate education in food science and technology.

**General education courses (63-65 hours)**

ENGL 100	Expository Writing I	3
ENGL 120	Expository Writing II	3
SPCH 105	Public Speaking IA	2
<b>or</b>		
SPCH 106	Public Speaking I	3
ECON 110	Principles of Macroeconomics	3
PSYCH 110	General Psychology	3
SOCIO 211	Introduction to Sociology	3
Humanities elective (foreign language recommended)		6
BIOL 198	Principles of Biology	4
BIOL 455	General Microbiology	4
CHM 210	Chemistry I	4
CHM 230	Chemistry II	4
CHM 350	General Organic Chemistry	3
CHM 351	General Organic Chemistry Lab	2
BIOCH 521	General Biochemistry	3
BIOCH 522	General Biochemistry Lab	2
PHYS 115	Descriptive Physics	4
MATH 110	College Algebra	3
MATH 210	Technical Calculus I	3
<b>or</b>		
MATH 220	Analytic Geometry and Calculus I	4
STAT 320	Elements of Statistics	3
<b>or</b>		
STAT 330	Biometrics	3
KIN 101	Principles of Physical Fitness	1

**Professional courses (38 hours)**

FN 300	Food Preparation and Meal Management	4
FN 301	Food Trends, Legislation, and Regulation	3
FN 501	Food Science	3
FN 502	Principles of Nutrition	3
FN 612	Principles of Food Product Development	3
FN 680	Seminar in Foods and Nutrition	2
FN 721	Sensory Analysis of Foods	3
FN 790	Food Research Techniques	3
ATM 440	Introduction to Food Engineering Technology	3
ATM 441	Introduction to Food Engineering Technology Lab	1
ASI 607	Food Microbiology	4
Six hours from foods processing electives:		
ASI 350	Meat Science	3
ASI 502	Principles of Dairy Food Processing	4
ASI 671	Meat Selection and Utilization	2
ASI 695	Quality Assurance	3
GRSC 651	Food and Feed Plant Sanitation	4
ET 640	Food Processing Operations	5
GRSC 100	Principles of Milling	3
GRSC 625	Flour and Dough Testing	3
GRSC 635	Baking Science I	2
GRSC 636	Baking Science I Lab	2

**Professional electives (Select 9 hours)**

At least 3 hours must be from FN courses		
FN 499	Problem in Foods and Nutrition	Var.
FN 600	Practicum in Foods and Nutrition	Var.
FN 610	Nutrition Throughout the Life Cycle	3
FN 660	Nutrition and Food Behavior	3
FN 720	Food Systems	3
BIOL 240	Structure and Function of the Human Body	6
ENGL 516	Written Communications for the Sciences	3
<b>or</b>		
JMC 250	Agricultural Journalism	3
JMC 320	Principles of Advertising	3
JMC 325	Fundamentals of Public Relations	3
MKTG 400	Marketing	3
MKTG 450	Consumer Behavior	3
PSYCH 480	Fundamentals of Sensation and Perception	3
<b>or</b>		
PSYCH 570	Psychobiology	3
CIS 110	Introduction to Personal Computing	3

To emphasize sensory analysis:

Select from FN 499 or 600, PSYCH 480 or 570, CIS 110, or MKTG 400.

To emphasize consumer communication:

Select from FN 499 or 600, 610 or 660, ENGL 516, JMC 250, 320, 325, MKTG 400, 450, or CIS 110.

To emphasize nutrition:

Select from FN 499 or 600, 610, 660, BIOL 240, or CIS 110.

**Supporting courses (6 hours)**

HDFS 605	Consumer and the Market	3
CTID or HRIMD elective		3

**Unrestricted electives** ..... 9-11

**Total hours for graduation** ..... 127

**Nutritional sciences (pre-medicine)**

Bachelor of science in foods and nutrition

The nutritional sciences program emphasizes the biological and physical sciences and provides students with the background necessary to understand the function and metabolism of nutrients. The program provides an excellent foundation for students considering careers in medicine, dentistry, and other health science professions. Academic requirements for entering medical school are met through this degree.

**General education courses (51-53 hours)**

ENGL 100	Expository Writing I	3
ENGL 120	Expository Writing II	3
SPCH 105	Public Speaking IA	2
<b>or</b>		
SPCH 106	Public Speaking I	3
PSYCH 110	General Psychology	3
ECON 110	Principles of Macroeconomics	3
SOCIO 211	Introduction to Sociology	3
Humanities		3
BIOL 198	Principles of Biology	4
BIOL 240	Human Body	6
BIOL 455	General Microbiology	4
MATH 150	Trigonometry*	3
MATH 220	Analytic Geometry and Calculus I	4
PHYS 113	General Physics I	4
PHYS 114	General Physics II	4
KIN 101	Principles of Physical Fitness	1

\*If taken in high school, substitute computer science, statistics, or higher mathematic course (3-4 hours).

**Professional courses (31 hours)**

FN 300	Food Preparation and Meal Management .....	4
FN 301	Food Trends, Legislation, and Regulation .....	3
FN 501	Food Science .....	3
FN 502	Principles of Nutrition .....	3
FN 610	Nutrition Throughout the Life Cycle .....	3
FN 630	Clinical Nutrition .....	4
FN 680	Seminar in Foods and Nutrition .....	2
FN 700	Community Nutrition .....	3
FN 710	Bionutrition .....	3
FN	Foods and nutrition elective .....	3

**Supporting courses (31 hours)**

CHM 210	Chemistry I .....	4
CHM 230	Chemistry II .....	4
CHM 271	Chemical Analysis .....	4
CHM 531	Organic Chemistry I .....	3
CHM 532	Organic Chemistry Lab .....	2
CHM 550	Organic Chemistry II .....	3
BIOCH 521	General Biochemistry .....	3
BIOCH 522	General Biochemistry Lab .....	2
HDFS 110	Introduction to Human Development .....	3
FN 352	Concepts of Personal Health .....	3
	<b>or</b>	
HDFS 400	Family Economics .....	3

**Unrestricted electives** ..... 11-13

**Total hours for graduation** ..... 125

**Nutrition and exercise sciences\***

Bachelor of science in foods and nutrition  
Bachelor of science, kinesiology major,  
exercise science option

Nutrition and exercise sciences is a dual-degree program. Students complete a total of 150 credit hours and earn two degrees, one from the Department of Foods and Nutrition and the second from the Department of Kinesiology. Graduates of this program may pursue careers in health programs offered by hospitals, industries, wellness centers, public and private clinics, fitness camps, and athletic clubs.

In addition, students in this program can fulfill the minimum academic requirements for membership in the American Dietetic Association by including four specified requirements in their course work.

\*This program was under revision at the time of catalog printing. Contact the dean's office or advisor for new requirements in fall 1992.

Those interested in becoming registered dietitians can do so by completing an additional experience requirement and passing a national examination. Students who would like to meet these requirements should consult their advisor.

**General education and supporting courses (71-77 hours)**

ENGL 100	Expository Writing I .....	3
ENGL 120	Expository Writing II .....	3
SPCH 105	Public Speaking IA .....	2
	<b>or</b>	
SPCH 106	Public Speaking I .....	3
PSYCH 110	General Psychology .....	3
ECON 110	Principles of Macroeconomics .....	3
SOCIO 211	Introduction to Sociology .....	3

Additional courses as specified in the General Requirements section for Arts and Sciences:  
Humanities ..... 11-12  
(One course each in fine arts, philosophy, Western heritage, and literary or rhetorical arts.)

Additional social science course (1 course) ..... 3  
International studies overlay (1 course) ..... 0-3

BIOL 198	Principles of Biology .....	4
BIOL 240	Human Body .....	6
BIOL 455	General Microbiology .....	4
CHM 210	Chemistry I .....	4
CHM 230	Chemistry II .....	4
CHM 350	General Organic Chemistry .....	3
CHM 351	General Organic Chemistry .....	2
BIOCH 365	Elementary Biochemistry .....	3
PHYS 115	Descriptive Physics .....	4
MATH 100	College Algebra .....	3
	<b>or</b>	
MATH 220	Analytic Geometry and Calculus I .....	4
STAT 320	Elements of Statistics .....	3
	<b>or</b>	
STAT 330	Elementary Statistics for the Social Sciences .....	3

**Nutrition science (36-39 hours)**

FN 300	Food Preparation and Meal Management .....	4
FN 301	Food Trends, Legislation, and Regulation .....	3
FN 352	Concepts of Personal Health .....	3
FN 501	Food Science .....	3
FN 502	Principles of Nutrition .....	3
FN 610	Nutrition Throughout the Life Cycle .....	3
FN 630	Clinical Nutrition .....	4
FN 635	Nutrition and Exercise (if not taken as KIN 635 below) .....	0-3
FN 680	Seminar in Foods and Nutrition .....	2
FN 700	Community Nutrition .....	3
FN 706	Practicum in Community Nutrition .....	3
HRIMD 440	Fundamentals of Quantity Food Production .....	5

**Exercise science (29-32 hours)**

KIN 101	Principles of Physical Fitness .....	1
KIN 206	Professional Orientation .....	1
KIN 320	Motor Development and Learning .....	3
KIN 325	History and Philosophy of Physical Education .....	3
KIN 330	Biomechanics .....	3
KIN 335	Physiology of Exercise .....	3
KIN 340	Social-Psychological Dimensions of Physical Activity .....	3
KIN 510	Measurement and Research Techniques in Kinesiology .....	3
KIN 561	Adapted Physical Education .....	3
KIN 625	Exercise Testing and Prescription .....	3
KIN 635	Nutrition and Exercise (if not taken as FN 635 above) .....	0-3
KIN 655	Adult Exercise Programs .....	3

Certification required in standard first aid, community CPR, and basic life support for the professional rescuer through the Red Cross or American Heart Association courses.

**Unrestricted electives** ..... 5-11

**Total hours for graduation** ..... 150

**Foods and nutrition courses****Undergraduate credit**

**FN 132. Basic Nutrition.** (3) I, II, S. Fundamentals of human nutrition as they relate to health and well-being of individuals. Nutritional requirements over the life span. Not open to students in foods and nutrition, dietetics and institutional management, or home economics education.

**FN 300. Food Preparation and Meal Management.** (4) I. Principles of food preparation; selection and evaluation of food products; meal service with emphasis on nutritional adequacy, aesthetics, and management of resources. Two hours rec. and six hours lab a week.

**FN 301. Food Trends, Legislation, and Regulation.** (3) II. Food laws, regulation, labeling, additives, and residues. Current trends in market forms, packaging, and utilization of various foods. Pr.: ECON 110.

**FN 352. Concepts of Personal Health.** (3) I, II. Current health issues in various developmental stages of the individual. Factors conducive to maintaining health of family members from the prenatal period through old age. Pr.: Sophomore standing.

**FN 499. Problem in Foods and Nutrition.** (Var.) I, II, S. Supervised individual project to study current topics or participation in research in foods and nutrition. Pr.: Six hours in FN and consent of instructor.

**Undergraduate and graduate credit in minor field**

**FN 501. Food Science.** (3) I, II. Basic scientific principles of preparation of foods as related to their chemical and physical properties. Two hours rec. and three hours lab a week. Pr.: CHM 350 and 351, or 531 and 532; and FN 300.

**FN 502. Principles of Nutrition.** (3) I, II. Functions and interrelationships of various nutrients in the body. Two hours rec. and three hours lab a week. Pr.: CHM 350 and 351, or 531 and 532; and BIOL 198.

**FN 503. Maternal and Child Nutrition.** (2-3) II. A study of the principles of prenatal, infant, and child nutrition emphasizing the practical application to life situations. Pr.: FN 132 and BIOL 198.

**FN 520. Topics in Foods and Nutrition.** (1-3) On sufficient demand. May be taken more than once for a maximum of 6 hours. Pr.: Junior standing and consent of instructor.

**Undergraduate and graduate credit**

**FN 600. Practicum in Foods and Nutrition.** (3-5) I, II, S. Supervised professional field experience in foods and nutrition. Graduate students may enroll for a maximum of 3 credits. Pr.: FN 501, 502, and consent of instructor.

**FN 610. Nutrition Throughout the Life Cycle.** (3) I. Food patterns, dietary intakes, and nutritional requirements of infants, children, adolescents, and adults. Pr.: BIOCH 201 or 521; BIOL 240 or 526 or AP 530; and FN 502.

**FN 612. Principles of Food Product Development and Control.** (3) I. Food product concept, feasibility, and evaluation. Pr.: FN 501.

**FN 630. Clinical Nutrition.** (4) II. Nutrition in disease including physiological and biochemical basis of nutrition care, effects of disease on nutrient metabolism, diet therapy, nutrition assessment and nutrition counseling. Pr.: FN 502; BIOCH 201 or 521; and BIOL 240 or AP 530 or BIOL 526.

**FN 635. Nutrition and Exercise.** (3) II. The interrelationships among diet, nutrition, and exercise. Topics covered include physical fitness, weight control, nutrient metabolism during exercise, and athletic performance. Pr.: FN 132 or 502; and KIN 335. Cross-listed with College of Arts and Sciences; see KIN 635.

**FN 655. Community Health Programs.** (3) II. Analysis of local, state, and national health problems including infectious diseases, accidents, chronic illnesses, and occupational/environmental hazards, with emphasis on the programs designed to address these concerns. Pr.: FN 352 and BIOL 198.

**FN 660. Nutrition and Food Behavior.** (3) I, in even years. Focus on the physiological, environmental, cultural, and economic factors that influence the use of food. Identification of appropriate methodology to study these factors as well as programs to modify food behavior. Pr.: PSYCH 110 or SOCIO 211 or ANTH 200; and FN 502.

**FN 680. Seminar in Foods and Nutrition.** (2) I. Individual reports and discussion of current topics in foods and nutrition. Pr.: FN 501 and 502.

**FN 700. Community Nutrition.** (3) I. Factors in the community influencing nutritional status, techniques to assess community nutritional needs, methodology for implementing and evaluating community nutrition programs. Pr.: FN 503 or 610.

**FN 702. Nutrition in Developing Countries.** (3) I, in odd years. Nutritional problems in developing countries, including an analysis of factors which contribute to malnutrition, effects of undernutrition, methods for assessing nutritional status, and interventions to combat nutrition problems. Pr.: FN 503 or 610.

**FN 706. Practicum in Community Nutrition.** (3) I, II, S. Supervised experience in community nutrition agencies. Pr.: FN 700 and consent of instructor.

**FN 710. Bio nutrition.** (3) II. Nutrient interrelationships based on knowledge of biochemical and physiological processes, functions of specific nutrients, and evaluation of nutritional status. Pr.: BIOCH 521, BIOL 526, and FN 502.

**FN 718. Physical Health and Aging.** (3) I, alternate odd years. Focus is on the physiological theories of aging, the relationship between normal aging processes, and the major chronic and acute diseases of the elderly, and community health promotion/maintenance programs for older adults. Pr.: BIOL 198 or 310; HDFS 510.

**FN 720. Food Systems.** (3) II. Chemical and physical principles of food components; emulsions and colloidal food systems. Two hours lec. and three hours lab a week. Pr.: BIOCH 521 and FN 501.

**FN 721. Sensory Analysis of Foods.** (3) II. Sensory analysis of food appearance, texture, aroma, flavor; physiology of sensory receptors; application of laboratory and consumer panels; and interpretation of data. Two hours rec. and two hours lab a week. Pr.: FN 501.

**FN 731. Descriptive Sensory Analysis.** (3) II, even years. Flavor and texture profiling and other descriptive techniques for use in product development, research, and quality control. Practical experiences in conducting tests and leading panels. Two hours lec. and two hours lab a week. Pr.: FN 721.

**FN 741. Consumer Response Evaluation.** (3) II, odd years. Evaluating consumer attitudes and perceptions of products to provide quantitative and qualitative information for research guidance. Design and implementation of consumer questionnaires and development of guides for focus groups and interviews. Two hours lec. and four hours lab a week. Pr.: FN 501 or 502 or permission of the instructor.

**FN 750. Nutritional Aspects of Food Processing and Preparation.** (2-3) I. In alternate years. Stability of nutrients during processing, storage, and preparation of foods from raw food to products for human consumption. Pr.: FN 501; FN 502; and BIOCII 200 or 521.

**FN 780. Problems in Foods and Nutrition.** (Var.) I, II, S. Laboratory and library experience in current problems in foods and nutrition. Three hours lab a week for each hour of credit. Pr.: FN 501 or 502.

**FN 782. Topics in Foods and Nutrition.** (1-3) On sufficient demand. May be taken more than once for a maximum of 6 hours. Pr.: Senior standing and consent of instructor.

**FN 790. Food Research Techniques.** (3) I. Fundamental principles of food quality evaluation and development of an independent research problem. Pr.: FN 501.

## General Human Ecology

Professors Moxley and Stowe; Instructors Pence and Segó.

General human ecology programs prepare students for careers in education, extension, and communication.

### General human ecology

Bachelor of science in human ecology

Degree programs in general human ecology allow students to integrate knowledge for an understanding of human needs, environments, and relationships. In the freshman and sophomore years, the general program allows flexibility in course selection for students who are undecided but interested in programs offered by the College of Human Ecology. Careful planning allows students to explore options while completing courses applicable in most programs.

#### General education (38-40 hours)

ENGL 100	Expository Writing I	3
ENGL 120	Expository Writing II	3
SPCH 105	Public Speaking IA	2
<b>or</b>		
SPCH 106	Public Speaking I	3
ECON 110	Principles of Macroeconomics	3
Two of the following:		
HDFS 110	Introduction to Human Development	3
PSYCH 110	General Psychology	3
SOCIO 211	Introduction to Sociology	3
Humanities elective minimum		
BIOL 198	Principles of Biology	4
CHM 110	General Chemistry	5
<b>or</b>		
PHYS 101	The Physical World I	3
<b>and</b>		
PHYS 103	The Physical World I Lab	1
MATH 100	College Algebra	3
STAT 320	Elements of Statistics	3
<b>or</b>		
STAT 330	Elements of Statistics for Social Sciences	3
<b>or</b>		
STAT 350	Business and Economics Statistics	3
KIN 101	Principles of Physical Fitness	1

#### Human ecology courses (45 hours)

CT 155	Fundamentals of Clothing Evaluation	3
<b>or</b>		
CT 330	Clothing and Society	3
CT 260	Textiles	3
HDFS 105	Introduction to Personal and Family Finance	3
<b>or</b>		
HDFS 400	Family Economics	3
HDFS 370	Parenting	3
HDFS 460	Family Resource Management	3
IDH 410	Housing and Its Environment	3
FN 132	Basic Nutrition	3
<b>or</b>		
FN 502	Principles of Nutrition	3
HDFS 350	Family Relations and Sex Roles	3

FN 300	Food Preparation and Meal Management	4
<b>or</b>		
FN 301	Food Trends, Legislation and Regulation	3

Human ecology electives (17-18 hours from at least two departments)

Students seeking certification in home economics education may apply 1-4 hours of specified EDSEC courses.\*

Select in consultation with advisor.

#### Supporting courses (15 hours)

In consultation with advisor choose 15 hours, 300-level or higher, in areas other than human ecology.

**Unrestricted electives** ..... 26-28

**Total for graduation** ..... 126

\*Students seeking certification in home economics education must meet certification standards as well as degree requirements. See the College of Education section of this catalog for more information.

### Human ecology and mass communications\*

Bachelor of science in human ecology and mass communications

In this program students select areas of concentration in human ecology and mass communications according to their individual interests. In human ecology they may specialize in clothing, textiles, and interior design; foods and nutrition; hotel, restaurant, institution management and dietetics; or human development and family studies. In mass communications they may choose advertising, print or broadcast journalism, public relations, radio-TV, or a general program.

Enrollment in all skills courses in the School of Journalism and Mass Communications requires a minimum 2.5 GPA based on completion of at least 30 hours at the 100-level or above. Skills courses include News and Feature Writing, Advertising Writing, Writing for the Electronic Media, Editing and Design, Advertising Techniques, Public Relations Techniques, and audio/video courses.

No entrance requirement exists for the basic introductory courses of Mass Communication in Society, Principles of Advertising, Fundamentals of Public Relations, and Radio-TV and Society.

#### General education (37-38 hours)

ENGL 100	Expository Writing I	3
ENGL 120	Expository Writing II	3
SPCH 105	Public Speaking IA	2
<b>or</b>		
SPCH 106	Public Speaking I	3
ECON 110	Principles of Macroeconomics	3

Two of the following:

HDFS 110	Introduction to Human Development	3
PSYCH 110	General Psychology	3

\*This program was under revision at the time of catalog printing. Contact the dean's office or advisor for new requirements in fall 1992.

SOCIO 211	Introduction to Sociology	3
Humanities electives*		6
MATH 100	College Algebra	3
<b>or</b>		
A college-level calculus course		3
Any 3-hour introductory statistics course		3
<b>or</b>		
Any 3-hour computing literacy course		3
Biological sciences and physical sciences		7
(One course must be taken from each area; one course must include a laboratory.)		
KIN 101	Principles of Physical Fitness	1

\*Two-hour courses are not acceptable in humanities.

#### Professional courses (45–54 hours)

**Human ecology courses** ..... 15–18  
Area of concentration in: CTID, HRIMD, HDFS, or FN

#### Journalism and mass communications courses (30–35 hours)

In consultation with your advisor, select one of the options listed below:

##### 1. Journalism

JMC 235	Mass Communication in Society	3
JMC 275	News and Feature Writing	3
JMC 565	Law of Mass Communications	3
JMC 600	Public Affairs Reporting	3

##### Print Track

JMC 300	Editing and Design	3
<b>and</b>		
JMC 500	Advanced News and Feature Writing	3
<b>and</b>		
JMC 540	Advanced Editing and Design	3

##### Broadcast Track

RTV 240	Audio I	3
<b>and</b>		
RTV 320	Fundamentals of RTV Performance	3
<b>and</b>		
JMC 505	Electronic News Reporting	3

Electives in journalism and mass communications\*\* ..... 9–14

##### 2. General

JMC 235	Mass Communication in Society	3
JMC 275	News and Feature Writing	3
JMC 300	Editing and Design	3
JMC 320	Principles of Advertising	3
JMC 500	Advanced News and Feature Writing	3
JMC 565	Law of Mass Communications	3
JMC 570	Ethics of Mass Communications	3
<b>or</b>		
JMC 575	History of Journalism	3
Electives in journalism and mass communications**		9–14

##### 3. Advertising

JMC 235	Mass Communication in Society	3
JMC 275	News and Feature Writing	3
JMC 320	Principles of Advertising	3
JMC 545	Advertising Media Planning	3
JMC 555	Advertising Techniques	3
RTV 525	Electronic Media Advertising Sales	3
JMC 565	Law of Mass Communications	3
JMC 640	Advertising Campaigns	3
Electives in journalism and mass communications**		6–11

##### 4. Public Relations

JMC 235	Mass Communication in Society	3
JMC 275	News and Feature Writing	3
JMC 300	Editing and Design	3
JMC 325	Fundamentals of Public Relations	3
JMC 500	Advanced News and Feature Writing	3

JMC 550	Mass Communications Internship	1–3
JMC 565	Law of Mass Communications	3
JMC 635	Public Relations Techniques	3
JMC 645	Public Relations Campaigns	3
Electives in journalism and mass communications**		5–10

##### 5. Radio-TV

JMC 235	Mass Communication in Society	3
RTV 237	Writing for the Electronic Media	3
RTV 240	Audio I	3
RTV 250	Video I	3
RTV 490	Senior Seminar	3

One of the following:

RTV 340	Audio II	3
RTV 350	Video II	3

One of the following courses:

JMC 530	The Ethnic Media in America	3
JMC 560	Non-Traditional Press	3
JMC 565	Law of Mass Communications	3
JMC 570	Ethics of Mass Communications	3
JMC 575	History of Journalism	3
RTV 580	History of Telecommunications	3
JMC 612	Women and the Media	3
JMC 670	International Communications	3
JMC 730	Seminar in the Future of the Media	3
JMC 740	Colloquium in Mass Communications	3

One of the following:

RTV 525	Electronic Media Advertising Sales	3
RTV 630	Electronic Media Programming	3
RTV 685	Electronic Media Management	3

Electives in journalism and mass communications\*\* ..... 6–11

\*\*The human ecology and mass communications degree requires a minimum of 90 credit hours outside the School of Journalism and Mass Communications and a minimum of 30 credit hours within that school.

#### Supporting courses (24 hours)

Selected in consultation with faculty advisor.

Human ecology courses (18 hours)		
CT 330	Clothing and Society***	3
HDFS 350	Family Relations and Sex Roles***	3
HDFS 400	Family Economics***	3
FN 132	Basic Nutrition***	3
Additional human ecology courses		6–9
Political science electives		6
<b>or</b>		
Business administration electives		6

**Unrestricted electives** ..... 9–19

**Total for graduation** ..... 125

\*\*\*It not taken as a professional course.

### Home economics education certification requirements

#### Bachelor of science in human ecology

This program provides students with the skills and knowledge necessary to deliver home economics education to diverse populations in various settings. Graduates of the program work in secondary schools, vocational education programs, cooperative extension, business, and industry.

Upon successful completion of the teacher education program and the National Teacher Examination, graduates are eligible for certification to teach home economics in Kansas schools. See the College of Education section of this catalog for more information on eligibility require-

ments. Inquiries should be directed to the Center for Student and Professional Services, 13 Bluemont Hall.

#### General education (49–53 hours)

ENGL 100	Expository Writing I	3
ENGL 120	Expository Writing II	3
SPCH 105	Public Speaking IA	2
<b>or</b>		
SPCH 106	Public Speaking I	3
ECON 110	Principles of Macroeconomics	3
ANTH 200	Introduction to Cultural Anthropology	3
PSYCH 110	General Psychology	3
One course in American or world history (HIST 101, 102, 251, or 252)		3
ART 100	Design I	2
Literature elective (ENGL 261, 262, 271, 272, 361, 362, 381, or 382)		3
Humanities elective (ENGL 230, 231, 233, or 234)		3
CHM 110	General Chemistry	5
<b>or</b>		
CHM 210	Chemistry I	4
<b>and</b>		
CHM 230	Chemistry II	4
CHM 350	General Organic Chemistry	3
<b>and</b>		
CHM 351	General Organic Chemistry Lab	2
<b>or</b>		
BIOCH 265	Introductory Organic and Biological Chemistry	5
BIOL 198	Principles of Biology	4
MATH 100	College Algebra	3
STAT 320	Elements of Statistics	3
<b>or</b>		
STAT 330	Elements of Statistics for Social Science	3
<b>or</b>		
STAT 350	Business and Economics Statistics	3
KIN 101	Principles of Physical Fitness	1

#### Professional human ecology courses (41 hours)

CT 155	Fundamentals of Apparel Evaluation	3
CT 260	Textiles	3
HDFS 105	Introduction to Personal and Family Finance	3
IDH 410	Housing and Its Environment	3
IDH 440	Home Appliance Design and Evaluation	3
HDFS 460	Family Resource Management, Theory and Application	3
FN 300	Food Preparation and Meal Management	4
FN 502	Principles of Nutrition	3
HDFS 310	Early Childhood	3
HDFS 313	Preschool Child Lab	1
HDFS 350	Family Relationships and Sex Roles	3
HDFS 370	Parenting	3
HDFS 302	You and Your Sexuality	3
FN 501	Food Science	3
<b>or</b>		
FN 352	Concepts of Personal Health	3
<b>or</b>		
HDFS 400	Family Economics	3
<b>or</b>		
HDFS 506	Middle Childhood and Adolescence	2
<b>and</b>		
HDFS 508	Adolescent Lab	1

#### Professional education courses (40 hours)

DED 102	Teaching as a Career	1
EDCEP 215	Education Implications of Growth and Development	3
EDCEP 315	Educational Psychology**	3
EDSP 323	Exceptional Students in the Secondary School**	2
EDSEC 376	Core Teaching Skills and Lab**	3

EDSEC 477	Middle Level/Secondary Reading**	2
EDSEC 550	Methods of Teaching Home Economics**	2
EDSEC 420	Block II Lab**	1
EDSEC 621	Program Planning in Vocational Education**	2
EDCIP 455	Teaching in a Multicultural Society**	1
EDCEP 525	Interpersonal Relations in the School**	1
EDSEC 586	Teaching Participation in the Secondary School and Professional Development Seminar**	12

\*\*These courses are blocked in three sequential semesters; courses in each block are to be taken concurrently and are prerequisites to the subsequent designated block of courses.

EDSEC 620	Principles and Philosophy of Vocational Education	3
EDETC 318	Instructional Media and Technology	2
EDSEC 610	Occupational Home Economics	2

**General human ecology courses**

**Undergraduate credit**

**GNHE 208. Human Ecology Colloquium.** (Var.) I, II, S. Special topics for human ecology majors.

**GNHE 385. Problem in General Human Ecology.** (Var.) I, II, S. Independent study. Pr.: Consent of instructor.

**GNHE 399. Honors Seminar in Human Ecology.** (1) I, II. Selected topics in human ecology. May be taken more than once for credit. For students in honors program only.

