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General Catalog 1988-90

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Kansas State University Bulletin 1988-90

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Glossary and Abbreviations

A/Pass/F: An alternative grading system whereby a course in which a student earning a grade of A 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 for which a student is enrolled in one semester.

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

Advisor: A faculty member who provides information for a student and makes recommendations on courses, requirements, prerequisites, and programs of study. All students are assigned advisors from the department or college in which they are enrolled.

Audit: To attend a class regularly without participating in class work and without receiving credit. A nonrefundable fee of \$1.00 a semester hour is charged if you are not a full-time student. Lab courses may not be audited.

B.A.: Bachelor of arts degree. Courses are selected from a variety of disciplines although concentrations are 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 may be taken but is not required.

Baccalaureate: Refers to the bachelor's degree.

Classification: Level of progress toward a degree. An undergraduate student is classified as a freshman, sophomore, junior, or senior, depending on the number of semester hours completed.

College: An academic unit of the University. Kansas State University is composed of eight colleges and a Graduate School.

Concurrent enrollment: Taking a course at the same time as another. Abbreviation: Conc.

Course: A specific class in any subject.

Credit by examination: Credit received from the University 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 by a student. 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: An alternative grading system whereby the successful completion of a course is recorded as Credit and failure is recorded 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, such as the Department of Statistics or the Department of Agronomy.

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

Dismissal: Students who neglect their academic responsibilities may be dismissed on recommendation of an academic dean.

Double major: Having two programs of academic study, each requiring considerable course work.

Drop/Add: Changing the student's class schedule by adding a course, dropping a course, or both. This must be done through the student's advisor.

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

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

Enrollment: The process of selecting courses and arranging a schedule for the next semester.

Equiv.: Equivalent.

Extracurricular: Activities such as band, debate, and journalism for which students may earn credit toward graduation. Extracurricular activities are counted as electives.

Financial aid: Help for students who lack 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. For the purpose of GPA, an A = 4 points, a B = 3 points, a C = 2 points, a D = 1 point, and an F = 0 points.

Graduate student: A student who has completed a bachelor's degree and has met all the requirements for admission to the Graduate School.

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: Immediately preceding the spring and summer semester, 40 to 75 regular and new or experimental courses are offered between regular semesters and summer session. They usually run for two weeks, and can fulfill degree requirements. Intersession offers the opportunity to explore areas of study which would not be possible during regular semesters.

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

M.A.: Master of arts degree. A post-baccalaureate degree awarded upon completion of about 30 semester hours in the humanities or social sciences. May or may not include research and a thesis, depending on the field of study.

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

Minor: A student's secondary field of academic emphasis.

M.S.: Master of science degree. A post-baccalaureate degree awarded upon completion of about 30 semester hours in the sciences or professions. Research and a thesis are required in most of the sciences.

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

Orientation: Activities and programs designed to help the new student become acquainted with the University.

Ph.D.: Doctor of philosophy degree. A post-baccalaureate degree awarded upon completion of at least three years of full-time specialized study together with a major research contribution to the discipline that demonstrates independence as a scholar and culminates in a formal dissertation.

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

Probation: Probation is an academic warning that a student is in academic difficulty which could lead to dismissal from the University. Undergraduate students may be placed on academic probation for an indefinite period of time by an academic dean if they do not meet the requirements outlined in this catalog under the section called Grades.

Rec.: Recitation. A small section usually taken in conjunction with a lecture. Primarily group discussion of the lecture.

Scholastic honors: Undergraduate students may be designated as summa cum laude, magna cum laude, or cum laude based on the excellence of their KSU academic average.

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

Special student: A student taking courses at KSU but not regularly enrolled in work for 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 in KSU.

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

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

Calendar

Summer Term 1988

June 6, Monday

Summer school enrollment.

June 7, Tuesday

Classes begin; late fee, \$10.00 for subsequent enrollment.

June 8, Wednesday

Program of study due in Graduate School.

June 10, Friday

Last day to enroll without dean's permission. Regular enrollment closes for University staff. End of full refund period for eight-week classes.

June 13, Monday

Start of 75 percent fee refund period for eight-week classes.

June 15, Wednesday

Typed copies of doctors' dissertations with abstracts due in major professor's offices. Approval forms may be obtained in graduate dean's office.

June 17, Friday

Last day to sign up for A/Pass/F grading option in student's dean's office. Last day for applications for July graduation due in deans' offices.

June 20, Monday

Tenth class day; late fee \$25.00 for subsequent enrollment. Start of 50 percent fee refund period for eight-week classes.

June 22, Wednesday

Last day to drop classes without a W being recorded. Dissertation approval forms due in graduate dean's office.

June 24, Friday

Last day to receive a partial fee refund for eight-week classes.

June 30, Thursday

Applications for graduation due in University registrar's office from deans' offices. Last date of doctors' final examinations for summer session. Typed copies of masters' theses and reports with abstracts due in major professor's office. Approval forms may be obtained in graduate dean's office.

July 4, Monday

Independence Day. No classes. University holiday.

July 7, Thursday

Final copies of doctors' dissertations due in graduate dean's office. Nonthesis and masters' approval forms due in graduate dean's office.

July 8, Friday

Last day classes may be dropped before the end of summer school.

July 14, Thursday

Last date for masters' final oral examinations for summer session.

July 19, Tuesday

Final copies of masters' theses and reports due in graduate dean's office.

July 22, Friday

Distribute final grade sheets for all students to faculty.

July 29, Friday

Last day of summer school examinations.

August 1, Monday

Final grade sheets due in registrar's office.

Fall Semester 1988

August 17-19, Wednesday-Friday

Enrollment and fee payment for all students, including testing and orientation.

August 22, Monday

Classes begin; late fee, \$10.00 for enrollment.

August 26, Friday

Last day to add a class without instructor's permission.

September 2, Friday

Last day to enroll without dean's permission.

September 5, Monday

Labor Day. No classes.

September 16, Friday

Last day to sign up for A/Pass/F grading option. Last day for applications for December graduation for undergraduate and graduate students due in deans' offices.

September 19, Monday

Twentieth class day; late fee \$25.00 for subsequent enrollment.

September 23, Friday

Midsemester progress reports due in registrar's office.

September 26, Monday

Last day to drop course without a W being recorded.

September 30, Friday

Last day to withdraw and receive a partial refund. Typed copies of doctors' dissertations, with abstracts, due in major professor's office. Approval forms may be obtained in graduate dean's office.

October 7, Friday

Typed copies of masters' theses and reports, with abstracts, due in major professor's office. Approval forms may be obtained in graduate dean's office.

October 21, Friday

Dissertation approval forms due in graduate dean's office.

October 27, Thursday

Masters' approval forms due in graduate office. Nonthesis, nonreport approval forms due on the same date as thesis and report approval forms.

October 28, Friday

Last day course may be dropped before end of semester. Final date of doctors' final examinations.

November 4, Friday

Final date of masters' final examinations.

November 14–December 2

Early enrollment for spring 1989 classes.

November 15, Tuesday

Final copies of doctors' dissertations due in graduate dean's office.

November 22, Tuesday

10:00 p.m. Thanksgiving student recess begins. Final copies of masters' theses and reports due in graduate dean's office.

November 28, Monday

Classes resume.

December 10, Saturday

Commencement ceremonies.

December 12–16, Monday–Friday

Semester examinations for all students.

December 19, Monday noon

Deadline for grades to registrar's office.

December 27, 1988, Tuesday–January 10, 1989, Tuesday

Winter Intersession 1989.

Spring Semester 1989

January 9–10, Monday–Tuesday

Enrollment and fee payment for all students, including testing and orientation.

January 11, Wednesday

Classes begin; late fee \$10.00 for enrollment.

January 16, Monday

Martin Luther King Day. University holiday.

January 17, Tuesday

Last day to add a class without instructor's permission.

January 20, Friday

Last day to enroll without dean's permission.

February 3, Friday

Last day to sign up for A/Pass/F grading option. Last day for applications for May graduation for undergraduate and graduate students due in deans' offices.

February 8, Wednesday

Twentieth class day; late fee \$25.00 for subsequent enrollment.

February 10, Friday

Midsemester progress reports due in registrar's office.

February 15, Wednesday

Last day to drop courses without a W being recorded.

February 17, Friday

Last day for students to withdraw and receive a partial fee refund.

February 24, Friday

Typed copies of doctors' dissertations, with abstracts, due in major professor's office. Approval forms may be obtained in graduate dean's office.

March 3, Friday

Tentative copies of masters' theses and reports, with abstracts, due in major professor's office.

March 11, Saturday noon

Spring break begins.

March 20, Monday

Classes resume.

March 23, Thursday

Dissertation approval forms due in graduate dean's office.