**Undergraduate and graduate credit**

**GNHE 780. Problems in General Human Ecology.** (Var.) I, II, S. Individual investigation into work in general human ecology. Pr.: Consent of instructor.

# Hotel, Restaurant, Institution Management and Dietetics

Judy Miller, \* Head

Professor Miller\* and Shanklin;\* Associate Professors Canter\* and Gregoire;\* Instructors Dana, Dienhart, Pesci, and Petrillose; Emeriti: Professors Shugart\* and Spears;\* Associate Professors Riggs, Roach,\* and Ziegler.\*

The programs in the Department of Hotel, Restaurant, Institution Management and Dietetics prepare students to enter the professions of hotel and restaurant management, foodservice management, and dietetics.

The department offers a bachelor of science degree in dietetics and a bachelor of science degree in hotel and restaurant management. Two programs, the coordinated program in dietetics and general dietetics, lead to the bachelor of science degree in dietetics.

**Coordinated program in dietetics**

**Program I**

Students complete preprofessional study during the freshman and sophomore years, and apply for formal admission into the program at the end of the sophomore year. The coordinated program prepares students for the dietetic profession by integrating course work with 1,035 hours supervised practice experiences. Graduates are eligible for active membership in the American Dietetic Association and, upon passing a national qualifying examination, for registration as a dietitian (R.D.). The program is accredited by the American Dietetic Association Council on Education, Division of Accreditation/Approval, a specialized accrediting body recognized by the Council on Postsecondary Accreditation and the United States Department of Education.

Junior and senior students gain foodservice management experience in Housing and Dining Services and the K-State Union on campus. Seniors also spend one semester in area health care facilities where they work directly with practicing dietitians in clinical and community practice settings.

Application for admission to the coordinated program in dietetics should occur during the second semester of the sophomore year. Criteria for admission are:

An overall minimum grade point average of 2.5 on a 4.0 scale, with no grade lower than C in the physical and biological sciences.

A completed application form.

Two completed recommendation forms, one from a former instructor familiar with the applicant's scholastic abilities, and the other from an employer or other person well acquainted with the applicant.

An interview with the program director, to be scheduled by the applicant.

The application process should be completed by April 30 for fall semester admission, and by October 31 for spring semester admission.

Ongoing evaluation of the student's didactic and performance-based learning is an important component in the coordinated program in dietetics.

Criteria for progression to the senior year are:

An overall minimum grade point average of 2.7, with no grade lower than C in professional courses (HRIMD or FN courses).

Recommendation of the student by faculty teaching the junior-level professional courses.

**General dietetics**

**Program II**

The program in general dietetics is approved by The American Dietetic Association Council on Education, Division of Accreditation/Approval as a Didactic Program in Dietetics. Completion of the program meets the academic requirements for membership in the American Dietetics Association.

Supervised practice experience, required for eligibility to take the national R.D. exam, must be obtained by the student after graduation through a dietetic internship or approved pre-professional practice program.

**Dietetics**

Bachelor of science in dietetics

Two programs are available in dietetics: Program I is the coordinated program in dietetics, and Program II is in general dietetics. See information earlier in this section.

**General education courses (62-64 hours)**

ENGL 100	Expository Writing I	3
ENGL 120	Expository Writing II	3
SPCH 105	Public Speaking IA	2
	<b>or</b>	
SPCH 106	Public Speaking I	3
ECON 110	Principles of Macroeconomics	3
PSYCH 110	General Psychology	3
SOCIO 211	Introduction to Sociology	3
	Humanities electives	6
BIOL 198	Principles of Biology	4
BIOL 240	Structure and Function of the Human Body	6
HRIMD 650	Fundamentals of Public Health and Food Safety	3
	<b>or</b>	
BIOL 455	General Microbiology	4
CHM 210	Chemistry I	4
CHM 230	Chemistry II	4
CHM 350	General Organic Chemistry	3
CHM 351	General Organic Chemistry Lab	2
BIOCH 365	Elementary Biochemistry	3
MATH 100	College Algebra	3
	<b>or</b>	
	College-level calculus	
CIS 110	Introduction to Personal Computing	3
	<b>or</b>	
HDFS 120	Microcomputers in Human Services	3
STAT 320	Elements of Statistics	3
	<b>or</b>	
STAT 330	Elements of Statistics for the Social Sciences	3
	<b>or</b>	
STAT 340	Biometrics	3
	<b>or</b>	
STAT 350	Business and Economic Statistics I	3
KIN 101	Principles of Physical Fitness	1

**Choose one of the professional programs: I, II.**

**Program I: Coordinated program in dietetics**  
**Professional courses (60 hours)**

ACCTG 231	Accounting for Business Operations	3
FN 300	Food Preparation and Meal Management	4
FN 501	Food Science	3
FN 502	Principles of Nutrition	3

FN 610	Nutrition Throughout the Life Cycle .....	3
FN 630	Clinical Nutrition .....	4
HRIMD 130	Introduction to Professional Dietetic Practice .....	1
HRIMD 440	Fundamentals of Quantity Food Production .....	5
HRIMD 455	Foodservice Systems .....	4
HRIMD 456	Hotel and Foodservice Purchasing ..	3
HRIMD 482	Employee Development for the Hospitality Industry .....	2
Management semester*		
HRIMD 560	Management in Dietetics .....	9
HRIMD 670	Seminar in Hotel, Restaurant Management, and Dietetics .....	1
Clinical semester in Topeka or other area hospitals		
HRIMD 520	Applied Clinical Dietetics .....	7
HRIMD 521	Clinical Dietetic Practicum .....	8
<b>Supporting courses (6 hours)</b>		
Choose two of the following:		
HDFS 110	Introduction to Human Development .....	3
HDFS 350	Family Relationships and Sex Roles .....	3
HDFS 400	Family Economics .....	3
HDFS 105	Introduction to Personal and Family Finance .....	3
FN 301	Food Trends, Legislation, and Regulation .....	3
<b>Unrestricted electives .....</b>		
<b>Total hours for graduation .....</b>		

\*STAT course (3 hours) may be taken during the management semester.

**Program II: General dietetics**

**Professional courses (45 hours)**

ACCTG 231	Accounting for Business Operations .....	3
ASI 671	Meat Selection and Utilization .....	2
MANGT 420	Management Concepts .....	3
FN 300	Food Preparation and Meal Management .....	4
FN 301	Food Trends, Legislation, and Regulation .....	3
FN 501	Food Science .....	3
FN 502	Principles of Nutrition .....	3
FN 610	Nutrition Throughout the Life Cycle .....	3
FN 630	Clinical Nutrition .....	4
FN 700	Community Nutrition .....	3
HRIMD 130	Introduction to Professional Dietetic Practice .....	1
HRIMD 440	Fundamentals of Quantity Food Production .....	5
HRIMD 445	Organization and Management of Foodservice Operations .....	3
HRIMD 456	Hotel and Foodservice Purchasing ..	3
HRIMD 482	Employee Development for the Hospitality Industry .....	2

**Supporting courses (9 hours)**

Three of the following:

CT 330	Clothing and Society .....	3
FN 612	Principles of Food Product Development and Control .....	3
HDFS 105	Introduction to Personal and Family Finance .....	3
HDFS 110	Introduction to Human Development .....	3
HDFS 350	Family Relationships and Sex Roles .....	3
HDFS 400	Family Economics .....	3

**Unrestricted electives .....**

**Total hours for graduation .....**

**Hotel and restaurant management**

Bachelor of science in hotel and restaurant management

The mission of the hotel and restaurant management program is to prepare students for professional careers in hospitality management by providing theory-based instruction and practical experience.

The program provides students with a broad liberal education, an understanding of business administration, a solid foundation of professional courses in both hotel and foodservice operations, and hands-on experience in the hospitality industry. A 400-hour field experience for academic credit is required.

Students apply concepts learned in the classroom to actual work situations. On-campus facilities include a quantity food production laboratory, Housing and Dining Services, and the K-State Union foodservices. Students gain valuable experience in commercial properties under the supervision of managers and faculty supervisors.

The hotel and restaurant management program prepares students for managerial careers in the hospitality industry. See information earlier in this section.

**General education courses (54-55 hours)**

ENGL 100	Expository Writing I .....	3
ENGL 120	Expository Writing II .....	3
ENGL 516	Written Communication for the Sciences .....	3
SPCH 105	Public Speaking IA .....	2
<b>or</b>		
SPCH 106	Public Speaking I .....	3
GEOG 100	World Regional Geography .....	3
ECON 110	Principles of Macroeconomics .....	3
ECON 120	Principles of Microeconomics .....	3
PSYCH 110	General Psychology .....	3
SOCIO 211	Introduction to Sociology .....	3
<b>Humanities electives .....</b>		
CHM 110	General Chemistry .....	5
CIS 110	Introduction to Personal Computing .....	3
<b>or</b>		
HDFS 120	Microcomputers in Human Services .....	3
MATH 100	College Algebra .....	3
<b>or</b>		
College-level calculus		
STAT 350	Business and Economic Statistics I .....	3
BIOL 198	Principles of Biology .....	4
HRIMD 650	Fundamentals of Public Health and Food Safety .....	3
KIN 101	Principles of Physical Fitness .....	1

**Professional courses (34 hours)**

HRIMD 120	Introduction to Hotel and Restaurant Management .....	1
HRIMD 230	Tourism and the Hospitality Industry .....	2
HRIMD 320	Commercial Food Preparation and Service .....	4
HRIMD 440	Fundamentals of Quantity Food Production .....	5
HRIMD 455	Foodservice Systems .....	4
HRIMD 465	Hotel Operations .....	4
HRIMD 468	Hotel and Restaurant Law .....	3
HRIMD 472	Hotel and Restaurant Marketing ..	3
HRIMD 475	Field Experience in Hotel, Restaurant Management, and Dietetics .....	3
HRIMD 476	Cost Controls in Hotel and Restaurant Operations .....	3

HRIMD 482	Employee Development for the Hospitality Industry .....	2
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**Professional electives (9 hours)**

Select from the following:

ASI 671	Meat Selection and Utilization .....	2
HRIMD 240	Beverage Service in Restaurants .....	2
HRIMD 456	Hotel and Foodservice Purchasing ..	3
HRIMD 466	Convention Services and Meeting Planning .....	2
HRIMD 670	Seminar in Hotel, Restaurant Management, and Dietetics .....	1
MANGT 531	Personnel and Human Resource Management .....	3
MKTG 450	Consumer Behavior .....	3
MKTG 543	Promotional Strategies .....	3
POLSC 325	U.S. Politics .....	3

**Supporting courses (24 hours)**

FN 132	Basic Nutrition .....	3
HDFS 110	Introduction to Human Development .....	3
ACCTG 231	Accounting for Business Operations .....	3
ACCTG 241	Accounting for Investing and Financing .....	3
MKTG 400	Marketing .....	3
MANGT 420	Management Concepts .....	3
MANGT 530	Industrial and Labor Relations .....	3
<b>or</b>		
ECON 620	Labor Economics .....	3
FINAN 450	Essentials of Finance .....	3

**Unrestricted electives .....**

**Total for graduation .....**

**Hotel, restaurant, institution management and dietetics courses**

**Undergraduate credit**

**HRIMD 120. Introduction to Hotel and Restaurant Management.** (1) I. A survey of career opportunities and the scope, history, and development of the hotel and restaurant industry. Industry guest lecturers and field trips.

**HRIMD 130. Introduction to Professional Dietetic Practice.** (1) I. A survey of career opportunities in dietetic practice. Discussion of characteristics and skills needed for success; routes to becoming a registered dietitian.

**HRIMD 230. Tourism and the Hospitality Industry.** (2) II. Analysis of tourism development and its effect on the hospitality industry. Emphasis on the economic and social values relating tourism to hotels and restaurants.

**HRIMD 240. Beverage Service in Restaurants.** (2) I. Procurement and merchandising of alcoholic and nonalcoholic beverages in food and beverage operations; study of spirits, wines, and beers; emphasis on responsible service of alcoholic beverages.

**HRIMD 320. Commercial Food Preparation and Service.** (4) I, II. Principles of food preparation; presentation and service in commercial operations, tableside cookery, cooking to order, buffets, banquets; customer relations and teamwork. Three credits rec., 1 credit lab. Pr.: HRIMD 120 or conc. enrollment and sophomore standing.

**HRIMD 440. Fundamentals of Quantity Food Production.** (5) I, II. Principles and methods of preparing food in quantity; considerations of menu planning, quality food, food acceptability, work methods, sanitation, safety, and production controls. Three hours lec., five hours lab, and one hour rec. Pr.: FN 300 or HRIMD 320; and minimum cumulative 2.0 GPA.

**HRIMD 445. Organization and Management of Foodservice Operations.** (3) II, in alternate years. Effective use of resources to meet organizational objectives unique to foodservice operations. Challenges of foodservice in the health care arena. Pr.: HRIMD 440 and MANGT 420.

**HRIMD 455. Foodservice Systems.** (4) I, II.

Foodservice operations as a system with emphasis on procurement, production, distribution, service, and maintenance. Concepts covered in lecture sessions applied in practicum. Field trip required. Two credits rec., two credits practicum. Pr.: HRIMD 440 and minimum cumulative 2.0 GPA.

**HRIMD 456. Hotel and Foodservice Purchasing.** (3) I, II. Purchasing of food and supplies for hotels and restaurants and institutional foodservices. Field trips required. Pr.: HRIMD 320 or FN 300.

**HRIMD 465. Hotel Operations.** (4) I, II. Analysis of the guest cycle through various operating departments. Organization and management of hotel operation systems such as front office, sales, food and beverage, properties, and housekeeping. Emphasis on departmental relationships. Three credits rec., 1 credit practicum. Pr. or conc.: HRIMD 230 and minimum cumulative 2.0 GPA.

**HRIMD 466. Convention Services and Meeting Planning.** (2) I. An analysis of the planning and conduct of meetings as they impact on the hotel industry. The perspectives and responsibilities of both the hotel staff and the meeting planner are explored. Pr.: HRIMD 465.

**HRIMD 468. Hotel and Restaurant Law.** (3) I. Legal aspects of operating hotels and restaurants, rights and responsibilities of the operator, patron civil rights, governmental regulations, franchising contracts, and commercial transactions. Pr.: HRIMD 455 or 465.

**HRIMD 470. Seminar in Hotel and Restaurant Management.** (1) Offered on demand. Current developments and trends in hotel and restaurant management. Pr.: HRIMD 455 and 465.

**HRIMD 472. Hotel and Restaurant Marketing.** (3) II. Application of marketing principles to the hotel and restaurant industry through analysis of concepts, plans, and strategies. Pr.: MKTG 400; and HRIMD 455 or 465.

**HRIMD 475. Field Experience in Hotel, Restaurant Management, and Dietetics.** (1-3) I, II, S. Supervised work experience in hotels, restaurants, or dietetic operations. Pr.: For HRM students: junior standing, HRIMD 440 and either 455 or 465; and 400 hours of work experience in hotel/restaurant industry, exclusive of course work, in the preceding three years.

**HRIMD 476. Cost Controls in Hotel and Restaurant Operations.** (3) I, II. Application of accounting principles; methods of analysis and control of food, beverage, and labor costs in the hotel and restaurant operations. Relationship of cost, profit, and revenue. Pr.: ACCTG 231; and HRIMD 455 or 465.

**HRIMD 480. Management in the Hotel and Restaurant Industry.** (3) Offered on demand. Management of personnel and other resources in the hotel and restaurant industry. Emphasis on employee development and training. Pr.: HRIMD 455 or 465 and MANGT 420.

**HRIMD 482. Employee Development for the Hospitality Industry.** (2) I, II. A discussion of the hospitality manager's and dietitian's role as a facilitator and change agent with employee and clients to increase client/guest satisfaction. Application of principles of learning and instructional strategies appropriate to changing behavior. Pr.: HRIMD 440.

**HRIMD 499. Problems in Hotel, Restaurant, Institution Management and Dietetics.** (Var.) I, II, S. Independent study under the supervision of a faculty member. Pr.: Consent of instructor.

**Undergraduate and graduate credit**

**HRIMD 510. Introduction to Clinical Dietetics.** (1) Offered on demand. Application of concepts and skills in clinical dietetics in a simulated practice environment. One hour rec. per week. Pr.: FN 502; BIOCH 365; and BIOL 240; and conc. enrollment in FN 630.

**HRIMD 520. Applied Clinical Dietetics.** (7) I, II.

Professional role of dietitians in the nutritional care and education of persons throughout the life cycle. Four credits recitation, 3 credits supervised practice. Pr.: HRIMD 510; FN 610, 630; and admission to coordinated program in dietetics.

**HRIMD 521. Clinical Dietetic Practicum.** (8) I, II. Supervised clinical/community experience in the nutritional care of patients/clients and the promotion of dietetic services. Two credits recitation, 6 credits supervised practice. Pr.: HRIMD 510; FN 610, 630; and admission to coordinated program in dietetics.

**HRIMD 560. Management in Dietetics.** (9) I, II. Functions of management in foodservice; financial control policy making, interdepartmental relationships, and foodservice planning; independent study and management experience in campus and other foodservices. Three credits rec., 6 credits practicum. Pr.: HRIMD 455, 456, 482; ACCTG 231; and admission to the coordinated program in dietetics.

**HRIMD 635. Foodservice Equipment and Layout.** (2) I, II. Factors affecting the selection and arrangement of equipment in foodservice systems. Field trip required. Pr.: HRIMD 440.

**HRIMD 650. Fundamentals of Public Health and Food Safety.** (3) I. Organization and function of food inspection services; principles of disease transmission; diseases transmitted to man through the food chain. (Jointly with LM 650.) Pr.: BIOL 198 and consent of staff.

**HRIMD 670. Seminar in Hotel, Restaurant Management and Dietetics.** (1) I, II. Current trends, research, and developments in hotel and restaurant management and dietetics. Pr.: Senior standing in hotel/restaurant management or dietetics programs. May be taken more than once.

**HRIMD 705. Computer Implementation in Foodservice and Hospitality Operations.** (3) S. In alternate years. Review of computer development in foodservice and hospitality operations; development of criteria for implementation of a computer system; analysis of foodservice and hospitality hardware and software. Pr.: CIS 110; and HRIMD 480 or 560 or MANGT 420.

**HRIMD 710. Readings in Foodservice and Hospitality Management.** (1-3) I, II, S. Directed study of current literature in foodservice and hospitality management and related areas. Pr.: HRIMD 480 or 560 or MANGT 420.

**HRIMD 720. Current Issues in Hotel, Restaurant, Institution Management and Dietetics.** (1-3) Recent developments and concerns related to management of foodservice and hospitality operations. Pr.: HRIMD 440, 480 or 560 or MANGT 420.

**HRIMD 755. Consultation in Dietetics.** (2-3) II. On sufficient demand. Dietetic consultation for foodservice in small hospitals, nursing homes, and schools. Pr.: HRIMD 440.

**HRIMD 780. Problems in Hotel, Restaurant, Institution Management and Dietetics.** (Var.) I, II, S. Individual investigation of problems in institution management. Conferences and reports at appointed hours. Pr.: HRIMD 440; and HRIMD 480 or 560 or MANGT 420.

**HRIMD 785. Practicum in Foodservice Systems Management.** (1-6) I, II, S. Professional experiences in approved foodservice organization as a member of the management team under faculty supervision. Pr. or conc.: HRIMD 440; and HRIMD 480 or 560 or MANGT 420.

# Human Development and Family Studies

John P. Murray,\* Head

Professors Bollman,\* Jurich,\* Moxley,\* J. Murray,\* Russell,\* and Smith; Associate Professors Balk,\* Barnes,\* Bergen,\* Bradshaw, Jones, A. Murray,\* Poresky,\* Scheidt,\* Schumm,\* Walker, Wanska,\* and Wright;\* Assistant Professors Coulson, De Luccie,\* Miller,\* Prather, and Wilken; Instructors Cantrell, Hoover, Meyer, and West; Emeriti: Professors Hoeflin,\* Huyck,\* Kennedy,\* Long,\* Morse,\* and Stith;\* Associate Professor McNeil;\* Assistant Professor Larson.

The Department of Human Development and Family Studies focuses on the study of individuals and families from a multidisciplinary perspective. Programs emphasize developmental processes throughout the life cycle, interpersonal relationships, family economics, and educational programming for children and families.

Five programs are available at the undergraduate level. They are early childhood education, family and consumer economics, family life and community services, life span human development, and pre-law in family studies. The department offers a dual degree program in human development and family studies and social work. In addition, students often combine degree programs in early childhood education and elementary education.

The department places great importance on laboratory and field experiences along with classroom experiences.

For students pursuing early childhood education, the Early Childhood Laboratory and the Hoeflin Stone House Child Care Center provide on-campus observation and teaching. Both facilities are licensed by the state of Kansas and accredited by the National Academy of Early Childhood Programs.

Students in the family life and community services program must complete a field experience in a public or private agency that serves families, adolescents, single adults, children, or the elderly. Agency staff and department faculty guide students in the planning, direction, and evaluation of these supervised experiences. On-campus opportunities for gaining experience are available through the Family Center, Friendship Tutoring, FONE (a crisis hotline), and various organizations and offices which address students' needs.

## Bachelor of science in human development and family studies

### General education

These general education courses are identical for all programs leading to a bachelor of science in human development and family studies.

#### Communication (8-9)

ENGL 100	Expository Writing I	3
ENGL 120	Expository Writing II	3
SPCH 105	Public Speaking IA	2
	or	
SPCH 106	Public Speaking I	3

#### Social sciences (9)

ECON 110	Principles of Macroeconomics	3
PSYCH 110	General Psychology	3
	or	
HDFS 110	Introduction to Human Development	3
SOCIO 211	Introduction to Sociology	3

#### Humanities electives (6)

#### Sciences (7)

Biological sciences and physical sciences electives (One course must be taken from each area; one course must include a laboratory)

#### Quantitative studies (6)

MATH 100	College Algebra	3
	or	
	A college-level calculus course	3
	Any 3-unit introductory statistics course	3

#### Physical education (1)

KIN 101	Principles of Physical Fitness	1
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### HDFS foundation

These foundation courses form the common knowledge base for HDFS and are identical for all programs, with the exception of minor variations in early childhood education.

HDFS 110	Introduction to Human Development*	3
HDFS 301	Helping Relationship	3
	or	
HDFS 420	Interaction Techniques with Young Children	3
HDFS 302	You and Your Sexuality	3
HDFS 310	Early Childhood	3
HDFS 400	Family Economics	3
HDFS 506	Middle Childhood and Adolescence	3
HDFS 510	Human Development and Aging	3
HDFS 550	The Family	3

\*If not taken as general education course.

## Early childhood education

Bachelor of science in human development and family studies

This program is for students who wish to work in prekindergarten education programs in administrative or teaching positions, including work with parents and community resources as well as with young children.

The National Council for Accreditation of Teacher Education has approved K-State's early childhood education program.

Students completing the early childhood education program in human development and family studies are eligible for certification by the Kansas State Department of Education in Early Childhood Education. To complete the ECE program students

must have full admission into the teacher education program.

### Admission to teacher education

Application forms for admission to teacher education are available in the Center for Student and Professional Services, 13 Bluemont Hall. The application should be filed two years prior to graduation. (See the College of Education section of this catalog for details.)

Students transferring 50 or more hours from another institution should apply at the time of initial enrollment.

Requirements for admission to early childhood teacher education programs may also be found in the College of Education section. Details concerning these requirements include:

1. Hours: 50 total hours completed including all transfer and K-State credits.
2. English composition: Both Expository Writing I and II must be completed satisfactorily with a minimum of C average. Students may take an English exam if a grade average of C is not achieved.
3. Public speaking: SPCH 105, 106, or 109. A grade of C or better is required in one of the public speaking courses. Students may complete the requirement with the quiz-out conducted by the speech department.
4. Overall GPA: For full admission, a 2.5 is required in all college work attempted, including transfer and K-State credits. Probationary admission may be granted when a student has a 2.4 GPA in all college work, provided all other requirements have been met. The student must achieve the required 2.5 GPA by the end of the next 30 hours completed or the student will be dropped from teacher education.
5. Pre-Professional Skills Test: Students must take and pass the Pre-Professional Skills Test in reading, writing, and mathematics. The State Board of Regents has established a base score of 172 for each section. Completion of the test prior to application for admission to teacher education is required.

The Pre-Professional Skills Test will be scheduled during both fall and spring semesters. Registration for the test must be completed by the announced deadline. Application forms for registration for the test are available in 13 Bluemont Hall.

### Laboratory courses

Before participating in laboratory courses involving contact with children, students must undergo a physical examination, including a tuberculosis test, at their own expense. Students must not have any physical or mental conditions that would

interfere with the health, safety, or welfare of children.

Students will be screened by the Kansas Department of Health and Environment for criminal and child abuse histories (through the Kansas Bureau of Investigation and Social and Rehabilitative Services). Students with questionable histories, as determined by the Kansas Department of Health and Environment, will be dropped from the early childhood education program.

### Directed experiences (student teaching)

Application for student teaching must be made no later than the semester in which the student is enrolled in HDFS 545 Early Childhood Program Lab 1. Application forms are available in the advising center, Department of Human Development and Family Studies, 314 Justin Hall.

Enrollment in directed experiences is by permission only. Directed experiences may not be taken until the student has obtained full admission into teacher education and has completed HDFS 540 and 541.

### Certification

To be eligible for certification in early childhood education, students must complete the early childhood education option, including a grade of C or better in directed experiences, and receive recommendation from the Department of Human Development and Family Studies for submission to Kansas State University's certifying officer. Students must pass the National Teachers Examination as described in the College of Education section of this catalog.

Application for certification must be made during the semester in which the degree will be received. Forms are available in the Center for Student and Professional Services, College of Education, 13 Bluemont Hall.

### General education courses (37-38 hours)

See listing at the beginning of the degree requirements.

### HDFS foundation courses (12-15 hours)

HDFS 110	Introduction to Human Development*	3
HDFS 301	Helping Relationship	3
	or	
HDFS 420	Interaction Techniques with Young Children**	3
HDFS 310	Early Childhood	3
HDFS 400	Family Economics	3
HDFS 550	The Family	3

### Professional supporting courses (39-42 hours)

HDFS 313	Preschool Child Lab	1
HDFS 524	Professional Seminar in Early Childhood	3
HDFS 528	Exceptional Development in Early Childhood	3
HDFS 540	Curriculum for Cognitive and Language Development for Young Children	3

HDFS 541	Curriculum for Emotional, Social, and Physical Development of Young Children	3
HDFS 545	Early Childhood Program Lab I	1
HDFS 546	Early Childhood Program Lab II	2
HDFS 625	Directed Experiences***	8
HDFS 626	Administration of Early Childhood Programs	3
FN 132	Basic Nutrition	3
FN 352	Concepts of Personal Health	3
FN 503	Maternal and Child Nutrition	3
SPPAT 555	Language Development	3
PSYCH 110	General Psychology*	3

**Professional electives (12 hours)**

MANGT 202	Small Business Operations	3
ACCTG 231	Accounting for Business Operations	3
HDFS 120	Microcomputers in Human Services	3
HDFS 300	Problems in HDFS: Preschool Lab Experience	Var.
HDFS 302	You and Your Sexuality	3
HDFS 312	Infant Observation Lab	1
HDFS 370	Parenting	3
HDFS 506	Middle Childhood and Adolescence	3
HDFS 510	Human Development and Aging	3
HDFS 670	Parent Education	3
HDFS 710	Child Care: Components and Issues	2-3
HDFS 728	Assessment of Young Children	3

**Additional requirements for certification (14 hours)**

Social science elective****	3
Literature elective*****	3

Select additional electives from the areas of humanities, social sciences, sciences, mathematics, general religion, philosophy, art and music history, and appreciation of art, architecture, music, or theatre to fulfill the general education requirements for teaching certification in early childhood education

Unrestricted electives 7-8

Total for graduation 125

\*Must be taken if not taken as general education course.

\*\*Required for early childhood education students.

\*\*\*First aid/CPR certification required before enrollment in HDFS 625. This requirement can be met by successful completion of Red Cross or American Heart Association courses or by American Heart Association courses.

\*\*\*\*A minimum of 9 hours other than psychology is required for certification.

\*\*\*\*\*Literature for Children and Literature for Adolescents may not be used as a literature electives but may be used to fill additional general education requirements.

**Family and consumer economics**

Bachelor of science in human development and family studies

This program allows for combinations of course work in family and consumer economics, human development and family studies, marketing, personal finance, consumer education, and business. Students prepare for a variety of consumer-related job opportunities.

**General education courses (37-38 hours)**

See listing at the beginning of the degree requirements.

**HDFS foundation courses (21-24 hours)**

See listing at the beginning of the degree requirements.