March 24, Friday

Last day a course may be dropped before end of semester.

March 30, Thursday

Masters' approval forms due in graduate office for masters' candidates. Nonthesis, nonreport approval forms due on the same date as thesis and report approval forms.

March 31, Friday

Final date of doctors' final examinations.

April 6, Thursday

Final date of masters' final examinations.

April 7, Friday

Final copies of doctors' dissertations due in graduate dean's office.

April 10–21, Monday–Friday

Early enrollment for summer 1989 and fall 1989 classes.

April 14, Friday

Final copies of masters' theses and reports due in graduate dean's office.

April 28, Friday

Applications for July graduation (for graduate students only) due in graduate dean's office.

May 4, Thursday

No classes until 6:00 p.m. Deadline for submitting tentative grade sheets for graduating seniors.

May 4–10, Thursday, 6:00 p.m.–Wednesday

Semester examinations for all students.

May 11, Thursday

Deadline for returning grade change sheets.

May 12–13, Friday–Saturday

Commencement ceremonies.

May 15, Monday noon

Deadline for grades to registrar's office.

May 15, Monday–June 2, Friday

Spring Intersession 1989.

Summer Term 1989

June 5, Monday

Summer school enrollment.

June 6, Tuesday

Classes begin; late fee, \$10.00 for subsequent enrollment.

June 7, Wednesday

Program of study due in Graduate School.

June 9, Friday

Last day to enroll without dean's permission. Regular enrollment closes for University staff. End of full refund period for eight-week classes.

June 12, Monday

Start of 75 percent fee refund period for eight-week classes.

June 14, Wednesday

Typed copies of doctors' dissertations with abstracts due in major professor's offices. Approval forms may be obtained in graduate dean's office.

June 16, Friday

Last day to sign up for A/Pass/F grading option in student's dean's office. Last day for undergraduate applications for July graduation due in deans' offices.

June 19, Monday

Tenth class day; late fee \$25.00 for subsequent enrollment. Start of 50 percent fee refund period for eight-week classes.

June 21, Wednesday

Last day to drop classes without a W being recorded. Dissertation approval forms due in graduate dean's office.

June 23, Friday

Last day to receive a partial fee refund for eight-week classes.

June 29, Thursday

Applications for graduation due in University registrar's office from deans' offices. Last date of doctors' final examinations for summer session. Typed copies of masters' theses and reports with abstracts due in major professor's office. Approval forms may be obtained in graduate dean's office.

July 4, Tuesday

Holiday. No classes.

July 6, Thursday

Final copies of doctors' dissertations due in graduate dean's office. Masters' and nonthesis approval forms due in graduate dean's office.

July 7, Friday

Last day classes may be dropped before the end of summer school.

July 13, Thursday

Last date for masters' final oral examinations for summer session.

July 18, Tuesday

Final copies of masters' theses and reports due in graduate dean's office.

July 21, Friday

Distribution of final grade sheets for all students to faculty.

July 28, Friday

Last day of summer school examinations.

July 31, Monday

Final grade sheets due in registrar's office.

Fall Semester 1989

August 23-25, Wednesday-Friday

Enrollment and fee payment for all students, including testing and orientation.

August 28, Monday

Classes begin; late fee, \$10.00 for subsequent enrollment.

September 1, Friday

Last day to add a class without instructor's permission. Last day to withdraw with full refund.

September 4, Monday

Labor Day. No classes.

September 8, Friday

Last day to enroll without dean's permission.

September 22, Friday

Last day to sign up for A/Pass/F grading option in the Enrollment Center, Farrell Library. Last day for applications for December graduation for undergraduate and graduate students due in deans' offices.

September 25, Monday

Twentieth class day; late fee \$25.00 for subsequent enrollment.

September 29, Friday

Midsemester progress reports due in registrar's office.

October 2, Monday

Last day to drop course without a W being recorded.

October 6, Friday

Last day to withdraw and receive a partial refund. Typed copies of doctors' dissertations, with abstracts, due in major professor's office. Approval forms may be obtained in graduate dean's office.

October 13, Friday

Typed copies of masters' theses and reports, with abstracts, due in major professor's office. Approval forms may be obtained in graduate dean's office.

October 27, Friday

Dissertation approval forms due in graduate dean's office.

November 2, Thursday

Masters' approval forms due in graduate office. Nonthesis, nonreport approval forms due on the same date as thesis and report approval forms.