**Professional courses (25 hours)**

HDFS 105	Introduction to Personal and Family Finance	3
HDFS 405	Advanced Personal and Family Finance	3
HDFS 412	Consumer Rights and Responsibilities	3
HDFS 415	Family Law	3
HDFS 460	Family Resource Management Theory and Application	3
HDFS 605	Consumers and the Market	3
HDFS 675	Field Study in Family Economics	1
HDFS 705	Financial Problems of Families	3
HDFS 715	Families in the American Economy	3

**Supporting human ecology courses (9 hours)**

IDH 410	Housing and Its Environment	3
IDH 440	Home Appliance Design and Evaluation	3
Elective from FN or HRIMD		3

**Other supporting courses (18-21 hours)**

PSYCH 110	General Psychology*	3
ECON 120	Principles of Microeconomics	3
ACCTG 231	Accounting for Business Operations	3
HDFS 120	Microcomputers in Human Services	3
MKTG 400	Marketing	3
MKTG 450	Consumer Behavior	3
PSYCH 545	Consumer Psychology	3
POLSC 325	U.S. Politics	3

Unrestricted electives 11-12

Total for graduation 125

\*If not taken as general education course.

**Family life and community services**

Bachelor of science in human development and family studies

Family life and community services prepares students to develop and implement preventive education programs designed to strengthen family life and family relationships. Courses focus on the development of the individual in a family context throughout the life cycle.

**General education courses (37-38 hours)**

See listing at the beginning of the degree requirements.

**HDFS foundation courses (21-24 hours)**

See listing at the beginning of the degree requirements.

**Professional courses (36-39 hours)**

HDFS 350	Family Relationships and Sex Roles	3
HDFS 370	Parenting	3
HDFS 580	Directed Field Experience	8
HDFS 585	Professional Seminar in Family Life Education	4
HDFS 652	Black Families	3
HDFS 670	Parent Education	3
HDFS 704	Seminar in HDFS	3
One lab (HDFS 312, 313, 507, or 508)		1
SOCWK 260	Introduction to Social Work	3
PSYCH 110	General Psychology*	3
PSYCH 202	Drugs and Behavior	2
ANTH 510	Kinship and Marriage	3

**Supporting human ecology courses (6 hours)**

FN 352	Concepts of Personal Health	3
Elective from CHID or HRIMD		3

**Other supporting courses (11-12 hours)**

A course in group processes		2-3
(e.g., HDFS 440 and 441, SPCH 326, PSYCH 550)		
Literature or language elective		3
Philosophy or language elective		3

One of the following history courses:

HIST 102	Western Civilization: The Modern Era	3
or		
HIST 512	Women in European History	3
or		
HIST 541	Women in American History	3

Unrestricted electives 9-11

Total for graduation 125

**Pre-law program  
Family studies**

Bachelor of science in human development and family studies

The family studies pre-law program is for students wishing to combine the traditional foundations of a pre-law curriculum with a thorough understanding of the relations existing between the law and the family. This program includes a strong foundation in arts and sciences, in-depth education in human development and family relationships, specialized courses in legal issues concerning families and children, and a basic introduction to the law and judicial system in this country. Students are prepared to enter law schools or law-related careers.

**General education courses (37-38 hours)**

See listing at the beginning of the degree requirements.

**HDFS foundation courses (21-24 hours)**

See listing at the beginning of the degree requirements.

**Professional courses (20 hours)**

HDFS 350	Family Relationships and Sex Roles	3
HDFS 412	Consumer Rights and Responsibilities	3
HDFS 515	Family Law	3
HDFS 460	Family Resource Management	3
HDFS 580	Directed Field Experience	8

**Supporting human ecology courses (6 hours)****Supporting courses (21-24 hours)**

PSYCH 110	General Psychology*	3
PHIL 130	Introduction to Ethics	3
ENGL 300	Expository Writing III	3
POLSC 325	U.S. Politics	3
POLSC 377	Introduction to Public Policy	3
POLSC 615	Constitutional Law II	3
SPCH 325	Argumentation and Debate	3
Philosophy elective		3

Unrestricted electives 16-17

Total for graduation 125

\*If not taken as general education course.

**Life span human development**

Bachelor of science in human development and family studies

This program combines the study of human development with a strong foundation in the arts, sciences, and humanities. Course work emphasizes the development of individuals across the life span, the processes underlying development and aging through the life cycle, and the factors that enhance, support, or impede human development. The life span human development program prepares students for

graduate study in a variety of applied and academic fields.

**General education courses (37–38 hours)**

See listing at the beginning of the degree requirements.

**HDFS foundation courses (21–24 hours)**

See listing at the beginning of the degree requirements.

**Professional courses (14–21 hours)**

HDFS 312	Infant Observation Lab	1
	or	
HDFS 313	Preschool Child Lab	1
HDFS 350	Family Relationships and Sex Roles	3
FN 352	Concepts of Personal Health	3
HDFS 120	Microcomputers in Human Services	3
HDFS 507	Middle Childhood Lab	1
	or	
HDFS 508	Adolescence Lab	1
BIOL 198	Principles of Biology*	4
BIOL 310	Biology and the Future of Man	3
PSYCH 110	General Psychology*	3

**Supporting human ecology courses (6 hours)**

FN 132	Basic Nutrition	3
	Elective from CTID or HRIMD	3

**Professional electives (24 hours)**

HDFS or social science electives (300 level or above)

**Unrestricted electives** ..... 15–20

**Total for graduation** ..... 125

\*Must be taken if not taken as general education course.

**Dual degree: Human development and family studies and social work**

Bachelor of science in human development and family studies

Bachelor of science, social work major

This 150-hour program leads to a B.S. degree in human development and family studies through the College of Human Ecology, and to a B.S. degree with a social work major through the College of Arts and Sciences. The unique goal of this program is to give students skills in and knowledge of interpersonal relationships, an understanding of the developmental processes of children and families, and beginning social work skills. Upon completion of the program students are equipped to work with families and individuals in social work settings. They are also eligible to take the social work licensure examination. The social work major, housed in the Department of Sociology, Anthropology, and Social Work, is accredited by the Council on Social Work Education.

**General education courses (56–57 hours)**

ENGL 100	Expository Writing I	3
ENGL 120	Expository Writing II	3
SPCH 105	Public Speaking IA	2
	or	
SPCH 106	Public Speaking I	3
PSYCH 110	General Psychology	3
ECON 110	Principles of Macroeconomics	3
POLSC 301	Introduction to Political Thought	3
SOCIO 211	Introduction to Sociology	3
BIOL 198	Principles of Biology	4
	Physical science with lab	4
	Biological or physical science	3

	Biological or physical science with prerequisite in the same department	3
MATH 100	College Algebra	3
STAT 330	Elementary Statistics for Social Science	3
	Fine arts elective	3
	Philosophy elective	3
	Literary or rhetorical arts course	3
	Western heritage course	3
ANTH 200	Introduction to Cultural Anthropology	3
KIN 101	Principles of Physical Fitness	1

**Human development and family studies (26 hours)**

HDFS 110	Introduction to Human Development	3
HDFS 310	Early Childhood	3
HDFS 313	Preschool Child Lab	1
HDFS 350	Family Relationships and Sex Roles	3
HDFS 370	Parenting	3
HDFS 506	Middle Childhood and Adolescence	3
HDFS 507	Middle Childhood Lab	1
	or	
HDFS 508	The Adolescent Lab	1
HDFS 510	Human Development and Aging	3
HDFS 530	The Family	3
HDFS 670	Parent Education	3

**Human ecology supporting courses (11 hours)**

FN 132	Basic Nutrition	3
HDFS 400	Family Economics	3
HDFS electives		5

**Social work professional courses (46 hours)**

SOCWK 260	Introduction to Social Work	3
SOCWK 562	Field Experience	12
SOCWK 510	Social Welfare as a Social Institution	3
SOCWK 550	Field Practicum Research	1
SOCWK 560	Social Work Practice I	3
SOCWK 561	Social Work Practice II	3
SOCWK 564	Social Work Professional Seminar	3
SOCWK 565	Program and Policy Formation	3
SOCWK 567	Human Behavior in Social Environment	3
SOCWK 568	Social Work Practice III	2
SOCIO 532	Community Organization	3
SOCWK 519	Methods of Social Work	4
SOCIO 511	Comparative Social Theories	3

**Unrestricted electives** ..... 10–11

**Total for graduation** ..... 150

See Department of Sociology, Anthropology, and Social Work, College of Arts and Sciences, regarding acceptance into the social work component of this program.

**Human development and family studies courses**

**Undergraduate credit**

**HDFS 105. Introduction to Personal and Family Finance.** (3) I, II. Fundamental principles for making financial decisions. Analysis and evaluation of personal and family money management strategies.

**HDFS 110. Introduction to Human Development.** (3) I, II. A study of life span human development through an individual's awareness and understanding of his or her own physical, social, and psychological growth and relationships with family, peers, and others.

**HDFS 120. Microcomputers in Human Services.** (3) I, S. Introduction to the application of microcomputer systems for early childhood education, family life education, information processing, and access to national information networks. Rec. and lab.

**HDFS 300. Problems in Human Development and Family Studies.** (Var.) I, II, S. Independent or small group study. Pr.: Consent of instructor.

**HDFS 301. The Helping Relationship.** (2–3) I. Characteristics of the helping relationship; consideration of personal qualities necessary for recognizing needs of individuals and families; identification of effective procedures for referral to appropriate professions and agencies. Pr.: HDFS 110 or PSYCH 110.

**HDFS 302. You and Your Sexuality.** (3), I, II. Study of the role and meaning of human sexuality in relation to oneself as well as in interrelationships with others. Pr.: HDFS 110 or PSYCH 110.

**HDFS 310. Early Childhood.** (3) I, II. Principles of growth and development of children from conception through age five, including familial, societal, and other ecological factors affecting young children's development. Pr.: HDFS 110 or PSYCH 110.

**HDFS 312. Infant Observation Lab.** (1) I, II. Observation of the behavior and development of children from infancy through toddlerhood. Prior or concurrent enrollment with HDFS 310.

**HDFS 313. Preschool Child Lab.** (1) I, II. On sufficient demand. Observation of the development and guidance of children from 18 months to five years of age with emphasis on observation of children in groups. Prior or concurrent enrollment with HDFS 310.

**HDFS 350. Family Relationships and Sex Roles.** (3) I, II. Effects of family interaction upon individual development and sex roles; consideration of premarital, marital, and parent-child relationships. Pr.: HDFS 110 or PSYCH 110 or SOCIO 211.

**HDFS 370. Parenting.** (2–3) I. Principles and philosophies of parenting. How to establish a nurturing relationship between parents and their children.

**HDFS 400. Family Economics.** (3) I, II. The influence of socioeconomic factors on families. Emphasis on current economic issues and their potential for impacting families and society. Pr.: ECON 110 or conc. enrollment.

**HDFS 405. Advanced Personal and Family Finance.** (3) II. In-depth applications of personal and family money management principles with emphasis on credit, savings, insurance, and budgeting. Pr.: HDFS 105.

**HDFS 412. Consumer Rights and Responsibilities.** (3) I, II. Issues and problems confronting consumers. Economic and legal implications of governmental policies and consumer choices.

**HDFS 420. Interaction Techniques with Young Children.** (3) I. A developmental approach to the acquisition of interaction techniques conducive to healthy emotional and self-concept growth in the child from birth to five years. Two hours lec. and one hour lab. Pr.: HDFS 310.

**HDFS 440. Human Development Facilitation.** (2) I, II. Applied study of leadership skills in small discussion groups, with emphasis on learning and facilitating Introduction to Human Development concepts. Taken conc. with HDFS 441. Pr.: HDFS 110, preparatory workshop, and consent of instructor.

**HDFS 441. Human Development Facilitation Lab.** (1) I, II. Recitation group leader for HDFS 110. Assists students in discussion and preparing group presentations; evaluates written work and course participation of students in group. Conc. with HDFS 440.

**HDFS 460. Family Resource Management Theory and Application.** (3) I. The processes by which individuals and families identify, develop, and allocate resources. Projects emphasize practical applications of resource management theory.

**HDFS 499. Independent Study in Family Economics.** (Var.) I, II, S. Independent study. Pr.: Consent of instructor.

## Undergraduate and graduate credit in minor field

**HDFS 506. Middle Childhood and Adolescence.** (3) I. Principles of growth and development during middle childhood and adolescence, including familial, societal, and other ecological factors affecting development of youth. Pr.: HDFS 110 or PSYCH 110.

**HDFS 507. Middle Childhood Lab.** (1) I. Analysis of situations facing children age six to twelve and design of interventions to enable these children to cope with these situations. Prior or conc. enrollment in HDFS 506.

**HDFS 508. Adolescent Lab.** (1) I. Analysis of situations facing adolescents and design of interventions to enable adolescents to cope with these situations. Prior or conc. enrollment in HDFS 506.

**HDFS 510. Human Development and Aging.** (3) I. Survey of issues, research, and problems in aging and human development throughout adulthood, with particular emphasis upon the later years. Pr.: HDFS 110 or PSYCH 280.

**HDFS 515. Family Law.** (3) I. Survey of legal issues concerning children and families. Topics include: human rights and responsibilities; marriage, divorce, paternity, child custody; estate and intergenerational transfer; and juvenile codes and school law. Pr.: HDFS 110 or PSYCH 110.

**HDFS 524. Professional Seminar in Early Childhood Education.** (3) II. Examination of programs for young children, including philosophical and theoretical foundations. Implementation and evaluation of program models and related issues and research. Pr.: HDFS 310 or PSYCH 280.

**HDFS 528. Exceptional Development in Early Childhood.** (3) II. Exceptional development in early childhood (birth to five years), including sensory impairments, physical impairments, communication disorders, mental retardation, behavioral problems, and gifted performance; formal and informal assessment in all developmental areas; the family's role in the assessment/referral/intervention process. Pr.: HDFS 310.

**HDFS 540. Curriculum for Cognitive and Language Development of Young Children.** (3) I. Planning for the enhancement of cognitive and language development. The application of child development theory to the planning of programs for young children within the major curriculum areas. Conc. with HDFS 545 or 546. Prior or conc. with SPPAT 555. Pr.: HDFS 310 and 313 and admission into teacher education.

**HDFS 541. Curriculum for Emotional, Social, and Physical Development of Young Children.** (3) II. Planning for the enhancement of physical, social, and emotional development. The application of child development theory to the planning of programs for young children within the major curriculum areas. Conc. with HDFS 545 or 546. Pr.: HDFS 310 and 313 and admission into teacher education.

**HDFS 545. Early Childhood Program Lab I.** (1) I, II. Application of principles and techniques to planning, implementing, and evaluating developmentally appropriate activities for young children in a supervised lab setting and in recitation sessions. Conc. with HDFS 540 or 541. Pr.: HDFS 310 and 313 and admission into teacher education.

**HDFS 546. Early Childhood Program Lab II.** (2) I, II. Advanced application of principles and techniques for developmentally appropriate programs for young children. Planning, implementing, and evaluating activities in a supervised lab setting. Conc. with HDFS 540 or 541. Pr.: HDFS 545 and admission into teacher education.

**HDFS 550. The Family.** (3) I, S. Consideration of the family throughout the family life cycle; developmental tasks at each stage. Use and impact of family support services. Pr.: Nine hours in HDFS or other social science and junior standing.

**HDFS 580. Directed Field Experience.** (8) I, II. A block field placement in local agencies. Faculty-supervised experience in direct service to clients: individuals, groups, and communities. Weekly seminar during placement emphasizes theory underlying the practice. Pr.: HDFS 301 or SOCWK 260; HDFS 550; and consent of instructor.

**HDFS 585. Professional Seminar in Family Life Education.** (4) II. Consideration of professional philosophy, identity, ethics, career development, and characteristics of client populations. Development of skills for family life educators working in agencies with various socioeconomic, age, and ethnic groups. Pr.: Conc. enrollment in HDFS 580.

**HDFS 590. Proseminar in Human Development and Family Studies.** (1-3) On sufficient demand. Review of specific issues or professional practices affecting children and/or families. Pr.: Junior standing and consent of instructor.

## Undergraduate and graduate credit

**HDFS 600. Economic Status of Women.** (3) II, in alternate years. Socioeconomic factors affecting the economic roles of women. Income, wealth, discrimination, employment, household production, and attitudes as they pertain to the economic position of women in society. Pr.: Junior standing and ECON 110.

**HDFS 605. Consumers and the Market.** (3) I, in alternate years. Consumption behavior studied with a focus on social and economic variables. Pr.: ECON 110.

**HDFS 625. Directed Experiences in Early Childhood Education.** (8) I, II, S. Participation in a preschool program; planning, instruction, evaluation. Pre-arrangement and consent of instructor required. Pr.: HDFS 540, 541, and admission into teacher education.

**HDFS 626. Administration of Early Childhood Programs.** (3) I. Rationale for and techniques of administering programs for preschool children, including health, education, social services, parent involvement. Pr.: Nine hours of human development and family studies.

**HDFS 652. Black Families.** (2-3) Selected topics for understanding life styles of black families. Implications for professionals working with black children and families. Pr.: Nine hours in HDFS or other social science and junior standing.

**HDFS 654. Death and the Family.** (2-3) I. Exploration of contemporary attitudes toward death and dying; related influences on individual development and family life. Pr.: HDFS 550 or SOCIO 640.

**HDFS 670. Parent Education.** (3) II. Principles in child development and family relationships applied to professional group and individual work with parents. Pr.: HDFS 370 and 550.

**HDFS 675. Field Study in Family Economics.** (1-3) I, II. Supervised experiences in financial counseling, community action, or consumer services. Pr.: Consent of instructor.

**HDFS 700. Problems in Human Development and Family Studies.** (Var.) I, II, S. Independent study on aspects of human development and family studies. Pr.: Consent of instructor.

**HDFS 704. Seminar in Human Development and Family Studies.** (Var.) I, II, S. Interpretation and evaluation of information on varied topics relating to family members. May be taken for a maximum of nine hours. Pr.: Nine hours of HDFS or other social science.

**HDFS 705. Financial Problems of Families.** (3) I, in alternate years. Analysis of financial problems confronting families. Application of family economic theory to major financial decisions made by families. Pr.: HDFS 405.

**HDFS 708. Topics in Human Development and Family Studies.** (2-3) I, II, S. Review of recent research and theory related to exploration of methods and family and interpersonal processes. Pr.: Consent of instructor. May be taken more than one semester.

**HDFS 710. Child Care: Components and Issues.** (2-3) II. Resources and facilities of quality child care; exploration of methods and philosophies of such programs; designed for those working with paraprofessional child care personnel. Pr.: Fifteen hours of either social science and/or HDFS.

**HDFS 715. Families in the American Economy.** (3) II, in alternate years. Impact of socio-economic and public policy factors on family economic well-being. The special issues faced by financially disadvantaged and non-traditional households will be addressed. Pr.: Nine hours in HDFS or other social sciences.

**HDFS 728. Assessment of Young Children.** (3) I. Theory and practice of individual assessment of handicapped and normal children, infancy to age eight, including cognitive, language, fine and gross motor, social, and self-help skills. Focus on selection, administration, interpretation, and evaluation of screening and comprehensive evaluation instruments for assessment and individual program planning. Pr.: HDFS 310.

**HDFS 760. Family Decision Making.** (3) II, in alternate years. Analysis of conceptual frameworks of processes by which families and individuals allocate resources. Pr.: HDFS 460 and 550.

**HDFS 770. Economics of Aging.** (3) II, in alternate years. Analysis of economic factors associated with aging; implications for individuals, society, and the economy. Pr.: Nine hours of HDFS or other social sciences.

# Technology

Jerry J. Cole, Interim Dean  
Mike Renk, Director of Fiscal Affairs  
Bonnie J. Scranton, Director of College  
Advancement

2409 Scanlan Avenue  
Salina, KS 67401  
825-0275

The College of Technology in Salina provides education of technicians and technologists in the fields of aeronautical technology, engineering technology, information technology, and science technology. The college also provides education or training in related technical or occupational fields.

The College of Technology offers bachelor of science degrees in electronic and mechanical engineering technology. The college offers associate of technology degrees in aviation maintenance, chemical engineering technology, civil engineering technology, computer engineering technology, computer information systems technology, computer science technology, electronic engineering technology, industrial engineering technology, mechanical engineering technology, professional pilot, and surveying technology. In addition the college offers the associate of applied science degree and a certificate in aviation maintenance.

Technology courses typically combine lecture and laboratory experiences. For most lab courses, the contact time is twice that of recitation courses.

## Accreditation and certification

The Technology Accreditation Commission of the Accreditation Board for Engineering and Technology accredits the following degrees: chemical engineering technology, civil engineering technology, computer engineering technology, electronic engineering technology, and mechanical engineering technology

The aircraft maintenance program is certified as an "Aviation Maintenance Technician School No. 3344" by the Federal Aviation Administration.

## Support services

The College of Technology provides a number of support services on the Salina campus. Admissions, student financial assistance, registrar, and career services/placement personnel are available to assist students. These Salina offices function as extensions of the related university offices.

K-State at Salina has a locally run student union and campus bookstore. Housing is available through Kansas Wesleyan

University until fall 1994, when the new residence hall will open on the College of Technology campus. Health services are provided by a number of local clinics and physicians.

## Library services

The College's Tullis Library/Resource Center is located in the Technology Center. The library meets standards set for college libraries by the American Library Association.

It contains a collection of up-to-date technical information and reference materials covering a range of technological subjects. The library's subject strengths are computer science, information systems, aeronautical technology, professional pilot, mechanical engineering technology, civil engineering technology, chemical engineering technology, and industrial engineering technology.

The resource center houses general information and technical periodicals, newspapers, fiction books, a reading room/lounge, typewriters, computers, a copy center, and audio/visual resource center. Fax service is also available.

## Continuing education

The Division of Continuing Education offers workshops, seminars, and short-term and full-term courses in the fields of technology.

Continuing education programs cover a variety of subjects for both occupational and personal use. Class schedules are set for the convenience of the students during both daytime and evening hours.

Special courses can be designed to meet the needs of individuals, groups, and organizations. These services can be provided on-campus, in-plant, or in communities where technical services are needed but not readily available. Continuing education units may be granted in appropriate cases.

# Aeronautical Technology

Kenneth W. Barnard, Head

Professors Barnard; Associate Professor Gross; Assistant Professors Garrison and Kennedy; Instructors Claussen, Graves, Kabler, Kelley, Rankin, Schlitz, and Smith.

## Airframe and powerplant certificate (APC)

68 hours required for completion

This two-year program prepares students for the Federal Aviation Administration airframe and powerplant certificate. Students who successfully complete the program will be awarded a certificate of completion.

Upon passing the FAA written, oral, and practical exams, graduates will be certified airframe and powerplant maintenance technicians.

Airframe and powerplant mechanics inspect, repair, modify, and maintain aircraft for manufacturers, commercial airlines, businesses, corporations, and general aviation operators.

### Freshman

#### Fall semester

MATH 125	Elementary Functions . . .	3
AVM 121	Aircraft Drawings . . . . .	1
AVM 141	Aircraft Science . . . . .	5
AVM 131	Aircraft Standards . . . . .	3
AVM 111	Aircraft Basic Electricity . . . . .	4
		<b>16</b>

#### Spring semester

AVM 112	Aircraft Welding . . . . .	2
AVM 142	Airframe Systems . . . . .	4
AVM 152	Airframe Structures and Repair . . . . .	5
AVM 132	Aircraft Fluid Power . . . . .	3
AVM 162	Airframe/Powerplant Electrical Systems . . . . .	4
		<b>18</b>

### Sophomore

#### Fall semester

AVM 241	Navigation Aids and Communications Systems . . . . .	3
AVM 261	Inspection and Assembly . . . . .	5
AVM 231	Aircraft Finish and Fabrication . . . . .	3
AVM 221	Powerplant Fundamentals . . . . .	4
AVM 251	Powerplant Ignition Systems . . . . .	3
		<b>18</b>

#### Spring semester

AVM 242	Powerplant Induction and Fuel Systems . . . . .	3
AVM 212	Propellers . . . . .	2
AVM 222	Powerplant Operations and Troubleshooting . . . . .	3
AVM 252	Powerplant Overhaul . . . . .	4
AVM 232	Gas Turbine Powerplants . . . . .	4
		<b>16</b>

## Aviation maintenance degree (AVM)

Associate of applied science

81 hours required for graduation

The applied science degree in aviation maintenance is a terminal degree that can be earned in two years. The degree goes beyond the airframe and powerplant certificate program to include general education courses recommended by the Kansas Board of Regents.

**Freshman****Fall semester**

MATH 100	College Algebra	3
AVM 121	Aircraft Drawings	1
AVM 141	Aircraft Science	5
AVM 131	Aircraft Standards	3
AVM 111	Aircraft Basic Electricity	4
SPCH 105	Public Speaking IA	2
		<hr/>
		18

**Spring semester**

AVM 112	Aircraft Welding	2
AVM 142	Airframe Systems	4
AVM 152	Airframe Structures and Repair	5
AVM 132	Aircraft Fluid Power	3
AVM 162	Airframe and Powerplant Electrical Systems	4
		<hr/>
		18

**Summer session**

ENGL 100	Expository Writing I	3
BUS 117	Economics	3
PSYCH 110	Psychology	3
		<hr/>
		9

**Sophomore****Fall semester**

AVM 241	Navigation Aids and Communications Systems	3
AVM 261	Inspection and Assembly	5
AVM 231	Aircraft Finish and Fabrication	3
AVM 221	Powerplant Fundamentals	4
AVM 251	Powerplant Ignition Systems	3
		<hr/>
		18

**Spring semester**

AVM 242	Powerplant Induction and Fuel Systems	3
AVM 212	Propellers	2
AVM 222	Powerplant Operation and Troubleshooting	3
AVM 252	Powerplant Overhaul	4
AVM 232	Gas Turbine Powerplants	4
MATH 151	Applied Plane Trigonometry	2
		<hr/>
		18

**Aviation maintenance technology (AVMT)**

Associate of technology  
93 hours required for graduation

In addition to the aviation maintenance certificate program, 25 additional credits in math, English, and science fulfill requirements for an associate degree in aviation maintenance. Airlines, large corporations, and aircraft companies are supporting an associate degree requirement for their supervisory positions. This degree can be transferred to other four-year universities through articulation agreements. Contact the Department of Aeronautical Technology for details.

MATH 100	College Algebra	3
MATH 151	Applied Plane Trigonometry	2
ENGL 100	Expository Writing I	3
SPCH 105	Public Speaking IA	2
ENGL 202	Technical Writing	3
PHYS 113	General Physics I	4
BUS 117	Economics	3
BUS 115	Supervisory Management	3
CMST 110	Computer Fundamentals	2

**Helicopter maintenance option**

Students receive instruction and experience on a variety of helicopters. Servicing, component repair, reconstruction, and troubleshooting techniques using the latest

in tracking and balancing equipment will be performed. Reciprocating and turbine powered helicopters that are flown regularly are used in the curriculum.

AVM 285	Helicopter Maintenance	7
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**Aviation maintenance review (AVMR)**

Aviation maintenance review courses are designed to provide training for those students qualifying under FAR 65.77. This training is usually necessary to pass the FAA written, oral, and practical exams for the airframe and powerplant certificate. The credit hours for this training can be applied toward requirements for an associate degree in aviation maintenance. A maximum of 30 semester credit hours can be waived for the FAA certificate for airframe and powerplant maintenance when enrolled in an associate degree program at the college.

AVMR 220	Aviation Maintenance Review General	4
AVMR 230	Aviation Maintenance Review Airframe	4
AVMR 250	Aviation Maintenance Review Powerplant	4

**Professional pilot program (PPIL)**

Associate of technology  
66 hours required for completion

The Cessna Pilot Center integrated flight training program is utilized to obtain private, commercial, instrument, certified flight instructor, and multi-engine ratings.

The two-year associate degree emphasizes business courses as a complement to the English, math, and science requirements. Professional pilot graduates may fly as certified flight instructors, or charter, business, corporate, or airline pilots.

This program requires additional costs above the standard tuition, books, and supplies. Contact the Department of Aeronautical Technology for more information.

The flight training program is an FAR 141 approved flight school. The approval allows students to meet the commercial instrument minimum-flight-hour requirement in 190 hours instead of 250 hours.

This "savings" of 60 flight hours allows students to add additional ratings or realize reduced training costs. Frasca 141 flight training devices are used for additional cost savings and training benefits.

Veterans who are approved for flight training benefits are eligible for financial assistance.

Lab time reflected in the pilot course descriptions are minimum times. Significant time commitment is necessary for labs and flight training.

**Freshman****Fall semester**

PPIL 111	Private Pilot	4
PPIL 113	Private Pilot Flight Lab	1
CMS1 110	Computer Fundamentals	2
BUS 110	Introduction to Business	3
MATH 100	College Algebra	3
BUS 251	Financial Accounting	3
		<hr/>
		16

**Spring semester**

PPIL 112	Professional Instrument Pilot	3
PPIL 114	Professional Instrument Pilot Flight Lab	3
MATH 151	Applied Plane Trigonometry	2
ENGL 100	Expository Writing I	3
BUS 252	Managerial Accounting	3
ECON 100	Economics	3
		<hr/>
		17

**Sophomore****Fall semester**

PPIL 211	Professional Commercial Pilot	3
PPIL 213	Professional Commercial Pilot Flight Lab	2
SPCH 105	Public Speaking IA	2
PHYS 113	General Physics I	4
PPIL 121	Preventive Maintenance	2
BUS 210	Marketing	3
		<hr/>
		16

**Spring semester**

ENGL 202	Technical Writing	3
BUS 215	Business Law	3
BUS 115	Supervisory Management	3

**Track 1**

PPIL 212	Certified Flight Instructor	3
PPIL 214	Certified Flight Instructor Lab	1
Electives*		4

or

**Track 2**

PPIL 262	Multi-Engine Certification	2
Electives*		6
		<hr/>
		17

\*Electives must be approved by advisor. Professional pilot electives available are: PPIL 271, 272, 273, 274, 282, 285, 292.