November 3, Friday

Last day course may be dropped before end of semester. Final date of doctors' final examinations.

November 10, Friday

Final date of masters' final examinations.

November 13-December 1

Early enrollment for spring 1990 classes.

November 14, Tuesday

Final copies of doctors' dissertations due in graduate dean's office.

November 21, Tuesday

10:00 p.m. Thanksgiving student recess begins. Final copies of masters' theses and reports due in graduate dean's office.

November 27, Monday

Classes resume.

December 16, Saturday

Commencement ceremonies.

December 18-22, Monday-Friday

Semester examinations for all students.

December 26, Tuesday noon

Deadline for grades to registrar's office.

Spring Semester 1990

January 2, Tuesday-January 17,**Wednesday**

Winter Intersession 1990.

January 15, Monday

Martin Luther King Day. University holiday.

January 16-17, Tuesday-Wednesday

Enrollment and fee payment for all students, including testing and orientation.

January 18, Thursday

Classes begin; late fee, \$10.00 for subsequent enrollment.

January 24, Wednesday

Last day to add a class without instructor's permission.

January 26, Friday

Last day to enroll without dean's permission.

February 9, Friday

Last day to sign up for A/Pass/F grading option. Last day for applications for May graduation for undergraduate and graduate students due in deans' offices.

February 14, Wednesday

Twentieth class day; late fee \$25.00 for subsequent enrollment.

February 16, Friday

Midsemester progress reports due in registrar's office.

February 21, Wednesday

Last day to drop course without a W being recorded.

February 23, Friday

Last day for students to withdraw and receive a partial fee refund.

March 2, Friday

Typed copies of doctors' dissertations, with abstracts, due in major professor's office. Approval forms may be obtained in graduate dean's office.

March 9, Friday

Tentative copies of masters' theses and reports, with abstracts, due in major professor's office.

March 10, Saturday noon

Spring break begins.

March 19, Monday

Classes resume.

March 29, Thursday

Dissertation approval forms due in graduate dean's office.

March 30, Friday

Last day a course may be dropped before end of semester.

April 5, Thursday

Masters' approval forms due in graduate office for masters' candidates. Nonthesis, nonreport approval forms due on the same date as thesis and report approval forms.

April 6, Friday

Final date of doctors' final examinations.

April 12, Thursday

Final date of masters' final examinations.

April 13, Friday

Final copies of doctors' dissertations due in graduate dean's office.

April 16-27, Monday-Friday

Early enrollment for summer and fall 1990 classes.

April 20, Friday

Final copies of masters' theses and reports due in graduate dean's office.

May 10, Thursday

No classes until 6:00 p.m. Deadline for submitting tentative grade sheets for graduating seniors.

**May 10-16, Thursday, 6:00 p.m.-
Wednesday**
Semester examinations for all students.

May 17, Thursday
Deadline for returning grade change sheets.

May 18-19, Friday-Saturday
Commencement ceremonies.

May 21, Monday noon
Deadline for grades to registrar's office.

May 21, Monday-June 1, Friday
Spring Intersession 1990.

Summer Term 1990

June 4, Monday
Summer school enrollment.

June 5, Tuesday
Classes begin; late fee, \$10.00 for subsequent enrollment.

June 6, Wednesday
Program of study due in Graduate School.

June 8, Friday
Last day to enroll without dean's permission. Regular enrollment closes for University staff. End of full refund period for eight-week classes.

June 11, Monday
Start of 75 percent fee refund period for eight-week classes.

June 13, Wednesday
Typed copies of doctors' dissertations with abstracts due in major professor's offices. Approval forms may be obtained in graduate dean's office.

June 15, Friday
Last day to sign up for A/Pass/F grading option in student's dean's office. Last day for undergraduate applications for July graduation due in deans' offices.

June 18, Monday
Tenth class day; late fee \$25.00 for subsequent enrollment. Start of 50 percent fee refund period for eight-week classes.

June 20, Wednesday
Last day to drop classes without a W being recorded. Dissertation approval forms due in graduate dean's office.

June 22, Friday
Last day to receive a partial fee refund for eight-week classes.

June 28, Thursday
Applications for graduation due in University registrar's office from deans' offices. Last date of doctors' final examinations for summer session. Typed copies of masters' theses and reports with abstracts due in major professor's office. Approval forms may be obtained in graduate dean's office.

July 4, Wednesday
Independence Day. No classes. University holiday.