**Aviation maintenance courses Undergraduate credit**

**AVM 111. Basic Aircraft Electricity.** (4) I. A basic concept of DC/AC circuits, with basic laws relating to the following: measuring voltage, current, resistance, continuity and leakage; relationship of voltage, current and resistance in electrical circuits; reading and interpretation of electrical circuit diagrams; electrical devices and inspection and servicing of batteries.

**AVM 112. Aircraft Welding.** (2) II. Theory and skill development in aircraft welding processes. Exercises in gas welding processes as applied to ferrous and nonferrous materials. Oxygen/acetylene, inert gas, and resistance welding processes are to be studied.

**AVM 121. Aircraft Drawings.** (1) I. The course is designed to teach the student how to recognize and identify each kind of line as it appears in aircraft drawings and to interpret the meaning of the lines as they relate to surfaces and details in drawings.

**AVM 131. Aircraft Standards.** (3) I. A survey of the organization of the Federal Aviation Administration and the Civil Aeronautics Board. Emphasis will be placed on the regulations, standards, and specifications of each of these organizations.

**AVM 132. Aircraft Fluid Power.** (3) II. A study of basic fluid mechanics as it applies to practical applications in aircraft systems. Compressible and incompressible fluid systems will be studied. Pr.: AVM 141, MATH 125.

**AVM 141. Aircraft Science.** (5) II. A survey of aircraft nomenclature, basic physics, theory of flight and

aerodynamics, aircraft ground operation and servicing, and aircraft hardware, materials, and processes.

**AVM 142. Airframe Systems.** (4) II. A study of the airframe systems and components to include: pressurization, heating and cooling, and structural device. Pr.: AVM 141.

**AVM 152. Airframe Structures and Repair.** (5) II. A study of materials commonly used in airframe structures and the associated study of making structural repairs according to recommended procedures. Skills in sheetmetal are stressed. Pr.: AVM 141.

**AVM 162. Airframe/Powerplant Electrical Systems.** (4) II. An advanced study of DC/AC circuits law relating to circuit analysis and a detailed study of measuring instruments. Advanced study of relays, switches, alternator, and other devices encountered in circuit analysis, troubleshooting, and repair. Pr.: AVM 111.

**AVM 212. Aircraft Propellers.** (2) II. A study of the use, maintenance, and inspection of propellers and their related control systems.

**AVM 221. Powerplant Fundamentals.** (4) I. A study of the principles of operation, design features, and operating characteristics of reciprocating aircraft engines. Includes overhaul inspection procedures on current horizontal opposed and radial engines. Pr.: AVM 131, 141.

**AVM 222. Powerplant Operation and Troubleshooting.** (3) II. Experience in installation, operation, and removal of aircraft engines. Engine analysis and diagnosis of malfunctions, including methods of remedy, are performed on airworthy engines. Pr.: AVM 221.

**AVM 231. Aircraft Finish and Fabrication.** (3) I. This course is designed to acquaint the student with the wood and fabric coverings and procedures used on aircraft, and methods used in preparation for and application of paint finishes to aircraft surfaces.

**AVM 232. Gas Turbine Powerplant.** (4) II. Advanced study of the fundamentals of gas turbine powerplants including operation, studies of supporting systems and inspection methods are fundamental to this course. Pr.: AVM 221.

**AVM 241. Navigational Aids and Communications Systems.** (3) I. A survey study of the aids to navigation and communications used in light and intermediate class aircraft. Operation and installation of the various types of equipment will be stressed. Pr.: AVM 111.

**AVM 242. Powerplant Induction and Fuel Systems.** (3) II. A study of aircraft induction and fuel metering systems including fuels, carburetors, fuel injection systems, superchargers, and other induction system components used to ensure a dependable and accurate fuel supply at any flight configuration and attitude. Conc.: AVM 221.

**AVM 251. Powerplant Ignition Systems.** (3) I. A study of battery, magneto high- and low-tension ignition systems including turbine ignitors for today's aircraft. Emphasis will be placed on troubleshooting, repair, and timing of aircraft ignition systems. Pr.: AVM 111.

**AVM 252. Powerplant Overhaul.** (4) II. Practical experience in overhauling reciprocating engines. Engines are assembled and operationally checked in lab. One hour rec. and six hours lab a week. Pr.: AVM 221.

**AVM 261. Aircraft Inspection and Assembly.** (5) I. A study of assembly and manufacturing procedures and inspection of aircraft components. This course also covers in detail annual and 100-hour inspections. Pr.: MATH 125, AVM 121, 131, 141.

**AVM 285. Helicopter Maintenance.** (7) S. A study of airframe, rotor transmission, and engine components of turbine and reciprocating engine helicopters. Also includes a detailed study of required maintenance, historical records, and inspection of components. Three hours rec. and 12 hours lab a week. Pr.: Aviation maintenance major or consent of instructor.

**AVM 290. Problems in AVM.** (Var.) I, II, S. Advanced study in a specific area chosen by the instructor. Pr.: Consent of instructor.

## Aviation maintenance review courses Undergraduate credit

**AVMR 220. Aviation Maintenance Review/General.** (4) The general review course is designed for those individuals who have met the Federal Aviation Administration's eligibility requirements under FAR 65.77. The review conforms to the three levels of training set forth by the FAA. Three hours rec. and three hours lab a week. Pr.: Departmental consent. This course may be offered in two parts as: AVMR 221 Aviation Maintenance Review/General I and AVMR 222 Aviation Maintenance Review/General II.

**AVMR 230. Aviation Maintenance Review/Airframe.** (4) The airframe review course is designed for those individuals who have met the Federal Aviation Administration's eligibility requirements under FAR 65.77. The review conforms to the three levels of training set forth by the FAA. Pr.: Departmental consent. This course may be offered in two parts as: AVMR 231 Aviation Maintenance Review/Airframe I and AVMR 232 Aviation Maintenance Review/Airframe II.

**AVMR 250. Aviation Maintenance Review/Powerplant.** (4) The powerplant review course is designed for those individuals who have met the Federal Aviation Administration's eligibility requirements under FAR 65.77. The review conforms to the three levels of training set forth by the FAA. Pr.: Departmental consent. This course may be offered in two parts as: AVMR 251 Aviation Maintenance Review/Powerplant I and AVMR 252 Aviation Maintenance Review/Powerplant II.

## Professional pilot courses Undergraduate credit

**PPIL 111. Private Pilot.** (4) I. The subject areas necessary for completion and passing of the FAA Private Pilot Written Examination are presented. Four hours rec. a week.

**PPIL 112. Professional Instrument Pilot.** (3) II. A study of the procedures, regulations, and techniques required to safely fly in instrument meteorological conditions within our national airspace system. The course will prepare the student to pass the FAA Instrument Airplane Written Examination. Three hours rec. a week. Pr.: PPIL 111.

**PPIL 113. Private Pilot Flight Lab.** (1) I. An introduction of the fundamentals of flight. Solo flights to include all flight operations and maneuvers necessary for meeting the aeronautical experience for the FAA Private Pilot Certificate. Three hours lab a week. Conc.: PPIL 111.

**PPIL 114. Professional Instrument Pilot Flight Lab.** (3) II. Instructional flight training necessary to maneuver the aircraft safely in actual or simulated instrument meteorological conditions within the national airspace system. Nine hours lab a week. Pr.: PPIL 111, 113. Conc.: PPIL 112.

**PPIL 121. Preventive Maintenance.** (2) I. This course will give the student hands-on experience with the 25 maintenance tasks allowed under FAR 43 entitled preventive maintenance. Two hours rec. a week.

**PPIL 211. Professional Commercial Pilot.** (3) I. A continuation of PPIL 111-Private Pilot. For preparation to pass the FAA Commercial Pilot written examination. Three hours rec. a week. Pr.: PPIL 111.

**PPIL 212. Certified Flight Instructor Ground School.** (3) II. Instruction techniques, practices, and procedures necessary to provide skill in organizing and presenting lessons. This course will prepare the student for the FAA Certified Instructor Written Examination. Three hours rec. a week. Pr.: PPIL 211.

**PPIL 213. Professional Commercial Pilot Flight Lab.** (2) I. An introduction to complex airplane operations and a review of those operations required of a commercial pilot. The completion of this course readies the student to take the commercial FAA flight test. Six hours lab a week. Pr.: PPIL 113. Conc.: PPIL 211.

**PPIL 214. Certified Flight Instructor Flight Lab.** (1) II. The needed flight skills and proper display of teaching ability will be emphasized. The demonstration of flight maneuvers with recognition of common errors in students performing the demonstrated maneuvers is stressed. Three hours lab a week. Pr.: PPIL 114. Conc.: PPIL 212.

**PPIL 262. Multi-Engine Certification.** (2) II. Instruction and flight experience in a multi-engine aircraft to develop the aeronautical skill and knowledge to meet the requirements for a multi-engine land class rating to the student's existing pilot certificate. One hour rec. and three hours lab a week. Pr.: PPIL 114, 213.

**PPIL 271. Helicopter Pilot (Add On).** (1) I. Provides the student with the aeronautical skills and experience necessary to meet the requirements for the addition of a rotocraft helicopter rating to the pilot certificate. One hour rec. a week. Pr.: PPIL 111, 113 or Private Pilot Certificate Airplane Single Engine Land, or Commercial Pilot Certificate Airplane Single Engine Land.

**PPIL 272. Certified Flight Instructor Helicopter.** (3) II. Provides the student with the basic information leading to the helicopter flight instructor certificate. The course is divided into two sections. The first section consists of the fundamentals of teaching and learning, including effective teaching methods, aerodynamics responsibilities, and proper use of the flight training syllabus. The second section is concerned with the analysis of the helicopter flight maneuvers involved in the private, commercial, and flight instructor certificates. Three hours rec. a week. Pr.: PPIL 271, 273. Conc.: PPIL 274.

**PPIL 273. Helicopter Pilot Flight Lab.** (3) I. Provides the student with the aeronautical skills and experience necessary to meet and demonstrate the skills requirements for the addition of a rotocraft helicopter rating to his or her pilot certificate. Nine hours lab a week. Pr.: PPIL 111, 113 or Private Pilot certificate Airplane Single Engine Land, or Commercial Pilot Certificate Airplane Single Engine Land.

**PPIL 274. Certified Flight Instructor Helicopter Flight Lab.** (2) II. This course provides the student with the necessary flight training leading to an FAA Certified Flight Instructor Certificate in helicopters. The course involves dual flight instruction covering all maneuvers necessary for teaching private and commercial certificate requirements. Six hours lab a week. Pr.: PPIL 271, 273. Conc.: PPIL 272.

**PPIL 282. Certified Instrument Flight Instructor.** (2) II. Instrument instruction techniques, practices, and procedures necessary to provide skills in organizing and presenting lessons in instrument flying procedures. This course will prepare the student for the FAA Certified Instrument Flight Instructor written exam. One hour rec. and three hours lab a week. Pr.: PPIL 212.

**PPIL 285. Airline Transport Pilot Rating.** (2) 5. Provides the student with the aeronautical knowledge necessary to prepare for the FAA Airline Transport Pilot written examinations. The demonstration of flight maneuvers, with recognition of proper control of emergencies in compliance of the Airline Transport Pilot Practical Test Standards will be stressed. One hour rec. and three hours lab a week. Pr.: Consent of instructor and evaluation of student's pilot experience as it relates to FAR 61.151 through 61.157.

**PPIL 292. Certified Multi-Engine Flight Instructor.** (2) II. Provides the student with the aeronautical skills and experience necessary to meet the requirements for the addition of an airplane, multi-engine rating to the flight instructor certificate. One hour rec. and three hours lab a week. Pr.: PPIL 212, 214.

# Engineering Technology

Thomas Creech, Head

Professors Ashburn, Buchwald, Farmer, Hassan, and Powell; Associate Professors Anderson, Francisco, Kinsler, Richolson, Shreves, Thompson, and Wilson; Assistant Professors Goll and Mosier; Instructor Eisenhour.

## Civil engineering technology

Associate of technology

67 hours required for graduation

Civil engineering technicians perform functions in the control and layout of horizontal and vertical elevations for proposed construction of buildings, bridges, and transportation facilities. Their work includes preliminary and final surveys, assisting in design and detailing stage, or supervision of construction to maintain quality control.

The program prepares civil technicians for employment in industries dealing with the design and construction of highways, bridges, railroads, airports, water supply and distribution projects, and other projects ranging from small-scale construction jobs to those involving tremendous capital expenditures.

Accredited by the Technology Accreditation Commission for the Accreditation Board for Engineering and Technology.

### Freshman

#### Fall semester

MATH 100	College Algebra	3
MATH 151	Applied Plane Trigonometry	2
CET 120	Materials Sampling and Testing	2
MET 111	Technical Drafting	2
ENGL 100	Expository Writing I	3
CMST 101	Introduction to Computer Techniques	2
Humanities/social science elective		3
		<b>17</b>

#### Spring semester

PHYS 113	General Physics I	4
MATH 122	Applied Analytic Geometry and Calculus	4
CET 130	Plane Surveying	4
CET 110	Civil Technology Drafting	2
ENGL 202	Technical Writing	3
		<b>17</b>

### Sophomore

#### Fall semester

CET 311	Statics and Strength of Materials	5
MET 252	Fluid Mechanics	3
CET 233	Route Location Surveying	4
CET 220	Soils and Foundations	2
CET 241	Construction Methods and Estimating	2
		<b>16</b>

#### Spring semester

SPCH 105	Public Speaking IA	2
CET 313	Structural Design	5
CET 312	Transportation Systems	4

CHM 210	Chemistry I*	
	or	
PHYS 114	General Physics II	4
CET 210	Civil CAD	2
	or	
Humanities/social science elective*		3
		<b>17</b>

To be selected from ECON 100, PSYCH 110, ENGL 255, or HIST 231.

### Construction option

This option stresses the construction aspects of civil engineering technology. Courses are taught on contracts and specifications, construction surveying, print reading, and building electrical and mechanical systems. Emphasis will be in the area of heavy construction. In lieu of CET 110 Civil Technology Drafting and CET 312 Transportation Systems, the following courses must be substituted to complete the construction option:

CET 231	Construction Surveying	2
CET 140	Print Reading for Civil Construction	1
CET 340	Mechanical and Electrical Systems	3
CET 240	Contracts and Specifications	1

### Surveying technology (SRVT)

Associate of technology

67 hours required for graduation

Surveying is necessary for the planning, design, and layout of all major engineering projects. Surveys are used for subdivisions, buildings, bridges, railroads, highways, airports, canals, dams, irrigation and drainage projects, and in preparation of any kind of map.

Surveying technology graduates may seek employment in construction, as government surveyors (federal, state, county, and municipal), as engineering consultants, and as private surveyors.

Any person who goes into private practice must be licensed. This program, combined with the necessary work experience, will help individuals qualify to take the Registered Land Surveyors Examination.

### Freshman

#### Fall semester

MATH 100	College Algebra	3
MATH 151	Applied Plane Trigonometry	2
MET 111	Technical Drafting	2
ENGL 100	Expository Writing I	3
CMST 101	Introduction to Computer Techniques	2
SPCH 105	Public Speaking IA	2
Civil elective		3
		<b>17</b>

#### Spring semester

CET 110	Civil Technology Drafting	2
PHYS 113	General Physics I	4
MATH 122	Applied Analytic Geometry and Calculus	4
CET 130	Plane Surveying	4
CET 230	Land Surveys	3
		<b>17</b>

### Sophomore

#### Fall semester

CET 311	Statics and Strength of Materials	5
CET 233	Route Location Surveying	4
CET 232	Surveying Astronomy	3
ENGL 202	Technical Writing	3
Civil elective		2
		<b>17</b>

#### Spring Semester

CET 312	Transportation Systems	4
CET 235	Surveying Law	3
CHM 210	Chemistry I	
	or	
PHYS 114	General Physics II	4
Humanities/social science elective		3
CET 234	Advanced Surveying	2
		<b>16</b>

Civil electives must be a minimum of two credits from CET 120, CET 220, CET 241, CET 231, or CET 210.

Humanities/social science elective is to be selected from ECON 100, PSYCH 110, ENGL 255, or HIST 231.

### Geographic information systems option

68 hours required for graduation

The geographic information systems option addresses a rapidly increasing need for technicians familiar with the GIS technology. GIS is a computer-based mapping system that stores, integrates, and analyzes information about land aspects—what is on it; who owns it; what it is worth and where the natural resources, utilities, and environmentally sensitive areas are located relative to each other and to other land aspects.

GIS technology is currently being used in tax mapping; resource management; routing of emergency vehicles, delivery vans, and trucks; facilities management; planning; management of transportation systems and utility networks; legislative reapportionment; and monitoring environmental hazards.

### Freshman

#### Fall semester

MATH 100	College Algebra	3
MATH 151	Applied Plane Trigonometry	2
ENGL 100	Expository Writing I	3
MET 111	Technical Drafting	2
CMST 240	FORTTRAN	3
CMIS 245	Design, Systems and Software	3
		<b>16</b>

#### Spring semester

PHYS 113	General Physics I	4
CET 130	Plane Surveying	4
CET 110	Civil Technology Drafting	2
MET 212	Introduction to Computer-Aided Drafting	1
CET 150	Introduction to GIS	3
CET 255	Operating a GIS	2
		<b>16</b>

### Sophomore

#### Fall semester

CET 250	Photogrammetry	3
CET 251	Georeferencing	3
GEOL 102	Geology	4
GEOG 242	Physical Geography	3
CET 350	Advanced Issues in GIS	3
Business/social science elective		2
Optional work/study internship*		1
		<b>18-19</b>

**Spring semester**

CMST 315	Data Communication and Networking	3
CMST 331	Statistics with Computer Applications	3
CMST 301	Computer Graphics	2
ENGL 202	Technical Writing	3
CET 355	Projects in GIS	2
SPCH 105	Public Speaking IA	2
Business/social science elective		2
Optional work/study internship*		1
		<b>18</b>

\*Two semesters of work/study internship at 1 hour credit hour per semester are optional.

Business/social science elective is to be selected from ECON 100, PSYCH 110, ENGL 255, and HIST 231.

**Computer engineering technology (CMET)**

Associate of technology

68 hours required for graduation

New advances in electronics including the development of the microprocessor—an actual computer smaller than a postage stamp—have created a need for skilled individuals capable of working with this new technology.

By understanding both hardware and software, computer engineering technicians can be employed in computer hardware design, computer maintenance, factory automation, computer manufacturing and testing, and computer sales and servicing.

Computer engineering technicians often work closely with computer engineers, electrical engineers, and computer scientists in the design and development of computers and computer-based products.

Accredited by the Technology Accreditation Commission for the Accreditation Board for Engineering and Technology.

**Freshman****Fall semester**

ELET 101	Direct Current Circuits	4
MATH 100	College Algebra	3
MATH 151	Applied Plane Trigonometry	2
ENGL 100	Expository Writing I	3
CMST 103	Algorithmic Design	3
CMST 240	FORTRAN	3
		<b>18</b>

**Spring semester**

ELET 102	Alternating Current Circuits	4
FLET 110	Semiconductor Electronics	4
MATH 122	Applied Analytic Geometry and Calculus	4
SPCH 105	Public Speaking IA	2
CMET 150	Digital Electronics and Microprocessors	3
		<b>17</b>

**Sophomore****Fall semester**

ELET 260	Electronic Measurements	4
PHYS 113	General Physics I	4
CMET 250	Digital System Design I	4
CMST 245	Applications in C Programming	3
Social science/humanities elective		2
		<b>17</b>

**Spring semester**

CHM 210	Chemistry I	4
	<b>or</b>	
PHYS 114	General Physics II	4

CMET 251	Digital System Design II	4
ENGL 202	Technical Writing	3
MET 111	Technical Drafting	2
Business elective		3
		<b>16</b>

**Computer science technology (CMST)**

Associate of technology

66 hours required for graduation

The Computer Science Technology curriculum includes science and mathematics, as well as courses in computer programming, advanced manufacturing, and scientific computer applications. Courses require a significant amount of laboratory work; the time spent in the lab will vary depending on the abilities of each student.

**Freshman****Fall Semester**

MATH 100	College Algebra	3
MATH 151	Applied Plane Trigonometry	2
CMST 100	Operating Systems	3
SPCH 105	Public Speaking IA	2
CMST 103	Algorithmic Design	3
CMST 240	FORTRAN	3
		<b>16</b>

**Spring semester**

PHYS 113	General Physics I	4
MATH 122	Applied Analytic Geometry and Calculus	4
CMST 221	Pascal	3
CMST 300	Assembly Language Programming	3
ENGL 100	Expository Writing I	3
		<b>17</b>

**Sophomore****Fall semester**

CMST 245	Applications in C Programming	3
CMST 340	Computer Science Technology Seminar	2
Business/social science electives		5
CMST 321	Data Structures	2
ENGL 202	Technical Writing	3
		<b>15</b>

**Spring semester**

CHM 210	Chemistry I	4
	<b>or</b>	
PHYS 114	General Physics II	4
CMST 301	Computer Graphics	2
ELET 100	Basic Electricity	3
CMST 331	Statistics with Computer Applications	3
CMST 315	Data Communications and Networking	3
CMST 325	Database Concepts	3
		<b>18</b>

**Computer information systems technology (CMIS)**

Associate of technology

66 hours required for graduation

Computer information systems technology emphasizes algorithmic design skills, which provide fundamental problem-solving approaches. Structured programming provides the tools for implementing problem solutions. Information systems and business theory classes provide an understanding of the context within which systems are implemented. Programming class assignments are structured to prepare students for real-life programming projects.

**Freshman****Fall semester**

BUS 251	Financial Accounting	3
MATH 100	College Algebra	3
SPCH 105	Public Speaking IA	2
CMST 103	Algorithmic Design	3
CMST 220	COBOL I	3
CMST 100	Operating Systems	3
		<b>17</b>

**Spring semester**

CMST 320	COBOL II	3
BUS 252	Managerial Accounting	3
CMST 221	Pascal	
	<b>or</b>	
CMST 240	FORTRAN	3
CMST 225	Commercial Software Analysis	2
BUS 115	Supervisory Management	3
ENGL 100	Expository Writing I	3
		<b>17</b>

**Sophomore****Fall semester**

CMST 335	Small Business Software Development	2
	Technical Writing	3
ENGL 202	RPG II	3
CMST 230	RPG II	3
ECON 117	Economics	3
CMST 245	Applications in C Programming	3
CMST 330	System Analysis and Design	3
		<b>17</b>

**Spring semester**

CMST 331	Statistics with Computer Applications	3
CMST 325	Database Concepts	3
CMST 315	Data Communication and Networking	3
BUS 210	Marketing	3
CMST 300	Assembly Language Programming	3
		<b>15</b>

**Electronic engineering technology (ELET)**

Associate of technology

68 hours required for graduation

The many facets of electronics have produced a need for technicians who have a good understanding of the uses of instruments and basic electronics, including theory and practice of DC and AC circuits, electronic devices, digital systems including microcomputers and linear electronics, and communications systems.

Instruction in electronics is balanced between theory and practice, with approximately half of the class time taking place in a laboratory working with equipment similar to that found in industry. In addition students are expected to successfully complete course work in mathematics, science, technical writing, and social studies. Students desiring a concentration in electronic communications may select an optional track of courses.

**Freshman****Fall semester**

ENGL 100	Expository Writing I	3
MET 111	Technical Drafting	2
MATH 100	College Algebra	3
MATH 151	Applied Plane Trigonometry	2
CMST 101	Introduction to Computer Techniques	2
ELET 101	Direct Current Circuits	4

SPCH 105	Public Speaking IA	2
		<u>18</u>
<b>Spring semester</b>		
PHYS 113	General Physics I	4
MATH 122	Applied Analytic Geometry and Calculus	4
ELET 102	Alternating Current Circuits	4
ELET 110	Semiconductor Electronics	4
		<u>16</u>

**Sophomore**

<b>Fall semester</b>		
ELET 260	Electronic Measurements	4
	<b>or</b>	
ELET 221	Communication Circuits I	4
ELET 210	Linear Circuit Design	5
ELET 290	Electronic Seminar I	1
CMET 150	Digital Electronics and Microprocessors	3
ENGL 202	Technical Writing	3
		<u>16</u>

**Spring semester**

ELET 220	RF Communications Systems	
	<b>or</b>	
ELET 223	Communication Circuits II	4
ELET 291	Electronic Seminar II	1
CMET 250	Digital System Design I	4
CHM 210	Chemistry I	4
	<b>or</b>	
PHYS 114	General Physics II	4
	Social science/humanities elective	2
	Business elective	3
		<u>18</u>

**Avionics option**

Associate of technology  
68 hours required for graduation

Avionics is a branch of the electronics that deals with the communications and navigational equipment required to move modern aircraft safely through the sky.

By selecting the optional avionics courses during the second year of the program, graduates can qualify for employment in aircraft manufacturing, flightbase operations, repair shops, and with airlines.

**Freshman**

<b>Fall semester</b>		
ENGL 100	Expository Writing I	3
MET 111	Technical Drafting	2
MATH 100	College Algebra	3
MATH 151	Applied Plane Trigonometry	2
CMST 101	Introduction to Computer Techniques	2
ELET 101	Direct Current Circuits	4
SPCH 105	Public Speaking IA	2
		<u>18</u>

**Spring semester**

PHYS 113	General Physics I	4
MATH 122	Applied Analytic Geometry and Calculus	4
ELET 102	Alternating Current Circuits	4
ELET 110	Semiconductor Electronics	4
		<u>16</u>

**Sophomore**

<b>Fall semester</b>		
ELET 240	Aircraft Communications	3
ELET 210	Linear Circuit Design	5
ELET 241	A/C Navigation Systems I	4
CMET 150	Digital Electronics and Microprocessors	3
	Social science elective	3
		<u>18</u>

<b>Spring semester</b>		
ELET 242	A/C Navigation Systems II	5
CMET 250	Digital System Design I	4
ENGL 202	Technical Writing	3
CHM 210	Chemistry I	4
	<b>or</b>	
PHYS 114	General Physics II	4
		<u>16</u>

**Bachelor of science**

Students may wish to continue with the electronics engineering technology program toward a bachelor of science in electronic engineering technology. This is accomplished using a 2 + 2 concept.

All students complete the associate degree requirements. After two years they may graduate with an associate degree or continue for another two years of upper-division courses. The upper-division curriculum provides greater and more rigorous depth in electronics theory and applications. Along with more electronics specialty courses, additional study of mathematics, communications, social sciences, humanities, and related business and industrial operations provides breadth beyond the student's major concentration.

Students interested in the bachelor's degree curricula should contact the Department of Engineering Technology for further information.

**Mechanical engineering technology (MET)**

Mechanical engineering technology offers an associate of technology degree with two options and a bachelor of science in engineering technology degree. The programs prepare graduates for positions in mechanical and/or manufacturing industries as engineering technicians or technologists. The programs embrace the design, manufacture, test sales, and maintenance of mechanical products, including the tools and machines by which they are made. Programs help students develop the ability to use trade and technical literature to solve technical problems.

Graduates are employed by manufacturing industries, testing laboratories, marketing firms, consulting firms, government agencies, and in businesses they themselves establish.

**Design option**

Associate of technology  
69 hours required for graduation

The mechanical engineering technician choosing this option is concerned with the development, testing, evaluation, detailing, and design of machinery, equipment, instruments, and other mechanical devices.

The technician's duties may involve drafting, use of handbooks and tables, calculations of strength and reliability, selection of materials, and cost estimating

for the development or modification of the design of almost any type of machine or mechanism. Technicians may conduct performance and endurance tests on various devices and report the results.

During the first year of study students develop a strong base in mathematics, physical science, materials of industry, manufacturing processes, and written and graphic communications. During the second year, students develop abilities in strength of materials, fluid mechanics, mechanisms, computer-aided-drafting and design, CNC machine processes, and design of mechanical elements.

Accredited by the Technology Accreditation Commission for the Accreditation Board of Engineering and Technology.

**Freshman**

<b>Fall semester</b>		
MATH 151	Applied Plane Trigonometry	2
MATH 100	College Algebra	3
MET 115	Descriptive Geometry	1
MET 111	Technical Drafting	2
MET 121	Manufacturing Methods I	2
ENGL 100	Expository Writing I	3
CMST 101	Introduction to Computer Techniques	2
SPCH 105	Public Speaking IA	2
		<u>17</u>

**Spring semester**

PHYS 113	General Physics I	4
MET 231	Physical Materials and Metallurgy	3
MET 117	Mechanical Detailing	2
MET 123	Manufacturing Methods II	3
MATH 122	Applied Analytic Geometry and Calculus	4
	Business/social science elective	2
		<u>18</u>

**Sophomore**

<b>Fall semester</b>		
CHM 210	Chemistry I	4
	<b>or</b>	
PHYS 114	General Physics II	4
CET 311	Statics and Strength of Materials	5
MET 252	Fluid Mechanics	3
MET 242	Elements of Mechanisms	3
MET 260	Design Technology I	2
MET 212	Introduction to Computer Aided Drafting	1
		<u>18</u>

**Spring semester**

ENGL 202	Technical Writing	3
MET 331	Mechanical Testing Lab	1
MET 271	Thermodynamics I	2
ELET 100	Basic Electricity	3
MET 261	Design Technology II	4
	Humanities social science elective	3
		<u>16</u>

**Automated manufacturing option**

Associate of technology  
69 hours required for graduation

This option allows for more concentrated study in manufacturing processes including both traditional and advanced manufacturing systems. The emphasis during the second year is on computer-aided manufacturing, automated systems, industrial instrumentation and controls, sensors, lasers, and robotics.

**Freshman****Fall semester**

MATH 151	Applied Plane Trigonometry	2
MATH 100	College Algebra	3
MET 115	Descriptive Geometry	1
MET 111	Technical Drafting	2
MET 121	Manufacturing Methods I	2
ENGL 100	Expository Writing I	3
CMST 101	Introduction to Computer Techniques	2
SPCH 105	Public Speaking IA	2
		<b>17</b>

**Spring semester**

PHYS 113	General Physics I	4
MET 231	Physical Materials and Metallurgy	3
MET 117	Mechanical Detailing	2
MET 123	Manufacturing Methods II	3
MATH 122	Applied Analytic Geometry and Calculus	4
	Humanities/social science elective	2
		<b>18</b>

**Sophomore**

CET 311	Statics and Strength of Materials	5
MET 242	Elements of Mechanisms	3
MET 252	Fluid Mechanics	3
MET 212	Introduction to Computer-Aided Drafting	1
ELET 100	Basic Electricity	3
MET 230	Automated Manufacturing Systems I	3
		<b>18</b>

**Spring semester**

CHM 210	Chemistry I	
PHYS 114	General Physics II	4
ENGL 202	Technical Writing	3
MET 282	Industrial Instrumentation and Controls	3
MET 381	Automated Manufacturing Systems II	3
	Humanities/social science/electives	3
		<b>16</b>

**Bachelor of science**

Students may wish to continue with the mechanical engineering technology program toward a bachelor of science in mechanical engineering technology. This is accomplished using a 2 + 2 concept.

All students will complete the associate degree design option requirements. After two years, students may graduate with an associate degree or continue for another two years of upper-division courses. The upper-division curriculum provides greater and more rigorous depth in mechanical theory and applications. Along with more mechanical specialty courses, additional study of mathematics, communications, social sciences, humanities, and related business and industrial operations provides breadth beyond the student's major concentration.

Students interested in the bachelor's degree curricula should contact the Department of Engineering Technology for further information.

**Civil engineering technology courses Undergraduate credit**

**CET 110. Civil Technology Drafting.** (2) II. A course in drafting the types of drawings common to civil

engineering technology, including ownership certificates, plans and profiles, contour maps, site grading drawings, and topographic layouts. Drawings are made using traditional drafting equipment and computers. Six hours lab a week. Pr.: MET 111.

**CET 120. Materials Sampling and Testing.** (2) I. A course in the proper use of aggregates and concrete materials (Portland cement and asphalt) in construction. Sampling and testing methods conform with American Society of Testing Materials standards. Six hours lab a week.

**CET 130. Plane Surveying.** (4) II. A beginning course in the theory and practice of field measurements and notes for surveying. Emphasis is placed on accuracy and avoidance of common errors and mistakes. Two hours rec. and six hours lab a week. Pr. or conc.: MATH 151.

**CET 140. Print Reading for Civil Construction.** (1) I. A course dealing with methods used to retrieve information from construction plans in order to build all or part of the project. Three hours lab a week.

**CET 150. Introduction to GIS.** (3) II. In this introductory course in geographic information systems the student will review hardware and software components, explore several applications, and be introduced to data structures and basic functions. The student will explore application issues in GIS, operational and management issues, and which issues to consider when proposing and implementing a new GIS. Hands-on experience will be gained using a commercial GIS software package (pc ARC/INFO) or a PC-based graphics workstation. Two hours recitation and three hours lab a week. Pr.: CMST 240 and 245.

**CET 210. Civil CAD.** (2) II. This course makes use of the computer as a tool for the generation of drawings typical of those used in civil and surveying fields. One hour rec. and three hours lab a week. Pr.: CMST 101. Pr. or conc.: CET 110.

**CET 211. Statics.** (2) II. A study of forces and their effects on the bodies upon which they act. Two hours rec. a week. Pr.: PHYS 113.

**CET 220. Soils and Foundations.** (2) I. A course in the identification and classification of soils by the Unified method and the American Association of State Highway and Transportation Officials method. Routine field tests are covered and used in the laboratory. One hour rec. and three hours lab a week. Pr.: MATH 122.

**CET 230. Land Surveys.** (3) II. A course dealing with the history of land surveying, procedures for researching records, construction boundary surveys, writing descriptions, and producing documents. Two hours rec. and three hours lab a week. Pr. or conc.: CET 130.

**CET 231. Construction Surveying.** (2) I. A study of vertical and horizontal alignment and methods used to maintain control stations on a construction job. Emphasis is on practical methods and solutions to problems found on the construction job site. One hour rec. and three hours lab a week. Pr.: CET 130.

**CET 232. Surveying Astronomy.** (3) I. A course in the use of spherical trigonometric calculations to determine bearing, azimuth, latitude, longitude, and time from solar, polar, and star observations. Star recognition, locations and determination of line direction are emphasized. Two hours rec. and three hours lab a week. Pr.: CET 130.

**CET 233. Route Location Surveying.** (4) II. A course in the geometric methods of horizontal and vertical curve alignment. In addition, transitional spirals are examined and calculated. The laboratory portion provides a grounding of these concepts in the field by actual calculation and staking of control for roads, streets, and various types of routes. Two hours rec. and six hours lab a week. Pr.: CET 130.

**CET 234. Advanced Surveying.** (2) II. A study of the advanced areas of surveying with primary emphasis on control networks, state plane systems, tachemoetry, geodetic surveying, and the use of electronic surveying

equipment. One hour rec. and three hours lab a week. Pr.: CET 130.

**CET 235. Surveying Law.** (3) II. A study of the legal aspects that apply to the surveying profession, and the role of the surveyor within the judicial framework of our court system. Three hours rec. a week. Pr.: CET 130.

**CET 240. Contracts and Specifications.** (1) I. A study of the way a set of contracts and specifications are put together and how they act as a source of data on a construction job. The course also stresses the way information is gained from documents with speed and accuracy. One hour rec. a week. Pr.: CET 140 and 231.

**CET 241. Construction Methods and Estimating.** (2) I. A study of the basic equipment needs, usage, costs, and quantity determinations for planning and estimating construction projects. Field trips through construction sites and visitations with inspectors assist in developing reporting procedures and inspection responsibilities. One hour rec. and three hours lab a week. Pr.: MATH 100.

**CET 250. Photogrammetry.** (2) I. A class in which aerial photographs are used to create topographic drawings. Hands-on experience will be gained by using stereoscopic plotters to convert photographic data into engineering maps. One hour rec. and three hours lab a week. Pr.: CET 130.

**CET 251. Georeferencing.** (3) I. This course introduces spatial referencing concepts. A framework for spatial referencing is a necessary part of a geographic information system if different layers of information are to be interrelated. Two hours rec. and three hours lab a week. Pr.: MATH 100 and 151, CET 110 and 130.

**CET 252. Internship.** (1) I, II, S. Student works during summer or regular semester as an intern in a civil engineering, surveying, or other GIS-related industry. A report detailing duties performed and tasks accomplished is required at the end of the internship period. (Recommended during summer before second year and during second year). May be repeated for credit.

**CET 255. Operating a GIS.** (2) I. This course covers the issues which must be addressed to successfully operate a geographic information system in a production environment. One hour rec. and three hours lab a week. Pr.: CMIS 245 and CMST 240.

**CET 300. Problems in CET.** (Var.) I, II, S. A course in which advanced study is done in a specific area chosen by the student. Pr.: consent of instructor.

**CET 310. Strength of Materials.** (3) II. A study of the internal resistance to external forces. The course also deals with the resulting changes in the dimensions and shapes of bodies produced by outside forces. Three hours rec. a week. Pr.: CET 211.

**CET 311. Statics and Strength of Materials.** (5) I. Statics is a study of the results of applying external loads to a body and the resolution of forces in several planes. Strength of materials calculations are used to determine the internal reaction of the body to such forces. This course covers friction, centroids, moment of inertia, connections, beams, torsion, and columns. Five hours rec. a week. Pr.: PHYS 113.

**CET 312. Transportation Systems.** (4) II. A study of the design of transportation systems with emphasis on highways, urban roadways, railroads, and airports. Two hours rec. and six hours lab a week. Pr.: CET 233.

**CET 313. Structural Design.** (5) II. A course combining design of components of structures in steel and reinforced concrete. Basic stress calculations and design concepts are studied for use in either a simplified design, detailing, or inspection role. Three hours rec. and six hours lab a week. Pr.: CET 310 or 311.

**CET 314. Structural Steel Design.** (3) I, II, S. A course covering basic fundamentals of structural steel design. Stress calculations and design concepts are studied for use in either a design or inspection role. Two hours rec. and three hours lab a week. Pr.: CET 311.

**CET 315. Reinforced Concrete Design.** (3) I, II, S. A course covering basic fundamentals of reinforced concrete design. Stress calculations and design concepts are studied for use in either a design or inspection role. Two hours rec. and three hours lab a week. Pr.: CET 311.

**CET 340. Mechanical and Electrical Systems.** (3) II. A study of the way mechanical and electrical systems are used in the construction of a building by a contractor. Systems include plumbing, heating, ventilation, and air conditioning. Two hours rec. and three hours lab a week. Pr.: MATH 151, PHYS 113, and CET 241.

**CET 350. Advanced Issues in GIS.** (3) I. This course deals with GIS algorithms, data structures, advanced computational topics, analysis of error; ways in which traditional planning and management theories and techniques can be implemented in GIS; and evaluation of how GIS can be used to answer specific planning problems. Two hours rec. and three hours lab a week. Pr.: CET 150, MATH 100 and 151.

**CET 355. Projects in GIS.** (2) I, II, S. In this course the class will take an example real-world geographic information system project and complete the project, start to finish, using a GIS software package which they have learned to operate in a previous course. One hour rec. and three hours lab a week. Pr.: CET 251, 255, and 350.

## Computer engineering technology courses

### Undergraduate credit

**CMET 150. Digital Electronics and Microprocessors.** (3) I. Industrial applications of microprocessor operation and architecture are emphasized. Also studied is the use of microprocessor system development tools and hardware/software debugging techniques. Two hours rec. and three hours lab a week. Pr.: ELET 101 and CMST 101 or CMST 240.

**CMET 250. Digital System Design I.** (4) I, II. An extension of the material covered in CMET 150 Digital Electronics and Microprocessors. Covers techniques of sequential logic, analog-to-digital, and digital-to-analog conversion, display systems, and microprocessors as system elements. Two hours rec. and six hours lab a week. Pr.: CMET 150, ELET 110.

**CMET 251. Digital System Design II.** (4) II. An industry-related course used to acquaint the student with industrial project design and development. Small group research, design, and building of projects to implement computer-based tasks specified by instructor. Two hours rec. and six hours lab a week. Pr.: CMET 250, ELET 211.

## Computer science technology courses

### Undergraduate credit

**CMST 100. Operating Systems.** (3) I. This course introduces the fundamental concepts of standard operating system components, and is designed to give the student a working knowledge of the fundamentals of specific operating systems rather than operating systems theory. Three hours rec. a week.

**CMST 101. Introduction to Computer Techniques.** (2) I, II. Study of computer techniques and applications for the non-computer technology majors. Emphasis on problem solving using the BASIC programming language. Two hours rec. a week.

**CMST 103. Algorithmic Design.** (3) I, II. This course is designed as a language-independent introduction to the logic of data processing. Topics include an overview of information processing and computer architecture, overview of systems development, problem definition, and problem analysis. The student is also introduced to the various tools, techniques, and devices utilized in computer algorithmic design. Three hours rec. a week.

**CMST 110. Computer Fundamentals.** (2) I, II. This course is designed as an introduction for students

seeking to develop a broad, basic familiarity with the use of the microcomputer. Two hours rec. a week.

**CMST 111. Introduction to Computing.** (2) I. An entry-level course designed to introduce to the student the use of the PC type of microcomputer. Includes a familiarization with the use of MS-DOS, common terminology, computer hardware, and an introduction to software usage. Two hours rec. a week.

**CMST 210. Introduction to Enable.** (2) I, II. An intermediate-level course designed for students with prior experience with the PC type of microcomputer. The course is designed to expand the student's knowledge of computer terminology and the MS-DOS operating system. Two hours rec. a week in the lab. Pr.: CMST 111 or consent of instructor.

**CMST 215. Advanced Enable.** (2) I, II. Advanced-level course designed for students who have a working knowledge of computers and who have completed CMST 210 or equivalent work. Two hours rec. a week. Pr.: CMST 210 or consent of instructor.

**CMST 220. Cobol I.** (3) I, II. Study of the COBOL programming language will introduce students to algorithmic solutions using business applications. This initial programming class will stress not only the COBOL language but also concepts of modular designed structured programming and techniques. Three hours rec. a week. Conc.: CMS I 100 and 103.

**CMST 221. Pascal.** (3) I, II. Students will be introduced to the highly structured language of Pascal through lecture and programming assignments. Assignments will emphasize the use of modularity in program design. Data structuring and manipulation will be developed during the program lab sequence. Two hours rec. and three hours lab a week. Pr.: CMST 100, 103, and 220 or 240.

**CMST 225. Commercial Software Analysis.** (2) II. Students will be given a thorough, in-depth introduction to currently popular software application packages. Such items as word processors, spread sheets, database management systems, and integrated packages will be examined in terms of direct business/industrial applications. The current literature on commercial software will be researched in terms of fitting specific software to specific types of business/industrial tasks. Concepts of each software package (including advantages, disadvantages, limitations, and hardware requirements) will be analyzed. Particular emphasis will be placed on needs-analysis versus specific software analysis. Two hours rec. a week. Pr.: CMST 100, 103.

**CMST 230. RPG II.** (3) I. This course is designed to introduce the Report Program Generator language. RPG II is used primarily for generation of business reports such as payroll, inventory, general ledger, and other business applications. The lab work includes writing several RPG II programs to solve business report problems. Three hours rec. a week. Pr.: CMST 100 and 103.

**CMST 240. FORTRAN.** (3) I, II. The student is introduced to the computer language FORTRAN and its application to scientific and engineering problem solution. Includes study of input/output techniques, arithmetic and logic processes, non-numeric data handling, arrays, and subprograms. Three hours rec. lab a week. Pr. or conc.: MATH 151.

**CMST 245. Applications in C Programming.** (3) I, II. The syntax of the C language will be covered and structured programming and modular design will be stressed. Writing functions and procedures will be discussed, as will the inclusion of standard library functions and calls to the operating system. The uses of C in writing application programs will be reflected in the laboratory program assignments. Three hours rec. a week. Pr.: CMST 100, 103, and 220 or 240.

**CMST 300. Assembly Language Programming.** (3) I, II. This course covers programming of a mini digital computer at the assembly language level. Specific topics covered include an overview of the Harris operating

system and assembly language. Three hours rec. a week. Pr.: CMST 100, 103, and 221 or 240.

**CMST 301. Computer Graphics.** (2) II. The course allows the students a chance to apply their knowledge of programming to computer graphics. The student will write and debug graphics programs in FORTRAN with a TEKTRONIX PLOT 10 system on the Harris minicomputer and in BASIC on the microcomputer. The students will have the opportunity to use a commercial computer-aided design software package, a contouring software package, and a graphics-based mathematics software package on a Zenith microcomputer. This is a technical support course. Two hours rec. and two hours lab a week. Pr.: CMST 100, 103, and 240.

**CMST 315. Data Communications and Networking.** (3) II. This course will cover material that leads to an understanding of how computers communicate including both the hardware and software aspects of data communications. Also covered will be local area networks. Two hours rec. and two hours lab a week. Pr.: CMST 100, 103, and 221 or 240.

**CMST 320. Cobol II.** (3) I, II. This course consists of an in depth study of the COBOL language. More advanced topics will be covered including report writer, table processing, and the COBOL sort/merge feature. Lab work includes writing several business application programs using the COBOL language. Two hours rec. and two hours lab a week. Pr.: CMST 100, 103, and 220.

**CMST 321. Data Structures.** (2) I. An introduction to primitive and complex data structures will be accomplished via the programming language PASCAL. Students will investigate the theoretical usage of various data structures and apply this theory to actual programs. Two hour rec. a week. Pr.: CMST 100, 103, and 221 or 245.

**CMST 325. Data Base Concepts.** (3) II. This course deals with the role of the database administrator as well as the importance of the data dictionary, the database design process, data model comparisons, and the performance of a database. Laboratory work will include the design and implementation of individual databases. Three hours rec. a week. Pr.: CMST 103.

**CMST 330. Systems Analysis and Design.** (3) I. This course will study the steps in conducting a systems analysis, design, and development. Laboratory work includes a class project to analyze the computer needs of a local business and recommend possible system solutions to be implemented. Three hours rec. a week. Pr.: CMST 320.

**CMST 331. Statistics with Computer Applications.** (3) II. This course is an introduction to elementary statistics with emphasis on application using the computer. Topics include description and representation of sample data, probability, theoretical distributions, sampling, estimating, correlation, regression, and computer statistical packages. Three hours rec. a week. Pr.: CMST 221 or 240.

**CMST 335. Small Business Software Development.** (2) I. Using Microsoft BASIC as the vehicle language, this course introduces the student to business programming applications in the PC hardware environment. two hour rec. a week. Pr.: CMST 100, 103, and 225.

**CMST 340. Computer Science Technology Seminar.** (2) I, II. This course is designed to simulate the real-life development of a computer software project by covering the theoretical and practical applications of the software engineering process. Students will participate in group activities to produce a series of documents describing the top-down design of the software project. Two hour rec. a week. Pr.: CMST 100, 103, and 221 or 240.

**CMST 400. Problems in CMST.** (Var.) I, II, S. Opportunity for advanced study and practical experience with specific problems selected jointly by the instructor and student in the field of computer science technology. Pr.: Consent of instructor.

## Computer information systems technology courses

### Undergraduate credit

**CMIS 100. Introduction to MS-DOS.** (2) I, II, S. Provides fundamental concepts of the standard PC environment operating system (MS-DOS). Students will use the microcomputers in class to apply the operating system commands covered by the instructor. Lab assignments will be required in class. Eight-week course requiring four hours rec. a week in the lab.

**CMIS 110. Word Processing.** (2) I, II. A hands-on course introducing fundamental concepts and applications of word processing. Covers editing and formatting commands as well as sophisticated commands of the word processor. The word processing commands covered in class will be applied on the classroom microcomputers. Eight-week course requiring four hours rec. a week in the lab.

**CMIS 120. Spreadsheets.** (2) I, II. Introduces fundamental concepts and applications of a spreadsheet for a business environment. The class will progress to more sophisticated applications of the spreadsheet during the course of the class. Students will apply the concepts covered to the microcomputers in the classroom. Eight-week course requiring four hours rec. a week in the lab.

**CMIS 130. Database Management.** (2) I, II. Introduces fundamental concepts of a database management system application. Students will begin with the elementary database commands and will progress to more sophisticated database applications. Students will be required to apply the concepts covered in class to project assignments on the microcomputer. Eight-week course requiring four hours rec. a week in the lab.

**CMIS 140. Business Communications.** (2) I, II. This course covers the preparation of effective business communications. Organization, expression, and form of business letters, memos, reports, and other common communications will be stressed. Eight-week course requiring four hours rec. a week in the lab.

**CMIS 200. Introduction to Desktop Publishing.** (2) I, II. Students will learn to use PageMaker 4.0, a page composition/layout software package, in the hands-on environment of a PC lab. Students will perform production tasks and will learn the use of a scanner and basic design and production tips. Eight-week course requiring four hours rec a week in the lab. Pr.: CMIS 100 and 110.

**CMIS 245. Design, Systems, and Software.** (3) I, II. This course will introduce the student to the fundamental concepts of algorithmic design and operating systems. The student will also be provided a brief introduction to a commercially available word processor, spreadsheet, and database software package. Three hours rec. a week. Pr.: MATH 100 and 151.

**CMIS 250. Introduction to UNIX.** (2) I, II. This course is designed to provide the student with the basic commands and knowledge to use the UNIX operating system. The student will learn proper sign-on and-off procedures as well as how to manipulate files within the UNIX directory structure. The class is conducted in the hands-on environment of the computer lab. Eight-week course requiring four hours rec. a week in the lab. Pr.: previous programming experience.

## Electronic engineering technology courses

### Undergraduate credit

**ELET 100. Basic Electricity.** (3) I. A survey course designed to provide the non-electronics major with an overview of basic direct current and alternating current circuits. Laboratory exercises reinforce circuit theory and provide skills in the use of common electrical instruments. Two hours rec. and three hours lab a week. Conc.: MATH 125.

**ELET 101. Direct Current Circuits.** (4) I. A beginning course in basic circuit theory. Concepts of voltage,

current, resistance, and inductance are applied to various electric circuits to analyze their behavior. Laboratory exercises emphasize the use of basic measuring instruments, as well as the characteristics of passive circuits and components. Three hours rec. and three hours lab a week. Conc.: MATH 100.

**ELET 102. Alternating Current Circuits.** (4) II. A study of alternating current circuits. Includes an analysis of the sine wave, polar and rectangular algebra, inductive and capacitive reactance, impedance networks, power factor correction, resonant circuits, and transformer theory. Also includes an introduction to three phase power distribution. Laboratory exercises reinforce key concepts. Two hours rec. and six hours lab a week. Pr.: ELET 101. Conc.: MATH 151.

**ELET 104. Direct Current Circuits Review.** (1) II. Provides a coverage of DC circuits. Includes a review of current and voltage concepts, resistance, power, series and parallel circuit techniques, mesh and nodal analysis, delta-wye, Thevenin's and Norton's Theorems, capacitance, and inductance. One hour rec. a week. Pr.: ELET 100.

**ELET 110. Semiconductor Electronics.** (4) II. A survey of the family of active electronic devices. Analysis includes both graphic and mathematical models. Laboratory periods are devoted to the measurement of device characteristics in basic circuit configurations. Two hours rec. and six hours lab a week. Pr.: ELET 101.

**ELET 130. Fundamentals of Motors and Controls.** (2) I. Includes an introduction to basic electrical theory, series and parallel circuits, Fundamentals of AC, transformers, capacitors, and inductors. Also provides a coverage of basic electric motor theorems, single-phase and three-phase motors, DC motors, motor controls, electrical symbols, and basic troubleshooting. Two hours rec. a week.

**ELET 210. Linear Circuit Design.** (5) I. The application of electron devices to amplifiers. Emphasis is placed on analysis and design of RC-coupled, transformer-coupled, and direct-coupled amplifiers. Laboratory exercises emphasize principles of circuit design and analysis. Three hours rec. and six hours lab a week. Pr.: ELET 102 and 110.

**ELET 220. RF Communications Systems.** (4) II. A survey of electronic communication techniques and systems including amplitude modulation, frequency modulation, single-side band, and pulse modulation techniques. Transmission line, antenna theory, and the effects of noise are also included. Laboratory work involves design and measurement along with field trips to representative sites. Three hours rec. and three hours lab a week. Pr.: ELET 210 and 211.

**ELET 221. Communications Circuits I.** (4) I. A study of transmission lines, antennas, and the propagation of electromagnetic radio frequency waves. Laboratory work involves the design, construction, and testing of an antenna for the FM broadcast band. Other laboratory work is devoted to matching methods for transmission lines and alignment and testing procedures for typical transmitters and receivers. Three hours rec. and three hours lab a week. Pr.: ELET 102 and 110.

**ELET 223. Communications Circuits II.** (4) II. A study of RF circuit design, including resonant circuits, filter networks, matching networks, and transistor radio frequency amplifier design using both "Y" and "S" parameters. Laboratory work concentrates on the practical applications of design theory and the use of modern test equipment in the measurement, analysis, and optimization of circuits. Two hours rec. and six hours lab a week. Pr.: ELET 221.

**ELET 240. Aircraft Communications.** (3) I. A study of the principles of AM and FM. Investigation of the special techniques involved in VHF and UHF circuitry, as well as frequency control by using frequency synthesizers. Special emphasis is placed on performance measurements of transmitters and receivers, as well as trouble shooting to the component level and repair

procedures. Two hours rec. and three hours lab a week. Pr.: ELET 102 and 110.

**ELET 241. Aircraft Navigation Systems I.** (4) I. A study of the signals transmitted by the VOR/ILS/MB ground stations and the way in which they are received and processed for display. A study of the various types of pilot information displays will be made, including flight directors and horizontal situation indicators. The principles of operation of the new microwave landing system will be covered at the concepts level. Two hours rec. and six hours lab a week. Pr.: ELET 102 and 110.

**ELET 242. Aircraft Navigation Systems II.** (5) II. The study of the Automatic Direction Finder, Area Navigation System, and Long Range Navigation System. The study of the ADF will include theory of operation, alignment, installation, and troubleshooting and repair. The R-NAV will be studied from the stand point of the principle of operation, interconnections to other navigation systems and pilot information displays. The principle of the LORAN System will be investigated as will installation problems peculiar to this system. Three hours rec. and six hours lab a week. Pr.: ELET 240.

**ELET 243. Avionics Pulse Systems.** (3) II. A study of the operational theory and circuitry of distance measuring equipment (DME), ATC transponders, altitude encoders, and radar altimeters. The study is directed toward installation, testing, alignment, troubleshooting and repair. Particular attention is paid to optimum antenna locations and the reduction of radio frequency interference and electromagnetic interference (RFI, EMI). Two hours rec. and two hours lab a week.

**ELET 244. Weather Radar.** (3) II. Study is made of parabolic and colinear slot ("flat plane") antennas, waveguides, microwave devices, and pulse modulation as they are employed in both analog and digital/digital color radar systems. Particular emphasis is placed on the proper installation and cabling of these systems as well as testing and measurements to assure acceptable operation. Two hours rec. and two hours lab a week.

**ELET 260. Electronic Measurements.** (4) I. A study of theory and operation of basic electronic instruments. Includes DC and AC ammeters, voltmeters, impedance bridges, attenuators, and filters. Also includes a study of amplifiers as related to sensitive AC electronic voltmeters, sensitive DC electronic voltmeters, and oscilloscopes. Laboratory exercises provide experience in the selection of proper equipment for making measurements in electrical and electronic systems as well as interpretation of these measurements. Two hours rec. and six hours lab a week. Pr.: ELET 102 and 110.

**ELET 290. Electronic Seminar I.** (1) I. An industry-related course in which students design an electronic circuit to a set of specifications. Includes techniques of electronic chassis construction and printed circuit board techniques. Three hours lab a week. Pr.: ELET 102 and 110.

**ELET 291. Electronics Seminar II.** (1) II. The report developed for ELET 290 Electronic Seminar I is used by the student to develop the electronic hardware to a finished model. The model is tested to the original specifications. Three hours lab a week. Pr.: ELET 290.

**ELET 292. Problems in ELET.** (Var.) I, II, S. A course in which outside study is performed in a specific area selected by the student under the supervision of the assigned faculty member. Consent of instructor.

## Courses in mechanical engineering technology

### Undergraduate credit

**MET 111. Technical Drafting.** (2) I, II. Lettering, freehand sketching, and use of drafting equipment. Theory and applications of orthographic projection and pictorial drawings. Standards for symbols, section views, and dimensioning included. The student is also introduced to the CAD system. Six hours lab a week.

**MET 115. Descriptive Geometry.** (1) I, II. Orthographic solution involving the point, line and plane projections, intersections as well as surface development of solids, bearings, slope, true length, and true size using descriptive geometry. Three hours lab a week. Conc.: MET 111.

**MET 117. Mechanical Detailing.** (2) II. Preparation of shop drawings for manufacturing, fabrication, or assembly. Specifications of size, shape, material, and manufacture are also studied. CAD is used in conjunction with this course. Six hours lab a week. Pr.: MET 111.

**MET 121. Manufacturing Methods I.** (2) I. Study and practice in gas, arc, TIG welding, spot weld, weld testing, and cost estimation. Introduction to welding metallurgy and special welding processes. One hour rec. and three hours lab a week.

**MET 123. Manufacturing Methods II.** (3) II. Recitation and laboratory practice in basic machine shop operations on lathes, milling machines, and drill presses. Use of hand tools, measuring tools, metal cutting machines, and grinders are studied, along with CNC machine processes and observation of foundry. One hour rec. and six hours lab a week.