July 5, Thursday
Final copies of doctors' dissertations due in graduate dean's office. Master's and nonthesis approval forms due in graduate dean's office.

July 6, Friday
Last day classes may be dropped before the end of summer school.

July 12, Thursday
Last date for masters' final oral examinations for summer session.

July 17, Tuesday
Final copies of masters' theses and reports due in graduate dean's office.

July 20, Friday
Distribution of final grade sheets for all students to faculty.

July 27, Friday
Last day of summer school examinations.

July 30, Monday
Final grade sheets due in registrar's office.

Fall Semester 1990

August 22-24, Wednesday-Friday
Enrollment and fee payment for all students, including testing and orientation.

August 27, Monday
Classes begin; late fee, \$10.00 for subsequent enrollment.

August 31, Friday
Last day to add a class without instructor's permission.

September 3, Monday
Labor Day. No classes.

September 7, Friday
Last day to enroll without dean's permission.

September 21, Friday
Last day to sign up for A/Pass/F grading option. Last day for applications for December graduation for undergraduate and graduate students due in deans' offices.

September 24, Monday
Twentieth class day; late fee \$25.00 for subsequent enrollment.

September 28, Friday
Midsemester progress reports due in registrar's office.

October 1, Monday
Last day to drop course without a W being recorded.

October 5, Friday
Last day to withdraw and receive a partial refund. Typed copies of doctors' dissertations, with abstracts, due in major profes-

sor's office. Approval forms may be obtained in graduate dean's office.

October 12, Friday
Typed copies of masters' theses and reports, with abstracts, due in major professor's office. Approval forms may be obtained in graduate dean's office.

October 26, Friday
Dissertation approval forms due in graduate dean's office.

November 1, Thursday
Masters' approval forms due in graduate office. Nonthesis, nonreport approval forms due on the same date as thesis and report approval forms.

November 2, Friday
Last day course may be dropped before end of semester. Final date of doctors' final examinations.

November 9, Friday
Final date of masters' final examinations.

November 20, Tuesday
10:00 p.m. Thanksgiving student recess begins. Final copies of masters' theses and reports and doctor's dissertations due in graduate dean's office.

November 26, Monday
Classes resume.

November 26-December 7
Early enrollment for spring 1991 classes.

December 15, Saturday
Commencement ceremonies.

December 17-21, Monday-Friday
Semester examinations for all students.

December 24, Monday noon
Deadline for grades to registrar's office.

Spring Semester 1991

January 2, Wednesday-January 15, Tuesday
Winter Intersession 1991.

January 14-15, Monday-Tuesday
Enrollment and fee payment for all students, including testing and orientation.

January 16, Wednesday
Classes begin; late fee \$10.00 for subsequent enrollment.

January 21, Monday
Martin Luther King Day. University holiday.

January 22, Tuesday
Last day to add a class without instructor's permission.

January 25, Friday
Last day to enroll without dean's permission.

February 8, Friday

Last day to sign up for A/Pass/F grading option. Last day for applications for May graduation for undergraduate and graduate students due in deans' offices.

February 13, Wednesday

Twentieth class day; late fee \$25.00 for subsequent enrollment.

February 15, Friday

Midsemester progress reports due in registrar's office.

February 20, Wednesday

Last day to drop courses without a W being recorded.

February 22, Friday

Last day for students to withdraw and receive a partial fee refund.

March 1, Friday

Typed copies of doctors' dissertations, with abstracts, due in major professor's office. Approval forms may be obtained in graduate dean's office.

March 8, Friday

Tentative copies of masters' theses and reports, with abstracts, due in major professor's office. Approval forms may be obtained in graduate dean's office.

March 9, Saturday noon

Spring break begins.

March 18, Monday

Classes resume.

March 28, Thursday

Dissertation approval forms due in graduate dean's office.

March 29, Friday

Last day a course may be dropped before end of semester.

April 4, Thursday

Masters' approval forms due in graduate office for masters' candidates. Nonthesis, nonreport approval forms due on the same date as thesis and report approval forms.

April 5, Friday

Final date of doctors' final examinations.

April 11, Thursday

Final date of masters' final examinations.

April 12, Friday

Final copies of doctors' dissertations due in graduate dean's office.

April 15-26, Monday-Friday

Early enrollment for summer and fall 1991 classes.

April 19, Friday

Final copies of masters' theses and reports due in graduate dean's office.

May 9, Thursday

No classes until 6:00 p.m. Deadline for submitting tentative grade sheets for graduating seniors.