**MET 125. Computer-Numerical-Controlled Machine Processes.** (2) I, II. This course is designed to give students exposure to basic CNC programming and machining operations. There are no prerequisites to this course although a background in fundamental metal machining processes as well as algebra and right-angle trigonometry would be helpful. Six hours lab a week.

**MET 200. Geometric Dimensioning and Tolerancing.** (1) I. This course will introduce the fundamental concepts of geometric dimensioning and tolerancing as interpreted in the American National Standards Institute document *Dimensioning and Tolerancing*, ANSI Y14.5M-1982. One hour rec. a week. Pr.: Consent of instructor.

**MET 210. Computer-Aided Drafting.** (2) I, II. Applications and understanding of microcomputers in technical drafting and design are studied. Topics include generative graphics, hardware and software terminology, point plotting and line drafting, graphics, programming, geometric figures, dimensioning and annotating, and finished drawings. Six hours lab a week. Pr.: Knowledge of drafting.

**MET 212. Intro to Computer-Aided Drafting.** (1) I, II. This course introduces the use of computers as an aid to solving technical drafting and design problems. Topics covered include generative graphics, hardware and software, point plotting and line drawing, graphics programming, equation programmed figures, dimensioning and annotations, and the production of finished drawings. Three hours lab a week. Pr.: CMST 101 and MET 111.

**MET 214. Computer Aided Solid Modeling.** (1) I, II. This course is designed to introduce the modeling of real-world 3-D objects, rather than merely a collection of lines, arcs, and curves. Activities include developing 3-D objects containing surfaces and edges. Uses micro-based technology. Three hours lab a week. Pr.: Knowledge of drafting.

**MET 230. Automated Manufacturing Systems I.** (3) I. A general survey of the various components and operations in an automated manufacturing system including material handling, robotics, tooling, inspection and quality control, CAD, CNC, and other production processes. Two hours rec. and three hours lab a week. Pr.: MET 123, 212, and ELET 100.

**MET 231. Physical Materials and Metallurgy.** (3) II. A broad view of materials used in industry, including structures of materials, how they react to stress and temperature, how the polyphase structures form, and how they are controlled to produce optimum properties. Students will examine through study and laboratory experimentation ferrous and nonferrous metals, polymers, composites, and ceramics. Two hours rec. and three hours lab a week. Pr. or conc.: MATH 100.

**MET 242. Elements of Mechanisms.** (3) I. Fundamental motion concepts of displacement, velocity, and acceleration are studied, as well as analytical and graphical analysis and synthesis of linkages, gear trains, cams, pulleys, and combinations of these elements. Three hours rec. a week. Pr.: PHYS 113 and MET 111.

**MET 252. Fluid Mechanics.** (3) I. Fundamental concepts of fluid mechanics. Study of buoyancy, energy equation, viscosity, and flow measurement. Selected applications of fluid mechanics to civil and mechanical fields. Basic language programming exercises are included in this course. Two hours rec. and three hours lab a week. Pr.: PHYS 113.

**MET 260. Design Technology I.** (2) I. A study of the design process using handbooks and industrial catalogs to select components. One hour rec. and three hours lab a week. Pr. or conc.: MET 242.

**MET 271. Thermodynamics I.** (2) I. This course emphasizes thermodynamic laws and equations and the use of tables and charts for properties of important fluids. Applications to systems used for producing, transforming, and applying heat and mechanical energy are also studied. Two hours rec. a week. Pr.: MATH 100.

**MET 282. Industrial Instrumentation and Controls.** (3) II. An introduction to process control systems for industrial applications. Course topics include concepts and terminology, first- and second-order systems, measurement of motion, gauges and transducers, signal processing, and measurement of properties. Two hours rec. and three hours lab a week. Pr.: ELET 100 and PHYS 100.

**MET 299. Problems in MET.** (Var.) I, II. Opportunity for advanced study and practical experience with specific problems of the students choice in the field of mechanical engineering technology. Pr.: Consent of instructor.

**MET 331. Mechanical Testing Laboratory.** (1) II. Principles of mechanical testing including instrumentation and measurement in the areas of loads, stresses, deformations, heat flow, and other qualities. Three hours lab a week. Pr.: CET 311.

**MET 361. Design Technology II.** (4) II. Continued study of design process including investigation of theories of failure, stress analysis, stress concentration, deflections, materials, and costs relating to machine design. Two hours rec. and six hours lab a week. Pr.: CET 311 and MET 260.

**MET 381. Automated Manufacturing Systems II.** (3) II. Provides the capstone for the MET automated manufacturing option. Covers systems of manufacturing operations including facilities, supplies, materials, procedures, and control. Topics include design, programming, and feedback for manufacturing, computer-integrated manufacturing, production set-up, automated work cell, advanced CAD/CAM, and decision issues. One hour rec. and six hours lab a week. Pr.: MET 230. Conc.: MET 282.

## General Studies

Loren E. Riblett, Head

Professors Ahlvers, Bingham, Creech, Heublein, Riblett, and Sanders; Associate Professors Homolka and Stephens; Assistant Professor Barnes.

### Chemical engineering technology (CHET)

Associate of technology  
68 hours required for graduation

Chemical engineering technology relates to industrial processes in which raw materials are changed chemically or physically into useful products. Fuels, plastics, synthetic fibers, pharmaceuticals, food additives, inorganic chemicals, and organic chemicals are examples of the variety of products in the chemical industry.

Graduates are qualified to perform in chemical production plants, pilot plants, analytical laboratories, research and development laboratories, and sales related to chemicals or chemical manufacturing equipment. Job responsibilities frequently involve providing support to chemical engineers in process development and design, plant operation, operator training, compilation of performance reports, pilot plant set-up, consulting, pollution monitoring and control, environmental work, and preparation of information for computer analysis.

Chemical engineering technology students gain laboratory experience in instrumental analysis, organic chemistry, unit operations, and process control laboratories. In addition, they are encouraged to pursue summer internships in the chemical industry, when such positions are available.

Accredited by the Technology Accreditation Commission for the Accreditation Board for Engineering and Technology

### Freshman Fall semester

CMST 101	Introduction to Computer Techniques .....	2
MET 111	Technical Drafting .....	2
ENGL 100	Expository Writing I .....	3
MATH 151	Applied Plane Trigonometry .....	2
MATH 100	College Algebra .....	3
CHM 210	Chemistry I .....	4
		<hr/> 16

### Spring semester

CHET 142	Material and Energy Balances .....	3
MATH 122	Applied Analytical Geometry and Calculus .....	4
PHYS 113	General Physics I .....	4
	Business/humanities/social science elective .....	3
CHM 230	Chemistry II .....	4
		<hr/> 18

### Sophomore Fall semester

CHET 241	Unit Operations I .....	4
CHET 231	Chemical Reactions .....	2
CHM 191	Organic Chemistry .....	4
CHET 253	Industrial Processes .....	4
IET 264	Electric Power and Devices .....	3
		<hr/> 17

### Spring semester

CHET 242	Unit Operations II .....	4
CHET 252	Instrumentation and Control .....	2
CHET 262	Process Design Lab* .....	2
SPCH 105	Public Speaking IA .....	2
	Business/humanities/social science elective .....	2
CHET 271	Plant Engineering Technology .....	2
ENGL 202	Technical Writing .....	3
		<hr/> 17

\*Enrollment in either Internship or Process Design Lab is required. Internships may be undertaken during the

summer session between the first and second years or in the summer session following the second year.

### General studies

Kansas State University at Salina programs are intended to provide students the opportunity to acquire sufficient specialization in the technical field of their choice and a general education background intended to enhance their common knowledge. Each curriculum requires general education courses.

General studies includes courses in business, developmental studies, English/communications, mathematics, science, and social science.

### Industrial engineering technology (IET)

Associate of technology  
68 hours required for completion

Industrial engineering technicians are involved in the manufacturing process from start to finish, from research and development through production and customer servicing. Industrial engineering technicians work in quality control, safety, time and motion study, and many other areas.

Accredited by the Technology Accreditation Commission for the Accreditation Board of Engineering and Technology (TAC/ABET).

#### Freshman

##### Fall semester

MATH 151	Applied Plane Trigonometry	2
MATH 100	College Algebra	3
CMST 101	Introduction to Computer Techniques	2
MET 111	Technical Drafting	2
ENGL 100	Expository Writing I	3
CHM 210	Chemistry I	4
		<b>16</b>

##### Spring semester

ELET 100	Basic Electricity	3
MATH 122	Applied Analytic Geometry and Calculus	4
PHYS 113	General Physics I	4
CMST 240	FORTTRAN	3
SPCH 105	Public Speaking IA	2
	Business/social science/humanities elective	3
		<b>18</b>

#### Sophomore

##### Fall semester

IET 264	Electric Power and Devices	3
CET 311	Statics and Strength of Materials	5
PHYS 114	General Physics II	4
ENGL 202	Technical Writing	3
MET 121	Manufacturing Methods I	2
		<b>17</b>

##### Spring semester

MET 123	Manufacturing Methods II	3
CHET 252	Instrumentation and Control	2
IET 263	System Analysis and Quality Control	3
CHET 271	Plant Engineering Technology	2
CHM 230	Chemistry II	4
	Business/social science/humanities elective	3
		<b>17</b>

### Chemical engineering technology courses

#### Undergraduate credit

**CHET 142. Material and Energy Balances.** (3) II. Material balance problem solutions by direct, algebraic, and tie-component methods including recycle, bypass, and purge calculations. General energy balance including energy balances with chemical reactions. Three hours rec. a week. Pr.: CHM 210, MATH 100.

**CHET 231. Chemical Reaction.** (2) I. Review of fundamental kinetic and thermodynamic relations and energy balances with chemical reactions. Laboratory includes experimentation with various chemical reactions to illustrate thermodynamic and kinetic principles. One hour rec. and two hours lab a week. Pr.: MATH 122, CHET 142, and CHM 230.

**CHET 241. Unit Operations I.** (4) I. Equation of continuity, Bernoulli's equation, and application to sizing of pumps and compressors. Laboratory involves experimental work in the unit operations studied in the lecture. Two hours rec. and four hours lab a week. Pr.: CHET 142 and PHYS 113.

**CHET 242. Unit Operations II.** (4) II. Phase equilibria and its application to the study of distillation, liquid extraction, and gas absorption. Additional topics include humidification, dehumidification, filtration, and drying operations and their application in industry. Laboratory involves experimental work in the unit operations studied in lecture. Two hours rec. and four hours lab a week. Pr.: CHET 241.

**CHET 252. Instrumentation and Control.** (2) II. Principles of measurement and control. Transfer functions and their application to control of temperature, pressure, liquid level, and concentration. Laboratory involves experimental work with a liquid-level and temperature control system. One hour rec. and two hours lab a week. Pr.: PHYS 113 and MATH 122.

**CHET 253. Industrial Processes.** (4) I. A broad survey of chemical process industries with emphasis on process flow sheet interpretation. Laboratory work involves testing of water, fuels, and select chemicals by instrumental methods. Two hours rec. and four hours lab a week. Pr.: CHM 230.

**CHET 261. Internship.** (2) I, II, S. Student works as a summer intern in chemical or allied industry. A report detailing duties performed and tasks accomplished is required at the end of the internship period. Four hours lab a week. Recommended to be taken between freshman and sophomore year.

**CHET 262. Process Design Lab.** (2) II. Student is assigned a project requiring design equipment procurement and assembly, experimentation, data collection, and calculations preferably done on the computer. Weekly progress report memos and a final report are required. Enrollment in either Internship or Process Design Lab is required. Four hours lab a week. Pr.: CHET 241. Conc.: CHET 242.

**CHET 271. Plant Engineering Technology.** (2) II. Introduction to unit operations and chemical engineering and chemical processing equipment. Materials of construction and corrosion, materials handling, maintenance, utilities and services, and plant safety. Evaluation of purchased equipment and equipment depreciation costs. Overview of plant design report. Two hours rec. a week. Recommended for sophomore year.

**CHET 293. Problems in CHET.** (Var.) Opportunity for advanced study and practical experience with specific problems of the student's choice in the field of chemical engineering technology. Pr.: Instructor's consent.

### General studies courses

#### Undergraduate credit

##### Business courses

**BUS 110. Introduction to Business.** (3) This course surveys the objectives, decisions, and activities within

a business organization. Topics include a study of management responsibilities and controls, organizational structures, and marketing activities. Three hours rec. a week.

**BUS 115. Supervisory Management.** (3) An analysis of the responsibilities of the supervisor, with an examination of the skills and practices helpful in developing effective relations with people in a work setting. Three hours rec. a week.

**BUS 120. Skills and Techniques for Women in Management.** (2) Designed for women in management or those aspiring to attain a management position. Emphasis is on questionnaires, role playing, discussion, communication skills, financial planning, improving human performances, and analysis of case studies. Two hours rec. a week.

**BUS 121. Human Relations in Organizations.** (2) Focuses on the many psychological and social pressures people experience when they interact with each other. Two hours rec. a week.

**BUS 210. Marketing.** (3) Study of coordination and control of marketing activities in relation to management and society. Three hours rec. a week. Pr.: ECON 100.

**BUS 215. Business Law.** (3) This course introduces the student to the rules of common law under which the business world operates as well as the basic understanding of the legal rights and duties arising from common business transactions. Three hours rec. a week.

**BUS 250. Capital Investment Analysis.** (2) An introduction to the tools of economic and financial analysis of business expenditures including developing an awareness of interest computation, depreciation, taxes, and methods of evaluating proposals under the conditions of certainty and risk. Two hours rec. a week. Pr.: MATH 100.

**BUS 251. Financial Accounting.** (3) Study of business topics such as alternative forms of business organizations; typical business practices; legal instruments such as notes, bonds, and stocks; and financial statements and analysis. The main objective is to develop the ability to provide information to stockholders, creditors, and others who are outside an organization.

**BUS 252. Managerial Accounting.** (3) This course outlines the use of internal accounting data by managers in directing the affairs of business and non-business organizations. Three hours rec. a week. Pr.: BUS 251.

**BUS 253. Accounting Applications for Microcomputers.** (2) This course focuses on fundamental accounting principles and the use of a computerized accounting system. One hour rec. and three hours lab a week. Pr.: BUS 251.

#### Developmental studies courses

**COT 110. College Skills.** (2) A course designed to aid the student who sees a need or is perceived to need help or information in study skills such as note-taking, time management, test-taking, and reading comprehension. Other topics covered are career planning, placement, word processing, social adjustment, and survival skills for college. Two hours rec. a week.

**COT 120. Reading Improvement Lab.** (2) Supervised self-study in reading skills for students who have special problems in reading, and for students who wish to achieve an above-average proficiency in reading. A voluntary course earning two hours of credit. Six hours lab a week.

#### English/communications courses

**ENGL 080. Developmental English.** (3) Basics of standard edited (written) English with emphasis on grammar, usage, and sentence structure. This course does not fulfill requirements for the associate degree. Three hours rec. a week.

**ENGL 100. Expository Writing I.** (3) Introduction to expressive and informative writing. Frequent discussions, workshops, and conferences. Offers

extensive practice in the process of writing: getting ideas, drafting, analyzing drafts, revising, and editing.

**ENGL 202. Technical Writing.** (3) Technical Writing applies rhetorical skills to the special writing needs of business and industry. Special emphasis is placed on the writing process and audience analysis. Three hours rec. a week. Pr.: ENGL 100.

**ENGL 255. Literature and Technology.** (3) Students will read literature about technology from a variety of perspectives including novels, short stories, articles, and excerpts from other types of writing. Three hours rec. a week. Pr.: ENGL 100.

**JMC 110. Publication Practice I.** (1). Students will learn the basic aspects of newspaper publication from news writing to photography, layout, design, editing, and interviewing. Students will also learn the use of basic desktop publishing utilizing PageMaker software on a Macintosh. Three hours lab a week. Students earning credit in JMC 110 and 120 may use it for up to three credits of JMC 360 (see Arts and Sciences course description).

**JMC 120. Publication Practice II.** (1). Students will learn the basic aspects of magazine and yearbook production from feature writing to editing, layout, and design. Students will also become familiar with basic desktop publishing and learn PageMaker on the Macintosh computer. Three hours lab a week. Students earning credit in JMC 110 and 120 may use it for up to three credits of JMC 360 (see Arts and Sciences course description).

#### **JMC 191. Basic Black and White Darkroom**

**Techniques.** (1) Basic darkroom techniques combine camera work with normal darkroom processing and printing operations. It is designed for students with little or no laboratory background and/or limited experience with film processing. Three hours lab a week. Pr.: 35-mm photography or equivalent.

#### **JMC 192. Advanced Black and White Darkroom**

**Techniques.** (1). This course is designed for individuals wishing to move beyond basic darkroom skill levels. Students will work with various types of papers, developers, and techniques used in professional printing applications. Three hours lab a week. Pr.: Basic Black and White Darkroom Techniques.

**COT 200. Utilization of Media.** (3) Surveys the uses, theories, research, practices, programs, skills, and foundation of instructional technology. Principles are applicable to school, college, library, business, industry, organizational, and alternative learning settings. Three hours rec. a week.

**SPCH 105. Public Speaking IA.** (2). Alternate to SPCH 106. Principles and practice of message preparation, audience analysis, presentational skills, and speech criticism. Primarily granted for students whose curricula require a 2-credit hour course. Credit not granted for both SPCH 105 and 106.

**SPCH 106. Public Speaking I.** (3) Principles and practice of message preparation, audience analysis, presentational skills, and speech criticism permitting greater practice in oral presentation. Credit not granted for both SPCH 105 and 106.

#### **Mathematics courses**

**MATH 015. Beginning Algebra.** (5) This course in the principles of intermediate algebra. The course includes a review of basic mathematics including addition, subtraction, multiplication, and division of fractions, integers, algebraic fractions, and polynomials. Five hours rec. a week. May not be used toward degree.

**MATH 020. College Algebra Review.** (2). supplemental algebra lab to be taken in conjunction with MATH 100 for students who need additional instruction in algebra. The student will receive 2 hours credit, which will not count towards graduation. Students are placed in this course on the basis of their score on the College of Technology Math Placement Exam or ACT score. Two hours rec. a week.

**MATH 100. College Algebra.** (3). Pr.: B or better in MATH 015, or two years of high school algebra and a score of 22 or more on Enhanced ACT mathematics, or a score of at least 17 on the mathematics placement exam.

**MATH 120. Logic.** (2). Set theory is introduced on an intuitive basis and developed as a mathematical structure to include Boolean algebra. Symbolic logic will be introduced and then will be applied to the solutions of problems including statements, truth tables, arguments, and proofs. Two hours rec. a week.

**MATH 122. Applied Analytical Geometry and Calculus.** (4) A unified presentation dealing with elementary topics in calculus and certain selected topics from more advanced areas. Topics have been selected due to their application in the technologies and are developed in a non-rigorous and intuitive manner. Four hours rec. a week. Pr.: MATH 100, 151.

**MATH 125. Elementary Functions.** (3) A 3-credit hour course composed of 2 credit hours of in-class lecture and 1 credit hour of laboratory. The lecture portion includes basic algebraic, geometric, and trigonometric concepts. The purpose of the laboratory is to help review mathematic concepts, provide individual help, and apply mathematical concepts related to the student's technical area. Two hours rec. and three hours lab a week.

**MATH 151. Applied Plane Trigonometry.** (2) The fundamentals of college trigonometry with emphasis on applications to engineering technology. Course content includes right and oblique triangle solutions, vectors, polar coordinates, angular velocities, use of trigonometry in surveying, tool and machine design, sine and cosine law uses, introduction to identities solutions, and an introduction to the conic sections. Students are placed in this course on the basis of their score on the College of Technology math placement exam or ACT score. Two hours rec. a week.

**MATH 215. Calculus I.** (5). Course content includes a brief review of pre-calculus materials of algebra and trigonometry, functions, limits, differentiation, applications of differentiation, integration, and applications of the definite integral. Theory is presented in a style tailored for first-semester students of mathematics. Five hours rec. a week. Pr.: MATH 100, 151.

**MATH 216. Calculus II.** (5) An extension of MATH 220, Calculus I, to include integration, differentiation, and applications of transcendent functions. Five hours rec. a week. Pr.: MATH 220.

#### **Science courses**

**CHM 191. Organic Chemistry.** (4) I. A study of the reaction mechanism of industrially important reactions including alkylation, aromatization, dehydration, halogenation, hydrogenation, isomerization, nitration, oxidation-reduction, pyrolysis, and polymerization. Laboratory work emphasizes the analysis and synthesis of representative organic compounds. Three hours rec. and two hours lab a week. Pr.: CHM 210.

**CHM 210. Chemistry I.** (4). First course of a two-semester study of the principles of chemistry and the properties of the elements and their compounds. Three hours lec. and three hours lab a week. Conc.: MATH 100.

**CHM 230. Chemistry II.** (4). Second course of a two-semester study of the principles of chemistry and the properties of the elements and their compounds. Three hours lec. and three hours lab a week. Pr.: CHM 210.

**GEOG 242. Physical Geography.** (3) In this course the student will explore the issues of world geography and its physical elements. Three hours rec. a week. Pr.: MATH 100, 151, MET 111, CET 110.

**GEOL 102. Geology.** (4) This course is designed to acquaint the student with various geological processes, materials, and physical characteristics. Conceptually oriented themes will be explored emphasizing selected

learnings through a combination of classroom study and field trips to specific sites. Three hours rec. and three hours lab a week.

**PHYS 010. Technical Science.** (1). A 1-hour, non-degree credit course that coordinates the principles in beginning algebra with selected physical science activities. Three hours lab a week.

**PHYS 113. General Physics I.** (4). A basic development of the principles of mechanics, heat, fluids, oscillations, waves, and sound. Emphasis is on conceptual development and numerical problem solving. Two hours lec., one hour rec., one hour quiz, and two hours lab a week. Pr.: MATH 100, 151.

**PHYS 114. General Physics II.** (4). The continued treatment of the fundamentals of electricity and magnetism, light and optics, atomic and nuclear physics. These concepts are used to understand D.C. and A.C. circuits, motors, and generators. Emphasis is placed on conceptual development and problem solving. Two hours lec., one hour rec., one hour quiz, and two hours lab a week. Pr.: PHYS 113.

**PHYS 142. Aviation Meteorology.** (4). Students will study structured concepts relating to the understanding of various atmospheric phenomena. Causes for seasonal and daily weather pattern changes, modern prediction techniques, as well as aviation-related meteorological hazards are examined in detail. Particular attention will be given to specific atmospheric conditions affecting the professional pilot. Four hours rec. a week.

#### **Social science courses**

**ECON 100. Economics.** (3). A survey course of microeconomic and macroeconomic topics including decision making, demand and supply concepts, markets and competition, gross national product and its components, money and banking, and government's role in business. Three hours rec. a week.

**HIST 231. History of Technology.** (2). This course presents an overview of the development of technology from ancient times to modern day. Perspectives on the impact of technology on the quality of life will be explored. Two hours rec. a week.

**PSYCH 110. General Psychology.** (3) An introductory survey of the general content areas of psychology, including methods, data, and principles.

**PSYCH 120. Dealing with Difficult People.** (1) Designed to help people cope with the broad spectrum of difficult people. One hour rec. a week.

**SOCIO 211. Introduction to Sociology.** (3) Development, structure, and functioning of human groups; social and cultural patterns; and the principal social processes.

#### **Industrial engineering technology courses**

**IET 261 Internship.** (2) I, II, S. The student shall engage in an appropriate industrial activity and prepare a written report summarizing the internship job activities. Two hours rec. a week. Pr.: ENGL 100.

**IET 263. System Analysis and Quality Control.** (3) II. An introductory course in system analysis and statistical quality control, including work in the areas of control charts, control charts for attributes, acceptance sampling plan systems, and methods for determining necessary requirements for specific levels of finished product quality. Three hours rec. a week. Pr.: MATH 100.

**IET 264. Electric Power and Devices.** (3) I, II. An approach to technical understanding of the concepts and uses of alternating current power in industry. Strong alternating current theory with emphasis on motor speed controls, phase shifts, control systems, simpler forms of logic switching circuits, process systems with self-check, and servo loop principles. Various forms of transducers are examined. One hour rec. and six hours lab a week. Pr.: ELET 100 and MATH 151.

**IET 293. Problems in IET.** (Var.) I, II, S. Opportunity for advanced study and practical experience with specific problems of the student's choice in the field of industrial engineering technology. Pr.: Consent of instructor.

# Veterinary Medicine

Michael D. Lorenz, Dean  
Ronnie G. Elmore, Associate Dean  
Carolyn V. Roberts, Assistant Dean

101 Trotter Hall  
532-5660

## General Requirements

### Admission

Enrollment in the College of Veterinary Medicine is limited to well-qualified students who have completed the minimum 70 required hours of pre-professional courses (see pre-professional requirements). A student must have at least a 2.800 average over the pre-professional requirements and over the last 45 hours of undergraduate college work in order to be eligible for an interview. A grade below a C in a pre-professional requirement is not acceptable. Nonresidents must meet the same scholastic requirements to receive an application for the professional curriculum and consideration for selection.

Personal interviews are required of all students under consideration. Selection is based upon academic achievement and professional potential as determined by the interview with the Admissions Committee. Applicants are evaluated on such items as motivation, maturity, communication skills, experience with and knowledge of animals, and experience with and knowledge of veterinary medicine. Therefore, all students interested in applying to the College of Veterinary Medicine are encouraged to have adequate animal exposure and to have work experience related to veterinary medicine to demonstrate to the admissions committee an understanding of the profession.

Selection for admission to the curriculum in veterinary medicine is based on individual merit of qualified applicants who are graduates of Kansas high schools and/or who have been residents for at least three years immediately prior to first semester enrollment of the year for which they are applying.

After Kansans are selected, nonresidents from states with which K-State has a contract to provide veterinary medical education and who are certified by their state will be selected. Since the contract status may change yearly, interested applicants should contact the assistant dean, College of Veterinary Medicine, for

current information regarding contract states.

A limited number of at-large positions are available. Applicants for these positions may be considered after highly qualified Kansas residents and certified residents of contract states are selected. In the selection of the at-large positions, priority will be given to residents/citizens of the United States.

On September 1, applications for admission to the professional curriculum may be obtained from the Office of the Assistant Dean of the College of Veterinary Medicine for consideration in the next class.

No applications are accepted after January 30.

### Pre-professional requirements

The pre-professional work may be pursued at K-State in the College of Arts and Sciences or the College of Agriculture or in other academically accredited institutions.

Listed below are required courses, with K-State course numbers listed at left.

### Requirements

ENGL 100	Expository Writing I	3
ENGL 120	Expository Writing II	3
SPCH 105	Public Speaking IA	2
	<b>or</b>	
SPCH 106	Public Speaking I	3
CHM 210	Chemistry I	4
CHM 230	Chemistry II	4
CHM 350	General Organic Chemistry	3
CHM 351	General Organic Chemistry Laboratory	2
BIOCH 521	General Biochemistry	3
BIOCH 522	General Biochemistry Laboratory	2
PHYS 113	General Physics I	4
PHYS 114	General Physics II	4
BIOL 198	Principles of Biology	4
BIOL 510	Embryology	3
BIOL 511	Embryology Laboratory	1
BIOL 455	Microbiology (with lab)	4
ASI 500	Genetics	3
	Social sciences and/or humanities	12
	Electives	9
		<b>70</b>

All science courses (chemistry, physics, biology, and genetics) must have been taken within six years of the date of application. All pre-professional requirements must be graded.

A bachelor of science degree may be granted by the College of Agriculture or the College of Arts and Sciences upon completion of residency and academic requirements. Detailed information should be obtained from the dean's office of the appropriate college.

### Fees for veterinary medical students

See the Fees section in this catalog.

## Doctor of veterinary medicine curriculum

The curriculum in veterinary medicine was established to give Kansas residents preparation for entry into a variety of veterinary medical careers. While the professional curriculum in veterinary medicine is balanced and comprehensive with consideration given to all species, emphasis is placed on food animal diseases.

The academic standards of the College of Veterinary Medicine govern honors, progression, probation, and dismissal. Students will be informed of their academic status by the dean's office based on information supplied by the university registrar. The scholastic record of each student will be reviewed following each period of required registration in the veterinary curriculum.

Studies must be taken as prescribed. Elective courses may be taken with permission only.

For admission to the curriculum in veterinary medicine, consult the previously listed pre-professional requirements.

Completion of the professional curriculum leads to the degree of doctor of veterinary medicine. (Hours required for graduation: pre-professional—70; professional—165; total—235.)