May 9-15, Thursday, 6:00 p.m.-**Wednesday**

Semester examinations for all students.

May 16, Thursday

Deadline for returning tentative grade change sheets.

May 17-18, Friday-Saturday

Commencement ceremonies.

May 20, Monday noon

Deadline for grades to registrar's office.

May 20, Monday-May 31, Friday

Spring Intersession 1991.

Summer Term 1991

June 3, Monday

Summer school enrollment.

June 4, Tuesday

Classes begin; late fee, \$10.00 for subsequent enrollment.

June 5, Wednesday

Program of study due in Graduate School.

June 7, Friday

Last day to enroll without dean's permission. Regular enrollment closes for University staff. End of full refund period for eight-week classes.

June 10, Monday

Start of 75 percent fee refund period for eight-week classes.

June 12, Wednesday

Typed copies of doctors' dissertations with abstracts due in major professor's offices. Approval forms may be obtained in graduate dean's office.

June 14, Friday

Last day to sign up for A/Pass/F grading option in student's dean's office. Last day for undergraduate applications for July graduation due in deans' offices.

June 17, Monday

Tenth class day; late fee \$25.00 for subsequent enrollment. Start of 50 percent fee refund period for eight-week classes.

June 19, Wednesday

Last day to drop classes without a W being recorded. Dissertation approval forms due in graduate dean's office.

June 21, Friday

Last day to receive a partial fee refund for eight-week classes.

June 27, Thursday

Applications for graduation due in University registrar's office from deans' offices. Last date of doctors' final examinations for summer session. Typed copies of masters' theses and reports with abstracts due in major professor's office. Approval forms may be obtained in graduate dean's office.

July 3, Wednesday

Final copies of doctors' dissertations due in graduate dean's office. Master's and nonthesis approval forms due in graduate dean's office.

July 4, Thursday

Independence Day. No classes. University holiday.

July 5, Friday

Last day classes may be dropped before the end of summer school.

July 11, Thursday

Last date for masters' final oral examinations for summer session.

July 16, Tuesday

Final copies of masters' theses and reports due in graduate dean's office.

July 19, Friday

Distribution of final grade sheets for all students to faculty.

July 26, Friday

Last day of summer school examinations.

July 29, Monday

Final grade sheets due in registrar's office.

The Catalog

The General Catalog

The *KSU General Catalog* is a reference for those interested in academic policies, procedures, and programs of the University. Check 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.

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

Sample course description

ENGL 525. Women in Literature. (3) I, II, S. Literary works, chiefly fiction, by or about women. Considers important writers since 1800 and significant themes in literature about women. Pr.: ENGL 120 or 125. ENGL-525-0-1502

Course number

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

The three digits of the course number **525** represent the level of the course.

Level numbers:

- 000-099 Not applicable toward degree requirements.
- 100-299 Lower division undergraduate. Designed as freshman-sophomore courses.
- 300-499 Upper division undergraduate. Designed as junior-senior courses.
- 500-699 Upper division undergraduate. Primarily for juniors and seniors, but also may be taken for graduate credit. Courses numbered 500 may be taken for graduate credit only in a minor field. Courses 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 masters' courses and professional courses beyond the undergraduate level.
- 900-999 Graduate level, primarily for doctoral candidates.

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

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 525. Some courses may allow or require concurrent enrollment in other courses. This is indicated by the abbreviation **Conc.**

Faculty lists key

Each academic department at Kansas State University is described in this catalog. In those departmental sections, faculty members are listed by their last names. Faculty members who are on the graduate faculty have an asterisk following their names. The year of the faculty member's first appointment to Kansas State University is given in parentheses. An all-inclusive University faculty and administration list precedes the index.

Other publications

Publications concerning a number of topics are available on request. Contact the offices indicated below for additional information. See also scholarly and professional publications under Research, Extension, and Outreach.

Office of Admissions

119 Anderson Hall, 532-6250

K-State Viewbook: an introduction to Kansas State University, including photographs and application information and forms.

Study Guides: brief descriptions of curricula and career opportunities in many fields. Order form is available on request.

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

After Hours Course Bulletin: information and course descriptions for classes starting after 4:00 p.m. on campus during fall and spring semesters. Available in December and July.

Campus tours: available on request.

New Student Programs

112 Anderson Hall, 532-6318

Your First Year: a handbook for new students.

K-State News: for parents of KSU students.

Office of Student Financial Assistance

104 Fairchild Hall, 532-6420

Financial Aid Information: an introduction to financial aid at Kansas State University.

Financial Aid Instructions: information concerning application and award procedures.

List of scholarships available.

Housing Office

Pittman Building, 532-6453

Housing: opportunities and procedures for obtaining housing on and off campus and during summer school.

University Publications

5 Anderson Hall, 532-6419

Campus Map

In addition to these publications, many of the colleges and departments have printed material concerning programs and curricula. Contact individual departments for specific information.

The University

Kansas State University

The University, comprising nine colleges, 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 sections. Most buildings are constructed of native limestone.

Manhattan is situated in the rolling Flint Hills of northeast Kansas, 125 miles west of Kansas City via Interstate Highway 70. Five miles north of the city is Tuttle Creek Reservoir, one of the largest in the Midwest.

Off-campus experimental work in agriculture and other fields of study is accomplished through the Kansas Agricultural Experiment Station and its four branch stations—at Hays, Garden City, Colby, and Parsons. University-owned and -leased land at the station sites and 11 experimental fields exceeds 18,000 acres.

Educational work in agriculture, home economics, 4-H, and community development is conducted throughout Kansas in cooperation with 105 County Extension Councils legally established for this purpose.

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 KSU is transferable to other institutions.

The faculty

The faculty at Kansas State University is dedicated to excellence in teaching, student advising, research, extension education, scholarly achievement, and creative endeavor. In the fall of 1985, more than three-fourths of the full-time faculty members held the highest degrees awarded in their academic fields.

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

The faculty at KSU also is committed to public and professional service. Many are elected or appointed each year to positions of leadership in state, national, and international professional and service organizations.

Office of the Vice President for Institutional Advancement

Robert S. Krause, Vice President
Pat J. Bosco, Associate Vice President and
Dean of Student Life
John T. Fairman, Assistant Vice President
for University Relations
Michael L. Lynch, Assistant Vice President
for Personal Development Programs
Veryl Switzer, Assistant Vice President for
Special Services
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 on-going activities with the KSU Foundation, KSU Alumni Association, and KSU Athletic Department, and external relations with such groups as governmental agencies, the Board of Regents, and other constituents of the University. This position reports directly to the president and serves as chief spokesperson for the University.

Admission

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

Undergraduate students interested in attending Kansas State University should write to the Office of Admissions for an application form. The student should complete the form and return it to the Office of Admissions. All correspondence about admission should be addressed to this office.

Admissions advising

The admissions office is open weekdays from 8:00 a.m. to 5:00 p.m. for admissions advising. Campus offices are closed Saturdays and Sundays.

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

The admissions office is in the center of the main administration building, Anderson Hall.

Several types of campus tours are available by appointment to individuals and groups. Tours can be scheduled at 11:00 a.m., 1:00 p.m., and 3:30 p.m. Monday through Friday. Please call the Office of Admis-

sions, (913) 532-6250, for more information.

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.

No academically qualified applicant will be denied admission to the University on the basis of race, color, sex, religion, handicap, age, or national origin.

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

High school prerequisites

Entering freshmen should have completed the high school mathematics courses which are a necessary prerequisite for their curriculum as listed below. The capital letters correspond to the section on undergraduate degrees later in this catalog.

- (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) Two units of algebra or one unit of algebra and one unit of geometry, or approved substitute for home economics
- (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

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

- Four units of English
- Three units of mathematics
- Three units of social studies
- Three units of natural sciences
- Two units of foreign languages

It is further recommended that each of these academic areas consist of the following:

English

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

Mathematics

Two units of algebra and the remaining unit consisting of one-half unit of geometry

and one-half unit of trigonometry with the objective of preparing students for entry-level calculus.

Social studies

One unit of American history, one-half unit of government, one-half unit of economics, and one additional social science course.

Natural sciences

Any combination of two of the three natural sciences (biology, chemistry, physics) which adds to three units or one unit each of biology, chemistry, and physics.

Foreign languages

Two units of one foreign language or one unit each 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 KSU. Information about institutions previously attended 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 the appropriate school to the KSU Office of Admissions. 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 one-half of the hours required for a KSU degree can be taken at a two-year college.

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

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.

University regulations require 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 international students.

In most cases, international applicants seeking admission to Kansas State University must meet the same academic standards for admission as those required of native 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 also 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 United States high school.
3. Have completed fewer than two years (60 semester hours) of training in an accredited United States 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.