### First professional year

Fall semester	
AP 700	Gross Anatomy I ..... 6
AP 710	Microanatomy ..... 5
AP 737	Veterinary Physiology I ..... 6
AP 740	Veterinary Orientation ..... 1
AP 702	Animal Nutrition and Diet Formation ..... 2
	<b>20</b>

### Spring semester

AP 705	Gross Anatomy II ..... 6
AP 720	Veterinary Neuroscience ..... 2
AP 747	Veterinary Physiology II ..... 6
AP 801	Clinical Skills I ..... 1
LM 705	Veterinary Immunology ..... 2
LM 755	Principles of Epidemiology ..... 2
SM 741	Ethics and Jurisprudence ..... 1
	<b>20</b>

### Second professional year

Fall semester	
AP 770	Pharmacology ..... 5
LM 712	Veterinary Bacteriology and Mycology ..... 5
LM 715	Veterinary Parasitology ..... 5
PA 703	General Pathology ..... 5
	<b>20</b>

### Spring semester

LM 722	Veterinary Virology ..... 3
LM 775	Clinical Pathology ..... 3
PA 710	Systemic Pathology ..... 5
PA 859	Laboratory Animal Science ..... 2
SM 805	Surgery I ..... 3
SM 830	Medicine I ..... 4
SM 802	Clinical Skills II ..... 1
	<b>21</b>

### Third professional year

Fall semester	
LM 777	Laboratory Diagnosis ..... 1
PA 847	Avian Diseases ..... 3
SM 814	Small Animal Surgery ..... 4
SM 820	Theriogenology ..... 3
SM 824	Food Animal Medicine ..... 4
SM 850	Medicine II ..... 4
SM 895	Toxicology ..... 3
	<b>22</b>

### Spring semester

LM 753	Zoonosis and Preventative Medicine ..... 3
LM 875	Production Medicine ..... 2
SM 803	Clinical Skills III ..... 1
SM 811	Large Animal Surgery ..... 4
SM 821	Companion Animal Medicine ..... 4
SM 840	Radiology ..... 3
SM 886	Clinical Nutrition ..... 3
	<b>20</b>

### Fourth professional year

#### Summer, fall, and spring semesters

33 hours required core rotations:

Small Animal Medicine  
 Small Animal Surgery  
 Equine Medicine and Surgery  
 Agricultural Practice  
 Radiology/Anesthesiology  
 Necropsy-Toxicology-Public Health-MARC Elective

Plus minimum 9 hours of mini-electives and/or rotational electives.

### Veterinary medical library

The college's library, which is a part of the Kansas State University libraries system, consists of approximately 35,000 volumes that deal with all phases of veterinary medical literature and many allied fields. It subscribes to 900 journals and has medical/veterinary CD-ROM data bases.

## Anatomy and Physiology

Jon D. Dunn, Head

Professors Blecha,\* Dunn,\* Erickson,\* Fedde,\* Frey,\* Quadri,\* Upson,\* and Westfall;\* Associate Professors Cash,\* Hartke,\* and Troyer;\* Assistant Professors Ross,\* Sharp,\* and Weiss; Emeriti Professors: Klemm and Weinman; Adjunct Professors: Hand, Lewis, and TerHune.

The Department of Anatomy and Physiology presents courses in cell and systemic physiology, gross anatomy and microscopic anatomy, nutrition and metabolism, and pharmacology.

Biophysical electronic instrumentation, an electron microscope, scintillation counter, respiratory mass spectrometer, treadmills, and other instruments are available for physiological and anatomical studies.

A combined anatomy-physiology course and a course in pharmacology of farm animals are offered for undergraduate and graduate students outside veterinary medicine.

## Undergraduate and graduate credit in minor field

**AP 530. Anatomy and Physiology.** (4) II. General anatomy and physiology of the domestic animals. Three hours rec. and three hours lab a week. Same as ASI 533.

**AP 531. Introduction to Pharmacology of Farm Animals.** (2) II, in even years. The study of the basic principles of pharmacology as related to the proper and safe use of drugs and chemicals by the livestock industry. Same as ASI 534. Pr.: AP 530 or equiv.

## Clinical Sciences

J. R. Gillespie,\* Head

Professors Anderson,\* Brightman,\* Elmore, Frey, Gillespie,\* Lorenz, Oehme,\* Schoneweis,\* Spire,\* and Vestweber;\* Regents Distinguished Professor Leith;\* Associate Professors Beeman, Carpenter,\* Cox, R. DeBowes,\* Gabbert, Layton, Pickrell,\* and Williams;\* Assistant Professors Brandt, Bruyette, Cowan, Coyne, L. DeBowes, Fingland,\* Fortney, Gaines, Galland,\* Gaughan, Godshalk,\* Hodgson, Hoskinson, Kraft, McLaughlin, McMurphy, Roush,\* and Saint Jean;\* Emeriti: Professors Blauch, Butler, Carnahan, Edwards, Frick, Guffy, Noordsy, Railsback, and Taussig.

The KSU-Veterinary Medical Teaching Hospital is equipped for diagnosis and treatment of animal disease and for instruction of veterinary students, house officers, and post-graduate veterinarians.

The hospital has a capacity of 82 large animal patients and 150 small animal patients. Clinical faculty accompanied by students provide clinical veterinary service to clients in the local community, clients of referring veterinarians from a six-state region, and local and regional livestock farms. In addition to caring for sick animals, they provide preventative medical services and consultation on production medicine and management.

Fourth-year students are active participants in the hospital and clinical services. Students are regularly assigned on a rotation basis during the year to various specialists on the clinical and pathology staffs.

The department presents courses in medicine, surgery, toxicology, obstetrics, theriogenology, and other clinical specialties to veterinary students and post-DVM trainees.

### Clinical sciences courses

#### Undergraduate credit

**CS 235. Principles of Animal Disease Control.** (3) II. A study of the factors that influence animal health and disease control. For students majoring in agriculture and other fields. Three hours lec. a week. Same as

ASI 235. Pr.: ASI 101 or equiv., AP 530, and sophomore standing.

## Laboratory Medicine

**W. E. Moore,\* Head**

Professors Bailie,\* Chengappa,\* Keeton,\* Minocha,\* Moore,\* and Ridley;\* Associate Professors Brown\* and Scedle; Assistant Professors Chowdhury,\* Dryden,\* and McVey;\* Emeriti: Professor Coles; Associate Professor Burroughs.

Courses in parasitology, bacteriology, virology, immunology, public health, and clinical pathology are offered only for students enrolled in the veterinary medicine curriculum. Third- and fourth-year veterinary medical students receive practical instruction in clinical laboratory procedures and the interpretation of results of laboratory tests.

## Pathology

**J. E. Smith,\* Head**

Professors Dennis,\* Iandolo,\* Kruckenberg,\* Leipold,\* and Smith;\* Associate Professors Fenwick,\* Mosier,\* and Schoning;\* Assistant Professors Leedle\* and Oberst;\* Emeritus: Professor Cook.\*

Basic courses in pathology are offered for students enrolled in the veterinary medicine curriculum. Practical necropsy experience is provided for students as an adjunct to their pathology training and as an aid to disease diagnosis.

Courses in diseases of laboratory animals, wildlife, and fish are offered for non-veterinary undergraduate and graduate students.

### Undergraduate and graduate credit in minor field

**PA 500. Topics in Comparative Pathology.** (1-3) I, II, S. Selected topics in diseases of laboratory animals, wildlife, and fish for nonveterinary students. Same as ASI 503. Pr.: BIOL 198 or equiv.

**PA 501. Diseases of Wildlife.** (3) I. Infectious and noninfectious diseases of birds, furbearing animals, zoological animals, and fish with reference to methods of prevention and control. Three hours lec. a week. Pr.: BIOL 198 or equiv.

## Veterinary Diagnosis

**M. W. Vorhies, Head**

Professors Kennedy,\* Phillips,\* Strafuss,\* and Vorhies; Assistant Professors Basaraba, Briggs, Frank, and Veatch; Emeriti: Professor Anthony; Associate Professors Gray and Milleret.

The department's academic responsibilities include teaching diagnostic necropsy and laboratory procedures to fourth-year professional students and graduate students.

The department serves the livestock and companion animal industry by conducting investigational procedures to identify animal disease problems, by developing research projects related to disease pathogenesis and diagnosis.

The department's diagnostic laboratory is nationally recognized as fully accredited with capabilities in all areas of diagnostic medicine by A. A. V. L. D.

# Graduate School

Timothy R. Donoghue, Dean of the Graduate School and Vice Provost for Research

Elizabeth A. Unger, Associate Dean  
O. James Reichman, Interim Associate Vice Provost for Research

K. Bobette McGaughey, Assistant to the Dean

102 Fairchild Hall

532-6191

1-800-232-0133, ext. 6194 (in Kansas)

## Graduate study

Kansas State University offers 60 master's level programs and 42 doctoral level programs, offered either by departments or by interdepartmental graduate programs. Graduate programs extend the undergraduate experience into advanced areas of concentration in chosen fields of specialization.

While graduate study has major components of study in specialized course work at the advanced level, graduate students must also develop a capacity for independent research and scholarly activity to enable them to carry out original research under the direction of faculty members who are experts in the discipline. Independent research normally results in the preparation and publication of the research study as a thesis or dissertation, and the student must satisfactorily defend that research before a faculty committee appointed by the dean of the Graduate School.

In several professional disciplines, the master's degree curriculum is structured more in course work to place stronger emphasis on preparation for professional practice. While such professional programs also incorporate research methodologies in their graduate curriculum, the formal requirement of a thesis requiring independent research may be waived.

Students interested in pursuing graduate studies should consult the graduate catalog for descriptions of graduate programs and financial assistance opportunities.

## Admission

All students desiring to pursue graduate studies must first be formally admitted to the Graduate School. Students submit applications for admission directly to departments. After reviewing a student's qualifications to pursue advanced study, academic departments forward a recommendation on admission to the dean of the Graduate School for review and action.

All students admitted to the Graduate School are required to adhere to the

university policies established by the graduate faculty through the Graduate Council. They are advised to familiarize themselves with these policies as early in their graduate careers as possible. Students are also advised that departments or interdepartmental graduate programs may have additional policies particular to those programs above and beyond these university policies.

## Financial assistance

Financial assistance is available to graduate students in many disciplines to enable them to pursue an advanced degree. Such support is typically extended as fellowships, traineeships, graduate teaching assistantships, or graduate research assistantships, supported by university, state, federal, corporate, or private funding sources. Students interested in financial support are advised to contact the academic department or graduate program directly to obtain current information. Because many of these stipends are offered by March 15 for the following academic year, prospective students should make their inquiry upon first intent to pursue graduate studies.

## Graduate studies by seniors

K-State permits seniors who have a minimum cumulative GPA of 3.0 on prior undergraduate work and who are within two semesters of receiving a bachelor's degree to enroll for up to 9 semester hours of graduate credit for courses numbered in the 500, 600, and 700 sequences. Students desiring to enroll for more hours of graduate credit beyond this nine-semester-hour limit must first formally apply for admission to, and be accepted by, the Graduate School.

# Graduate Degrees

## Master's degrees

### Master of science

Agricultural economies  
Agricultural engineering  
Agronomy  
Anatomy and physiology  
Animal sciences  
Architectural engineering  
Agricultural technology management  
Biochemistry  
Biology  
Chemical engineering  
Chemistry  
Civil engineering  
Clothing, textiles, and interior design  
Computer and information sciences

## Education

Adult, occupational, and continuing education  
Educational administration  
Elementary education  
Secondary education  
Special education  
Student counseling and personnel services  
Electrical and computer engineering  
Entomology  
Food science  
Foods and nutrition  
Genetics  
Geology  
Grain science  
Horticulture  
Human development and family studies  
Industrial engineering  
Institution management  
Kinesiology  
Mass communications  
Mathematics  
Mechanical engineering  
Microbiology  
Nuclear engineering  
Physics  
Plant pathology  
Psychology  
Statistics  
Surgery and medicine  
Veterinary laboratory medicine  
Veterinary pathology

## Master of arts

Economics  
English  
Geography  
History  
Modern languages  
Political science  
Radio and television  
Sociology  
Speech

## Master of accountancy

## Master of architecture

## Master of business administration

## Master of fine arts

## Master of landscape architecture

## Master of music

## Master of public administration

## Master of regional and community planning

## Doctoral degrees

### Doctor of education

Adult, occupational, and continuing education  
Curriculum and instruction

Educational administration  
 Educational psychology  
 Special education  
 Student counseling and personnel services

**Doctor of philosophy**

Agronomy  
 Animal sciences  
 Biochemistry  
 Biology  
 Chemistry  
 Computer science  
 Economics  
   Agricultural  
   Arts and sciences  
 Education  
   Adult, occupational, and continuing  
   education  
   Curriculum and instruction  
   Student counseling and personnel  
   services  
 Engineering  
   Agricultural engineering  
   Chemical engineering  
   Civil engineering  
   Electrical and computer engineering  
   Industrial engineering  
   Mechanical engineering  
   Nuclear engineering  
 Entomology  
 Food science  
 Foods and nutrition  
 Genetics  
 Geology (Cooperative with University of  
   Kansas)  
 Grain science  
 History  
 Human ecology  
 Horticulture  
 Mathematics  
 Microbiology  
 Physics  
 Physiology  
 Plant pathology  
 Psychology  
 Sociology  
 Statistics  
 Veterinary pathology

# Intercollegiate Athletics

Milton E. Richards, Head and Athletic  
 Director

Coaches Altman, Bietau, Capriotti, Clark,  
 Elliott, Hagemeyer, Snyder, and Yow;  
 Assistant Coaches Buchanan, Chance,  
 Dimel, Doran, Graham, Gensing,  
 Griffith, Grogan, Hendrick, Kerwin,  
 Latina, Leavitt, Medley, Miller, Palmieri,  
 Quartaro, Rovelto, Stoops, Stuart, and  
 Turner; Sports Information Director Boyle;  
 Sports Information Assistants Ballou and  
 Theisen; Video Director Burge; Trainers  
 Toriscelli and Maurer; Administrative Staff  
 Adolph, Bonjour, Epps, McMillen,  
 Peterson, Refro, Switzer, and Zenger.

K-State is a member of the Big Eight  
 Conference and through that affiliation  
 competes with the University of Colorado,  
 Iowa State University, the University of  
 Kansas, the University of Nebraska, the  
 University of Missouri, the University  
 of Oklahoma, and Oklahoma State  
 University.

Intercollegiate competition is open to all  
 students and is coached by staff members  
 who are specialists in their fields.

The men's intercollegiate program com-  
 petes in football, basketball, baseball,  
 track (indoor and outdoor), cross country,  
 and golf. The women's program offers  
 competition in cross country, volleyball,  
 basketball, track (indoor and outdoor),  
 tennis, and golf.

**Courses**

**ATHM 101. Varsity Baseball.** (1) I, II. Pr.: Consent of instructor.

**ATHM 102. Varsity Basketball.** (1) I, II. Pr.: Consent of instructor.

**ATHM 103. Varsity Track.** (1) I, II. Pr.: Consent of instructor.

**ATHM 104. Varsity Football.** (1) I, II. Pr.: Consent of instructor.

**ATHM 105. Varsity Golf.** (1) I, II. Pr.: Consent of instructor.

**ATHW 150. Intercollegiate Basketball.** (1) I, II. Pr.: Consent of instructor.

**ATHW 152. Intercollegiate Track.** (1) I, II. Pr.: Consent of instructor.

**ATHW 154. Intercollegiate Tennis.** (1) II. Pr.: Consent of instructor.

**ATHW 155. Intercollegiate Volleyball.** (1) I. Pr.: Consent of instructor.

**ATHW 157. Intercollegiate Golf.** (1) I, II. Pr.: Consent of instructor.

# Agricultural Experiment Station

Walter Woods, Director  
George E. Ham, Associate Director  
Stanley E. Leland, Jr., Associate Director  
Michael D. Lorenz, Assistant Director  
Barbara S. Stowe, Assistant Director  
Steve C. Morgan, Editor  
Eileen K. Schofield, Associate Editor

113 Waters Hall  
532-6147

The Kansas Agricultural Experiment Station is supported by both federal and state funds. Annual sessions of the Kansas legislature and U.S. Congress provide funds to operate the experiment station. Fees and commercial organizations also provide some support, as do sales of experimental crops and animals.

The KAES conducts original research to enhance the capability of agriculture to provide adequate food and fiber and improve rural living and human nutrition for present and future generations.

Research is performed both on and off campus (on state-owned and leased land), and researchers have access to laboratories and scientific equipment. Twenty-six departments in five colleges are involved. The station is also strongly allied with the Graduate School; interested graduate students are encouraged to seek research assistantships.

Off-campus research is centered at two research-extension centers, two branch stations, and 11 experiment fields in various parts of the state.

Research is organized into more than 600 projects covering physiology and nutrition of plants and animals; water resources; feeds for livestock; marketing of agricultural products; production, maintenance, and use of farm equipment; sociological problems; community development; and home economics.

Results of research are published in scientific journals; in station bulletins, pamphlets, reports of progress, research papers, and reports at field days and other special events; and in popular journals and news releases to the press and radio and television stations. Requests for station publications should be sent to the Distribution Center, Umberger Hall.

## Fort Hays Branch Station

Patrick I. Coyne, Head and Professor

Professors Brethour, Harvey, and Martin; Associate Professors Kofoid, Olson, Seifers, Stahlman, and Stegmeier; Assistant Professor Thompson.

The Fort Hays Branch Station, south of Hays in Ellis County, owns 3,260 acres, and 465 acres are leased from Fort Hays State University. Some research is cooperative with that university. Investigations are primarily related to problems peculiar to western Kansas, where rainfall is limited. They include beef grazing, feeding, and breeding studies; crop improvement, with special emphasis on wheat, sorghum, millet, and sunflower; soil management; weed control; plant diseases; and insects.

## Northwest Research-Extension Center

Richard S. White, Head and Professor  
Reba B. White, Associate Head

Associate Professors Lawless, Schwulst, and Sunderman; Assistant Professor Lamm.

The Northwest Research-Extension Center occupies 727 acres. Major areas of research are crop improvement, soil and water management, sheep production, and horticulture. Extension emphasis includes specialists in agronomy, economics, forestry, home economics, and livestock.

## Southwest Research-Extension Center

James A. Schaffer, Head and Associate Professor  
Paul Hartman, Associate Head

Professor Greene; Associate Professors Buschman, Norwood, Schlegel, and Witt; Assistant Professors Currie, Dick, Freeman, and Spurgeon.

The Southwest Research-Extension Center provides more than 800 acres for research. Current investigations involve irrigation research, dryland soil and crop management, crop improvement, weed control, insect and other pest control in crops and livestock, specialty crops, soil and fertilizer relationships, beef cattle nutrition, and management studies. Many research projects are conducted jointly between station and on-campus scientists.

## Southeast Kansas Branch Station

Lyle W. Lomas, Head and Associate Professor

Associate Professors Coffey, Moyer, and Sweeney; Assistant Professors Kelley and Long.

The Southeast Kansas Branch Experiment Station in Labette County operates 1,093 acres, 764 acres of which are owned and 329 of which are leased. Soil studies in relation to water conservation, yield and quality of crops, weed control research, field crop investigations, beef cattle investigations, and extensive forage

research are being conducted at this station.

## Experiment fields and irrigation development farms

The Kansas Agricultural Experiment Station includes 11 experiment fields of 20 to 320 acres each. Fields, most of which are leased, are Cornbelt (Powhattan), North Central Kansas (Belleville), Irrigation (Scandia), Sandyland Irrigation and Dryland (St. John), South Central Kansas (Hutchinson), Harvey County (Hesston), East Central (Ottawa), and Kansas River Valley Irrigation (Topeka, Rossville, and Silver Lake).

Experimental work is devoted to horticultural and forest crops at three fields: Horticulture Research Center (Wichita), Pecan Experiment Field (Chetopa), and East Central Horticulture Field (DeSoto).

## Affiliated agencies

**Kansas Water Resources Research Institute**  
Cooperating with the Water Resources Institute, University of Kansas  
Hyde S. Jacobs, Director

The Kansas Water Resources Research Institute conducts basic and applied research on water use and to train scientists in water resources. Representatives of K-State and the University of Kansas participate in institute policy making and research. Research is focused on finding the most effective ways of conserving, using, and distributing available water.

## Food and Feed Grain Institute

C. W. Deyoe, Director

The Food and Feed Grain Institute has these goals: to develop effective methods of milling and processing grains; to evaluate and improve the quality and nutritional properties of food grains; to find new uses for grains; and to improve the handling, transporting, storing, and domestic and international use of grains and grain food products. Institute scientists are faculty members of the Departments of Grain Science and Industry, Agricultural Economics, Agricultural Engineering, and personnel of agencies such as the U.S. Grain Marketing Research Center.

## Statistical Laboratory

James J. Higgins, Director

The Statistical Laboratory serves scientists associated with the Agricultural Experiment Station. Both consulting and computational services are available.

# Outreach

## Division of Continuing Education

Robert F. Kruh, Vice Provost and Dean of Continuing Education

Sue Maes, Associate Director, Continuing Education

Edward M. McAleer, Jr., Director, Academic Outreach

Douglas W. King, Director, Administrative Systems

Lynda Spire, Director, Conferences

William Cashin, Director, Center for

Faculty Evaluation and Development

Enid Cocke, Director, English Language Program

Jan Kruh, Director, Kansas Regents Network (TELENET)

Linda Teener, Director, UFM

College Court Building  
532-5566

Professor R. Kruh; Associate Professor Cashin; Instructors Allard, Aasen, Bailey, Barton, Carter, Claussen, Cocke, Haag, King, J. Kruh, Law, Lawrence, J. Lewis, L. Lewis, Madison, Maes, Matteson, McAleer, Nikkel, Oliver, Ossar, Parmley, R. Peverill, T. Peverill, Pruett, Sinn, Sixbury, Spire, Stanley, Stauffer, Teener, Trent, Wherry, White, Williams, Wood, and Woodward.

The Division of Continuing Education brings together K-State's teaching resources with learners throughout Kansas who are unable to come to the campus. Classes and programs are provided in many communities by face-to-face instruction or by electronic means. In the latter case, the university makes use of both the Regents Network, an audio teleconferencing system, and the Regents Educational Communications Center, a video production facility. Credit and non-credit programs are offered for those seeking degrees, professional updates, or personal enrichment. For detailed information on offerings contact Academic Outreach at 532-5687 or 1-800-432-8222.

### K-State summer session

The summer session is designed to meet the needs of the following groups, among others:

Undergraduate and graduate students who wish to accelerate their programs of study and those who wish to make up courses missed during fall or spring semesters.

Teachers and other professionals who are unable to attend the university during the regular terms.

High school graduates seeking an early start on college. Regular introductory courses and special programs designed for high school students are available. These students find it valuable to establish study habits, become acquainted with the campus and faculty, and adjust to university life.

All facilities and services of the university available in the regular semesters are available in the summer, including housing, food service, counseling and testing services, Lafene Health Center, and K-State Union recreational programs.

The *Summer Session Bulletin* gives complete and detailed information about summer school. It is available in April each year. A free copy may be obtained from the Division of Continuing Education.

### Intersession

K-State conducts its intersession program during major breaks in the standard academic calendar. There are two intersessions each year: one in early January, the other in late May and early June. During intersession, 40 to 60 courses are offered, including both regular and new or experimental courses.

Many students use intersession as an opportunity to examine academic areas not scheduled in their current curricula. The faculty uses intersession as an opportunity to experiment with new ideas and formats for teaching.

Intersession courses are considered part of the regular K-State course offerings and can fulfill degree requirements. Students are encouraged to consult with their advisors to determine if a particular intersession course will meet requirements.

### Fort Riley courses

K-State works in cooperation with the Army Education Center to provide the Fort Riley community the opportunity to take university courses. Courses are scheduled at convenient times to assist military personnel and their dependents.

The courses are taught by regular K-State faculty members and allow the pursuit of associate, bachelor's, and master's degrees in several academic disciplines. Areas of study in highest demand include general social sciences, business administration, and education. K-State courses offered at Fort Riley are open to all area residents, although military personnel have priority.

K-State maintains an office at Fort Riley staffed by K-State personnel familiar with degree requirements and procedures on acceptance of transfer work. Students are encouraged to meet with these advisors to pursue their academic goals. For additional information contact the K-State coordinator at Fort Riley, (913) 784-5930.

### Regents Network (TELENET)

Many courses and educational programs offered on the K-State campus are available to the people of Kansas by means of the Regents Network (TELENET). The network is a teleconferencing system of educational centers located throughout Kansas and linked together via telephone lines. The locations include Abilene, Arkansas City, Atchison, Belleville, Beloit, Chanute, Colby, Concordia, Dodge City, El Dorado, Emporia, Garden City, Goodland, Great Bend, Hays, Howard, Hutchinson, Independence, Larned, Lawrence, Liberal, Manhattan, Marysville, Newton, Norton, Ottawa, Overland Park, Paola, Pittsburg, Pratt, Sabetha, Salina, Stockton, Topeka, Wathena, Wellington, and Wichita.

A TELEbridge has been added to the Regents Network to allow additional temporary teleconferencing classrooms to be established anywhere in Kansas for university courses, in-service training, meetings, or conferences.

### Non-Traditional Study Program

The Non-Traditional Study Program is designed for undergraduate students who have encountered obstacles to traditional college attendance, helping them surmount barriers created by distance, physical handicap, employment, or family need. Staff may be able to assist returning K-State students in finding remedies for past academic deficiencies.

NTS advisors assist students in planning individual programs of study and serve as guides to faculty and media resources. The advisors help students select options such as evening or off-campus classes; correspondence study; credit by examination; audio and video courses; telecourses; TELENET courses; internships; or independent study.

Students may earn baccalaureate degrees in traditional academic areas.

### Conference Office

The Conference Office makes university facilities and resources available to individuals and organizations through the design and management of conferences, short courses, workshops, special interest programs, and noncredit programs. For

further information, contact the Conference Office at 532-5575.

### **Center for Faculty Evaluation and Development**

The Center for Faculty Evaluation and Development was created in 1975 by a grant from the W. K. Kellogg Foundation. The center is now supported by fees received for its services. For additional information contact the Center for Faculty Evaluation and Development at 532-5970.

### **UFM**

UFM is a community learning center that develops and conducts informal educational opportunities that do not involve prerequisites, grades, or credits. More than 500 programs are available during the three sessions a year. Classes, symposia, forums, and unstructured learning experiences covering a range of human interests, activities, and concerns are offered.

### **English Language Program**

The English Language Program offers intensive English courses primarily for international students who plan to enter degree programs at K-State. It also accepts students who wish to come only for English instruction.

Students who wish to study English as a second language before entering a degree program should apply first for undergraduate or graduate admission and then should apply to the English Language Program.

For more information, write the English Language Program, 205 Fairchild Hall. (For course descriptions, see the listings in the Department of English section of this catalog.)

## **International Agricultural Programs**

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Jim Jorns, Acting Director  
108 Waters Hall  
532-5714

Since 1956, K-State has extended its outreach mandate to include people around the world through multi-million dollar USAID funded projects in developing countries; individual faculty research, consulting, and sabbatical activities; and hundreds of educational programs for international participants.

The first major projects helped establish land-grant type agricultural universities in India and Nigeria. Recent projects have provided specialized assistance for universities and ministries of agriculture in the Philippines, Botswana, Honduras, and Pakistan. As a partner in the MidAmerica International Agriculture Consortium faculty have been involved in projects in Peru, Morocco, Liberia, Tunisia, and Kenya. Through these projects, faculty members and their families have experienced other cultures and have brought these experiences back to K-State students and the community.

The International Meat and Livestock Program and the International Grains Program have helped hundreds of international participants develop new skills and knowledge. The Food and Feed Grain Institute has provided training in more than 50 countries to help solve postharvest problems of grain storage, transportation, processing, and marketing.

## **Kansas Regents Educational Communications Center**

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Melvin Chastain, Director  
Bob Dole Hall  
532-7041

The Educational Communications Center houses instructional television and related telecommunications studios, and production, editing, and distribution facilities, including Ku-Band satellite uplinks, fiber optics, Low Power TV, and compressed video. The center also houses studio and control room facilities for instructional use by journalism and mass communications faculty and students, as well as offices and studios for both Cooperative Extension and TELENET.

The ECC provides electronic access to and interconnection between each of the Kansas Regents' institutions. The center not only produces and distributes university-level instructional material, but also develops course work and in-service content for public schools, as well as credit and non-credit continuing education material.

# Division of Cooperative Extension

123 Umberger Hall  
532-5820

The basic mission of extension is to deliver informal, out-of-school, noncredit educational programs that help people solve their problems. These programs are based on up-to-date research and practical applications of knowledge conducted by this and other institutions.

The Cooperative Extension Service provides an important learning bridge between the university and the people of the state. It takes scientific knowledge, principles, and practices that bear directly on the grass roots problems of Kansans. At the same time, this unique information delivery system brings back requests for new knowledge to the research staff at the university.

The Cooperative Extension Service helps maintain County Extension Offices, operated by off-campus K-State faculty members, in all 105 Kansas counties.

County extension agents, as official representatives of the United States Department of Agriculture, are responsible for making people aware of educational programs affecting agriculture, family living, youth, community development, and related areas. The agents serve as a local source of information regarding programs of many other governmental agencies, such as the Soil Conservation Service, Rural Electrification Administration, Farm Credit Administration, and Agricultural Stabilization and Conservation Service.

## Extension Agricultural Programs

James P. Murphy, Acting Assistant Director, Professor

Specialists in several departments of the Colleges of Agriculture, Engineering, and Veterinary Medicine offer direct educational and technical assistance to citizens throughout the state.

In addition, extension offers interdisciplinary programs in four areas: food, feed, and forage production; animal production and utilization; resource use and conservation; and farm business and financial management.

### Extension agricultural economics

Marc A. Johnson, Head  
Barry L. Flinchbaugh, State Leader

### Farm management

Professors Barnaby, Fausett, Flinchbaugh, Johnson, L. Langemeier, and Schlender; Assistant Professors M. Langemeier and Nelson; Instructor Beech; Administrator DeLano; Farm Management Association Fieldmen Allen, Dawson, Eck, Everson, Freeze, Gronau, Herod, Huschka, Manny, McCorkle, Miller, Rempe, Roddy, Rowell, Schwarzentraub, Smith, Stucky, Thompson, Wahl, Wilken, Witt, Wood, and van der Hoeven; Emeriti: Professors Thomas and Whitehair; Associate Professors McReynolds and Parker; Assistant Professor Overley; Farm Management Association Fieldmen Collins, Dickson, Faidley, Germann, Greene, Hackler, Hageman, Mullen, Sturdevant.

The extension educational program in farm management is divided into two areas: Kansas Farm Management Association programs and area and state farm management programs.

In the Kansas Farm Management Association program, the 24 farm management fieldmen conduct an intensive educational program with approximately 2,600 Kansas farm families in the six farm management associations.

The extension farm management program is conducted by state specialists and area economists. It is done with in-depth educational programs in cooperation with the county extension agents. The area specialists conduct in-depth workshops in farm business management with farm families, provide a nearby reference resource for agents, and develop educational materials for agent use.

### Agricultural policy

The public affairs extension educational program provides educational information on policy issues of current interest. Problems are analyzed, alternatives and consequences examined, and the people are challenged to reach decisions.

The economic information program provides current data on factors affecting farming, business and industrial operations, labor supply and demand, and family living costs.

### Extension marketing

Professors Barton and Erickson; Associate Professors Mintert and Tierney; Assistant Professor Abeles-Allison; Emeriti: Professor Walker.

The main projects of marketing include marketing information, agri-business, and commodity marketing activities. News releases, monthly teleconferences, publica-

tions directed to the general public, and special information directed toward specific agricultural audiences are used to disseminate information.

### Extension economic development

Associate Professor Darling.

Extension economic development assists communities in development efforts. News releases, publications, and seminars are offered through county extension agents and area community development specialists.

### Extension local government

Assistant Professor Young.

The extension local government program provides direct educational assistance in the areas of management, finance, and policy. Educational programs are conducted in cooperation with county extension agents and area community development specialists.

### Extension agricultural engineering

Stanley J. Clark, Head  
James P. Murphy, State Leader

Professors Clark and Murphy; Associate Professors Black, Harner, Kuhlman, Powell, and Rogers; Assistant Professor Taylor; Emeriti: Professors Holmes, Jepson, and Wendling; Associate Professor Schindler.

Extension agricultural engineering carries on an educational program dealing with application of engineering principles to various phases of agriculture.

### Extension agronomy

Gerry Posler, Head  
David A. Whitney, State Leader

Professors Kilgore, Lamond, Posler, Regehr, Shroyer, Welch, and Whitney; Associate Professors Devlin, Mikesell, Ohlenbusch, Hickman, and Fjell; Assistant Professors Duncan, Kok, and Peterson; Emeriti: Professors Bieberly, Bohannon, Dicken, and Edelblute; Associate Professor Harper.

Extension agronomy conducts a statewide educational program in agricultural crop production and natural resource conservation. The object of the program is to improve crop production efficiency, stabilize the agricultural economy through stable agricultural production, and conserve natural resources.

### Extension animal sciences and industry

Jack G. Riley, Head  
Larry R. Corah, State Leader

Professors Adams, Brazle, Call, Corah, Dunham, Henderson, Riley, Schafer, Simms, and Zoellner; Associate Professors Kuhl, Nelssen, and Spaeth; Assistant Professors Blasi, Bolze, Boyle, Eck, Goodband, and Tokach; Extension Assistant Olson; Emeriti: Professors Francis, Good, Moyer, and Westmeyer; Assistant Professor Orwig.

Extension specialists in animal sciences and industry provide leadership for state programs in beef cattle, dairy cattle, horses, poultry, sheep, swine, meats, dairy products, and wildlife damage control.

### **Extension entomology**

C. Michael Smith, Head  
Randall A. Higgins, State Leader

Professors Bauernfeind, Brooks, Cress, Mock, Sloderbeck, and Smith; Associate Professors Higgins and Lippert; Emeritus: Professor Gates.

Extension entomology is concerned with practical insect control measures for Kansas citizens. Pilot pest management projects are used to introduce and validate newer, integrated approaches to managing pest populations.

### **State and extension forestry**

Raymond G. Aslin, State Forester  
Thomas D. Warner, Head, Department of Horticulture, Forestry, and Recreation Resources  
John K. Strickler, Extension Forester

Professors Aslin, Loucks, Naughton, Nighswonger, Pinkerton, and Strickler; Associate Professors Gould, Lynch, and Rowland; Assistant Professors Bruckerhoff, Kunkel, and Strine.

This department is responsible for all state and extension forestry programs in Kansas. The foresters provide direct technical assistance to landowners in all forestry and forestry-related areas. Landowners receive assistance in management and marketing of their timber.

### **Extension grain science and industry**

C. W. Deyoe, Head  
Timothy J. Herrman, State Leader

Professors Curran, Pederson, and Ponte; Assistant Professor Herrman; Instructors Bequette and Pudden; Emeritus: Balding, Schoeff, and Wilcox.

This extension program assists personnel in the formula feed and allied industries in: (1) the adoption and use of the latest manufacturing techniques, safety equipment, and practices; and quality-control procedures, marketing methods, and modern management principles and tools, including plant feasibility; and (2) the

proper use of drugs and feed additives in animals and manufacturing practices as required by state and federal laws and regulations.

### **Extension horticulture, forestry, and recreation resources**

Thomas D. Warner, Head  
Frank D. Morrison, State Leader

Professors Leuthold, Marr, Morrison, and van der Hoeven; Assistant Professors Gast and Stevens.

Programs in extension horticulture and landscaping serve persons interested in horticultural plants, including fruits, nuts, vegetables, flowers, turf, shrubs, and ornamental and shade trees.

### **Extension plant pathology**

Fred W. Schwenk, Head  
Douglas J. Jardine, State Leader

Professor Schwenk; Assistant Professor Bowden; Associate Professors Jardine and Tisserat; Instructor O'Mara; Emeritus: Professor King and Willis.

Plant pathology extension specialists provides information about the occurrence and nature of plant diseases and the economic means for their control.

### **Extension veterinary medicine**

Homer K. Caley, State Leader

Professor Caley; Associate Professor Breedon.

Extension veterinary medicine serves all facets of companion animals and the livestock industry, including veterinarians as a source of scientific material pertaining to the most recent information on disease prevention and control and proper drug use.

## **Extension Home Economics Programs**

### **College of Human Ecology**

Marilyn B. Corbin, Assistant Director of Extension, Home Economics Programs

Professors Bowers, Clarke, Murray, Peterson, and Smith; Associate Professors Bradshaw, Corbin, Jones, Mark, Penner, Phillips, and Walker; Assistant Professors Aramouni, Munson, Peters, Price, Schoenberger, Wilken, and Young; Emeriti: Professors Allen, Anderson, Carlson, Ellithorpe, Neufeld, Slinkman, and Tucker; Associate Professors Appleby, Atkinson, Clonts, Howe, Johnson, Schroeder, Wells, H. B. Wiggins, and M. C. Wiggins; Assistant Professors Crist, Guthrie, Miller, and Starkey.

Educational programs designed to improve the quality of living are carried on in each Kansas county under the direction of extension home economics programs.

Program emphases are on: development of children and youth; marital and parental roles; changing roles of men and women; management in allocation of family resources; family financial security; time and money management; consumer performance in the market; nutrition and health; food preparation and preservation; food safety and sanitation; clothing management; textiles; health and safety; hazards in the home and community; home selection, building, buying, and remodeling; housing costs and finance; community factors in housing decisions; furnishing and equipping the home; developing community economic, social, cultural, and human resources, including understanding public concerns affecting families; expansion and improvement of cultural opportunities; and development of leadership abilities.

### **Extension expanded food and nutrition education program**

Marilyn B. Corbin, Assistant Director of Extension, Home Economics Programs

Assistant Professor Stroh.

An educational program in nutrition education for adults and youth from families with limited resources, the program with individual family members and youth is conducted through paraprofessionals who work under the supervision and administration of an extension home economist. The program is conducted in designated counties.

## **4-H Youth Programs**

C. R. Salmon, Assistant Director of Extension

Professor Apel; Associate Professors Adams, Burns, Fisher, Kling, McFarland, and Salmon; Assistant Professor Collins, Severinson Godke; Emeriti: Professors Bates, Busset, Eyestone, Johnson, Redman, and Regnier; Associate Professors Borst and Whipps; Assistant Professor Weaver.

Kansas 4-H, Kansas' largest youth education apart from the public schools, is the pre-college-level education program of the university, conducted in cooperation with County Extension Councils and the United States Department of Agriculture.

4-H specialists staff and county extension agents interpret, extend, and encourage the application of relevant and current information to concerned adults, parents, and community leaders on techniques of working with children and youth so that

the children and youth will become self-directing, contributing members of society. Programs help children and youth build self-confidence, develop inquiring minds, learn to make decisions, relate to others, and develop a concern for the community and those in it.

## Extension Community Development Programs

William M. Eberle, Assistant Director of Extension

Professor Farlin; Associate Professors Bittel, Eberle, and Utermoehlen; Assistant Professor Leibhart; Emeritus: Professors Frazier and Norby; Associate Professors Halazon and Albright.

Extension community development programs help Kansans arrive at group decisions and take actions to enhance their communities as economic, social, service, and living centers. Major community development education program components include organization and leadership development, economic development, and local government.

### Kansas PRIDE program

Associate Specialist McAdoo.

The Kansas PRIDE Community Improvement Program is a cooperative effort between government, education, and private industry to develop an organizational and leadership structure for community-wide volunteer action. The Kansas PRIDE program is jointly administered by the Kansas State University Cooperative Extension Service and the Kansas Department of Commerce.

### Kansas DIRECT program

Associate Professor Sisk; Associate Specialists Hobson and Williams.

The Kansas DIRECT Program is a referral and information service providing a single point of contact for individuals needing information or assistance in economic, rural, or business development.

## Extension Energy Service

Richard B. Hayter, Assistant Director Professor Hayter; Assistant Professor Nelson; Instructors Gardner, Logan, Matteson, Meyer, Nelson, Snead, and Walter.

The Energy Extension Service provides educational programs for the small energy consumer. This outreach is directed toward four program areas: residential, agricultural, institutional, and small business and industry. Assistance is offered through short courses, technical publications, and on-site visits.

## Services and Facilities

### Extension Communications

Myrna Daly, Acting Head

Professors Sullins and Titus; Associate Professors Atkinson, Baker, Buchanan, Daly, Frank, Jorgensen, McGlashon, Ward, and Wright; Instructor Ballou; Emeriti Professors Burke, Graham, Medlin, Thomas, Unruh, and Warner; Associate Professors Dexter and Peck; Assistant Professors Kuehn, Nelson, and Tennant.

The Department of Extension Communications supports the Cooperative Extension Service, with emphasis on the media.

Information is channeled through newspapers, magazines, publications, circulars and posters, printed annual reports, exhibits, slides, radio, and television. Editing, printing, graphics, and media services are available.

Extension communications administers and programs KKSU, an institution-owned, public radio station on the air on 580 Hz. The K-State Radio Network is both a live and audiotape service to Kansas commercial radio stations.

Television programs are presented on cooperating television stations, provided for extension agents and specialists, and delivered via satellite videoconferences.

### Extension Computer Systems Office and Weather Data Library

Roger Terry, Acting Coordinator

Professor Brandsberg; Associate Professor Terry.

The Computer Systems Office supports all extension professionals in their use of computer-based information technology to deliver educational programs. Included in CSO is the Weather Data Library, which is jointly sponsored by the Cooperative Extension Service and the Agricultural Experiment Station.

### Extension field operations

#### Southwest Research-Extension Center, Garden City

James A. Schaffer, Head  
Paul Hartman, Area Extension Director and Associate Head

Professor Sloderbeck; Associate Professor Young; Assistant Professors Dhuyvetter and Eck; Emeriti: Professor Mann; Assistant Professor Blankenhagen.

#### Northwest Research-Extension Center, Colby

Richard S. White, Head  
Reba B. White, Area Extension Director and Associate Head

Professor R. S. White; Associate Professors Mikesell and Nelson; Assistant Professors Bolze and Leibhart; Emeritus: Assistant Professor Overley.

#### South Central Area Extension Office, Hutchinson

Earl L. Van Meter, Area Extension Director

Associate Professor Phillips; Assistant Professors Blasi, Duncan, and Warmann; District Forester Atchison; Emeriti: Professor Cox; Associate Professors Albright, McReynolds, and Wiggins; Assistant Professor Orwig.

#### Northeast Area Extension Office, Manhattan

Bob W. Newsome, Area Extension Director

Professor Newsome; Associate Professors Devlin, Mark, and Utermoehlen; Assistant Professors Tokach and Vandever; District Forester New; Emeriti: Professors Figurski and Francis; Instructors Burkhart and Marlow.

#### Southeast Area Extension Office, Chanute

Benny S. Robbins, Area Extension Director  
Professors Brazle, Fausett, Kilgore, and Robbins; Associate Professors Bittel, Lippert, and Rowland; Assistant Professors Bruckerhoff and Price; Emerita: Associate Professor Appleby.

### County extension offices

There are county extension offices in each of the 105 counties.

# University Faculty

**ABELES-ALLISON, LISA C.**, Asst. Prof. of Agricultural Economic Products; Extension Specialist, Horticultural Marketing (1990). BS 1980, U. of Minnesota-St. Paul; MS 1986, PhD 1990, Michigan St. U.

**ABBOTT, JAMES W.**, Instr., Education (1983). BA 1956, Drury Col.; MA 1959, U. of Missouri; LHD 1980, Concordia Teachers' Col.

**ABMEYER, ERWIN**, Asst. Prof. Emeritus of Horticulture (1934). BS 1933, Kansas St. U.

**ACASIO, ULYSSES A.**, Asst. Prof. of Grain Science and Industry (1978). MS 1972, U. of Philippines; PhD 1979, Kansas St. U.

**ACEVEDO, EDMUND**, Asst. Prof. of Kinesiology (1990). BS 1983, Springfield College; MS 1985, U. of Maryland; PhD 1989, U. of North Carolina at Greensboro.

**ACKLEY, R. DOUGLAS**, Asst. Controller, Cashiers and Loans (1978). BS 1971, Kansas St. U.

**ADAMCHAK, DONALD J.**, Assoc. Prof. of Sociology (1978). BA 1973, Ohio U.; MA 1975, Western Kentucky U.; PhD 1978, Bowling Green St. U. (\*)

**ADAMS, ALBERT W.**, Prof. of Animal Sciences and Industry; Extension Specialist, Poultry Sciences (1962). BS 1951, MS 1955, Kansas St. U.; PhD 1964, S. Dakota St. U. (\*)

**ADAMS, JAMES P.**, Assoc. Prof.; Extension Specialist, 4-H Youth, (1976). BA 1969, Kansas St. U.; MS 1971, Oklahoma St. U.

**ADAMS, MARJORIE**, Assoc. Prof. Emerita of English (1954). BA 1941, Louisiana Polytechnic; MA 1948, PhD 1951, U. of Texas. (\*)

**ADAMS, PATRICIA C.**, Admin. Asst., Biology (1983). BA 1969, Washburn U.; MBA 1980, Fort Hays St. U.

**ADAMS, WALTER R.**, Asst. Prof. of Anthropology (1990). BA 1975, Beloit; MA 1979, SUNY-Albany; MS 1981, U. of Pennsylvania; PhD 1988, Michigan St. U. (\*)

**ADAMS, WILLIAM J.**, Asst. Prof. of Journalism and Mass Communications (1985). BA 1976, Brigham Young U.; MA 1980, Ball St. U.; PhD 1988, Indiana U. (\*)

**ADDISON, CONALL E.**, Co. Extension Agent, Stafford Co., St. John (1974). BS 1966, Tulsa U.; BS 1970, MS 1972, Oklahoma St. U.

**ADOLPH, CAROL**, Ticket Manager, Intercollegiate Athletics (1955).

**AHERN, MICHAEL**, Instr. of Marketing (1981). BS 1979, MBA 1981, Kansas St. U.

**AHLVERS, DAVID A.**, Prof. of General Tech. (1982). AA 1970, Cloud County Comm. Col.; BS 1972, MS 1974, Fort Hays St. U.; CPA.

**AINSWORTH, PENNE L.**, Asst. Prof. of Accounting (1987). BS 1983, MAcc 1984, Kansas St. U.; CPA 1985, Kansas; PhD 1988, U. of Nebraska; CMA 1990.

**AKIN, JAMES N.**, Dir., Career Planning and Placement Cntr. (1966). BS 1960, MS 1964, Kansas St. U.

**AKINS, RICHARD GLENN**, Prof. of Chemical Engineering (1963). BS 1957, MS 1958, U. of Louisville; PhD 1962, Northwestern U. (\*)

**AKKINA, KRISHNA RAO**, Assoc. Prof. of Economics (1972). BA 1963, U. of Andhra; MA 1965, Delhi School of Economics; PhD 1972, U. of Minnesota. (\*)

**ALBERS, LEISA A.**, Research Asst. of Grain Science and Industry; USDA Grain Marketing Research Lab (1983). BS 1979, Kansas St. U.

**ALBRECHT, MARY L.**, Prof. of Horticulture; Research Horticulturist, Floricultural Crops, Agr. Exp.

Sta. (1980). BS 1975, Rutgers U.; MS 1977, PhD 1980, Ohio St. U. (\*)

**ALBRIGHT, KENNETH B.**, Assoc. Prof. Emeritus; Extension Specialist, Community Dev., South Central (1955). BS 1952, Kansas St. U.; MEd 1967, Colorado St. U.

**ALEXANDER, LOREN R.**, Assoc. Prof. of Modern Languages and Education (1965). BM 1951, Southwestern Col.; MA 1954, Colorado St. Col. of Educ.; MA 1965, PhD 1971, Michigan St. U. (\*)

**ALGRIM, EUGENE E.**, Co. Extension Agent, Agr., Rush Co., LaCrosse (1976). BS 1965, MS 1972, Kansas St. U.

**ALLARD, JOHN W.**, Coord. of Academic Outreach (1991). BA 1968, Colorado State U.; MEd 1979, N.W. Oklahoma State U.

**ALINGTON, CATHERINE B.**, Asst. Prof. of Landscape Architecture (1990). BA 1984, Victoria U., New Zealand; Graduate Diplomate 1988, Lincoln College, New Zealand; MIA 1990, Ohio St. U.

**ALLEN, DAVID**, Chair, Library Automation (1987). BA 1978, MLS 1982, Brigham Young U.

**ALLEN, ERIC B.**, Farm Management Association Fieldman (1973). BS 1971, MS 1972, Kansas St. U.

**ALLEN, GERTRUDE E.**, Prof. Emerita; Extension Specialist, Foods and Nutrition (1929). BS 1923, U. of Minnesota; MS 1936, Kansas St. U.

**ALLISON, MAX**, Asst. Prof. of Horticulture; Research Horticulturist (1985). BS 1961, U. of Illinois; MS 1976, Kansas St. U.; PhD 1984, Mississippi St. U.

**ALLOWAY, JAY E.**, Assoc. Operating Systems Specialist, Computing and Telecommunications Activities (1970). BS 1970, Kansas St. U.

**ALTMAN, DANA**, Head Men's Basketball Coach (1990). BS 1980, Eastern New Mexico; MBA 1981, Western St. Col.

**ALVAREZ, VINCENT L.**, Adjunct Assoc. Prof. of Anatomy (1991). MD 1972, Loyola U.

**AMBROSIUS, MARGERY**, Asst. Prof. of Political Science (1986). BA 1964, MA 1967, U. of Illinois; MA 1984, PhD 1986, U. of Nebraska.

**AMBURGEY, VICTOR**, Research Asst. of Plant Pathology (1983). BS 1983, Kansas St. U.

**AMICO, MICHAEL P.**, Asst. Prof. of Speech (1991). BA 1983, SUNY-Fredonia; MFA 1986, Penn St. U.

**AMOS, JOHN M.**, Adjunct Prof., Industrial Engineering (1987). BS 1956, MS 1957, Kansas St. U.; PhD 1960, Ohio St. U.

**AMSTEIN, WILLIAM G., JR.**, Agr. Alumni and Dev. Coord. (1986). BS 1952, MS 1957, Kansas St. U.

**ANDEREGG, MARVIN K.**, Co. Extension Agent, 4-H, Labette Co., Altamont (1969). BS 1969, Kansas St. U.

**ANDERSON, CATHY L.**, Assoc. Prof. of Speech (1980). BA 1974, Lyndon St. Col.; MFA 1980, U. of Connecticut.

**ANDERSON, DARRYL**, Asst. Track Coach (1984). BS 1983, MS 1985, Kansas St. U.

**ANDERSON, ELINOR A.**, Prof. Emerita; Extension Specialist, Family Economics (1963). BS 1939, MS 1952, Kansas St. U.

**ANDERSON, NEIL V.**, Prof. of Comparative Gastroenterology; Clinical Research Scientist (1967). BS 1953, Mankato St. Col.; BS 1959, DVM 1961, PhD 1968, U. of Minnesota; Diplomate 1972, American Col. of Vet. Internal Medicine. (\*)

**ANDERSON, PHILLIP D.**, Instr. of Speech (1980). MA 1966, Indiana U.

**ANDERSON, RODNEY L.**, Assoc. Prof. of Electronic Engineering Tech. (1984). BSEE 1958, Kansas St. U.; Professional Engineer.

**ANDERSSON, LAURA**, Asst. Prof. of Biochemistry (1990). BS 1978, Auburn U.; PhD 1982, U. of Southern California.

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**ANDRUS, DAVID M.**, Assoc. Prof. of Marketing (1983). BS 1976, Oklahoma St. U.; MA 1978, U. of Hawaii; PhD 1981, U. of Iowa. (\*)

**ANDRUS, LYNDA E.**, Instr. of Art (1983). BFA 1978, U. of Hawaii; MA 1979, MFA 1981, U. of Iowa.

**ANGLE, DENNIS R.**, Asst. Prof., Education (1979). BA 1968, MS 1974, Emporia St. U.; PhD 1984, Kansas St. U.

**ANNIS, PATTY SMITH**, Asst. Prof. of Clothing, Textiles, and Interior Design; Agr. Exp. Sta. (1958). BS 1955, Mississippi St. Col. for Women; MS 1957, U. of Tennessee. (\*)

**ANSDELL, ORA JOYE**, Assoc. Prof. Emerita of English (1946). BS 1932, Kansas St. U.; MA 1939, U. of Michigan; BLS 1946, U. of Chicago; PhD 1956, U. of Colorado. (\*)

**ANTHONY, HARRY D.**, Prof. Emeritus of Diagnostic Lab (1955). DVM 1952, MS 1957, Kansas St. U. (\*)

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**APPL, FREDRIC CARL**, Prof. of Mechanical Engineering (1960). BS 1954, MS 1955, PhD 1958, Carnegie-Mellon U. (\*)

**APPLEBY, MARIELLEN J.**, Assoc. Prof. Emerita; Extension Home Economist, Southeast (1955). BS 1955, Kansas St. U.; MS 1965, U. of Maryland.

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**ARCHER, ALLEN W.**, Asst. Prof. of Geology (1989). BS 1975, Oregon St. U.; AM 1979, PhD 1983, U. of Indiana. (\*)

**ARCHER, DWAIN**, Asst. Parking Manager (1991).

**ARCK, WILLIAM**, Dir. of Alcohol and Other Drug Education Service (1982). BS 1978, MS 1979, Kansas St. U.

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**ARMBRUST, DEAN V.**, Assoc. Prof. of Agronomy; Research Soil Scientist, Wind Erosion Research Unit, USDA, ARS (1968). BS 1960, MS 1961, PhD 1973, Kansas St. U. Adjunct appt. (\*)

**ARNOLD, JO ELLEN**, Co. Extension Agent, 4-H, Franklin Co., Ottawa (1977). BS 1977, Kansas St. U.

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**ARTHUR, CHARLES S.**, Instr. of Accounting (1971). BS 1967, Kansas St. U.; MLL 1970, New York U.

**ASENETA, LYDIA**, Assoc. Prof. Emerita of Speech (1967). BS 1949, MA 1958, The National Teachers' Col. of the Philippines; MA 1968, Kansas St. U.

**ASHBURN, MADISON H.**, Prof. of Mechanical Engineering Tech. (1975). ME 1975, Kansas U.

**ASLIN, RAYMOND G.**, Prof. of Forestry; St. Forester (1975). BS 1972, MS 1975, U. of Missouri.

**ATCHISON, FRED D.**, Assoc. Prof. Emeritus; Extension Forester, Northeast (1964). BS 1954, U. of Georgia; MS 1972, Fort Hays St. U.

**ATCHISON, ROBERT L.**, Asst. Forester; District Forester, South Central (1990). BS 1981, U. of Missouri.

**ATKINSON, C. HARRY**, Assoc. Prof. Emeritus of Agronomy (1949). BS 1931, MS 1933, Pennsylvania St. U.

**ATKINSON, DAISY E.**, Assoc. Prof. Emerita of Foods and Nutrition; Extension Specialist, Human Nutrition (1959). BA 1938, MS 1953, Iowa St. U.

**ATKINSON, ERIC J.**, Assoc. Prof.; Extension Specialist, Radio and TV (1983). BS 1978, MS 1982, Kansas St. U.

**AVERELL, ROBERT B.**, Adjunct Asst. Prof. of Clothing, Textiles, and Interior Design (1981). BA 1964, U. of Pennsylvania; MS 1969, Rutgers.

**AZADIVAR, FARHAD**, Prof. of Industrial Engineering (1990). Dir. of Advanced Manufacturing Inst. (1991). BS 1970, Tehran U., Iran; MS 1972, Asian Inst. of Tech.; PhD 1980, Purdue U. (\*)

**AZER, NAIM ZAKI**, Prof. of Mechanical Engineering (1958). BS 1950, MS 1954, U. of Alexandria, Egypt; PhD 1959, U. of Illinois. (\*)

**BABBAR, SUNIL**, Asst. Prof. (1990). MA 1979, Meerut University, India; MBA 1983, PhD 1988, Kent St. U.

**BAER, MAURICE (BUZ)**, Faculty Emeritus (1969). AF 1973, Kansas Tech. Inst.

**BABCOCK, MICHAEL W.**, Prof. of Economics (1972). BS, BA 1967, Drake U.; MA 1969, PhD 1973, U. of Illinois. (\*)

**BAGLEY, EDGAR SIDNEY**, Prof. Emeritus of Economics (1940). BA 1935, MA 1936, U. of California at Los Angeles; PhD 1950, St. U. of Iowa. (\*)

**BAILEY, GERALD D.**, Prof., Education (1972). BS 1966, MEd 1969, EdD 1972, U. of Nebraska. (\*)

**BAILEY, GWEN**, Project Coord. of Rural Clearing-house (1985). BS 1969, U. of Nebraska; MS 1973, PhD 1985, Kansas St. U.

**BAILIE, WAYNE E.**, Prof. of Bacteriology; Research Bacteriologist (1972). BS 1957, DVM 1957, PhD 1969, Kansas St. U.; Diplomate 1980, American Col. of Vet. Microbiologists. (\*)

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**BAKER, LYMAN A., JR.**, Instr. of English (1972). BA 1964, U. of Missouri; MA 1968, Stanford U.

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**BALDING, JAMES L.**, Prof. Emeritus of Grain Science and Industry; Extension Specialist, Formula Feeds Manufacturing (1965). BS 1960, MS 1971, Kansas St. U.

**BALK, DAVID E.**, Assoc. Prof. of Human Dev. and Family Studies (1987). BA 1965, Immaculate Conception Seminary; MA 1970, Marquette U.; PhD 1981, U. of Illinois. (\*)

**BALL, HERBERT DEAN**, Prof. Emeritus of Mechanical Engineering (1958). BS 1952, MS 1958, U. of Nebraska; PhD 1972, Kansas St. U. (\*)

**BALLOU, DAN**, Asst. Sports Information Dir. (1991).

**BALLOU, RUSSELL S.**, Instr.: Motion Picture Producer (1973). BS 1971, Kansas St. U.

**BANBURY, EVANS E.**, Prof. Emeritus, Colby Branch Agr. Exp. Sta. (1946). BS 1940, Kansas St. U.

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K-State  
Undergraduate Catalog  
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