Students studying in the United States must submit required admissions materials and credentials to the Office of Admissions at least three months prior to the beginning of the semester for which application is being made. Students outside the United States must submit admissions material at least six months in advance.

All appropriate immigration standards and requirements must be met.

Awarding of advanced standing credit to international students

International students are admitted to the freshmen level at Kansas State University with no award of credit for previous academic work. It is possible to receive academic credit by validation for comparable courses successfully completed in the student's home country. 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. 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 KSU 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.

2. Credit is granted based upon recommendation by recognized academic publications, primarily the *World Education Series* of American Association of Collegiate Registrars and Admissions Officers.

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.

All undergraduate students (including transfer students) whose primary language is not English are required to take the Written Proficiency Test and the Spoken Proficiency Test prior to enrollment. These tests are conducted during the registration period at the beginning of each semester. 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. Students who do not pass the proficiency tests are recommended to enroll in and satisfactorily complete English and speech courses.

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 enroll for credit in undergraduate courses as students in special status. International students do not qualify for this option.

Students applying for this non-degree status need only submit an application for admissions. Test scores and transcripts may not be required. However, students must provide an indication of their ability to successfully complete college-level study as determined by admissions officers.

Those admitted as non-degree 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 several 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.

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.

Non-degree students are subject to regulations for regular students, and are responsible for payment of all fees, regular attendance at classes, and maintenance of satisfactory standing.

American College Test (ACT)

Freshman applicants to KSU are required to take the ACT and 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 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 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.

Credit by examination

Many opportunities exist at Kansas State University to earn college credit by examination. KSU participates in the College Level Examination Program (CLEP), Proficiency Examination (PEP), DANTES, and U.S. Advanced Placement Testing Program. Local examinations (quiz outs) also are given in many course areas by individual departments within the University. See following sections for more information about departmental exams.

Details concerning testing opportunities at KSU are available on request from the Office of Admissions, 119 Anderson Hall, Manhattan, Kansas 66506. Also see the catalog section on the Academic Assistance Center (204 Holton Hall).

Enrollment

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

New student enrollment for the fall semester takes place in early summer. Admitted students are scheduled on specific days during this period. New students also may enroll during the August enrollment period.

Academic advising

All new students are assigned academic advisors at the beginning of the school year. These advisors are available any time students need help. Academic advisors assist students in defining goals to be reached in college; give information regarding curricula, courses, career, and graduate school; and discuss personal problems students may have, especially problems related to the student's progress and plans for subsequent work.

In order to assist academic advisors, students are expected to complete the ACT Assessment Program before enrolling and to participate in pre-enrollment/orientation programs. In addition, students are expected to schedule appointments with their academic advisors before pre-enrollment and at other times as needed throughout the semester. Students must inform their advisor of any special needs or deficiencies which might affect course performance or placement, or threaten 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 further encouraged to seek assistance as needed from the academic and student support services provided by the University.

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 office of the dean of arts and sciences as early as possible in their undergraduate careers. Also see catalog information on pre-law studies in the Colleges of Engineering and Human Ecology, and the Departments of Political Science and Philosophy.

Medical history

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

Extension and correspondence credit

College-level credit earned through accredited extension divisions may be applied toward credit requirements for a degree at KSU. The credit must be applicable to the curriculum chosen and the amount of such credit which can be used is limited. For example, in the College of Arts and Sciences a maximum of 30 semester hours of acceptable correspondence and/or extension work may be applied toward a degree.

Credit by departmental examination

Any student who is enrolled at KSU is eligible to gain undergraduate credit by 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. A departmental examination may be given only to a student who has enrolled at KSU, and credit earned 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 credit will be treated as resident credit and such graded work will receive grade points to be computed in the student's GPA. Nongraded credit by examination shall be treated as graded hours in implementing A/Pass/F policy.

Military training

Reserve Officer Training is offered by both the Air Force and Army. Students may enter the program during their freshman or sophomore years. Students with two or more years remaining, including graduate work, may qualify for the ROTC two-year program. Junior and senior students who qualify for the advanced ROTC program are paid \$100 per month subsistence. Advanced ROTC includes summer training at a military base. Successful completion of the advanced program and a University degree earn the student a commission as a second lieutenant.

Scholarships are awarded on a competitive basis to entering freshmen, sophomores, and juniors. ROTC scholarships pay

University tuition, lab fees, and books, plus a monthly subsistence of \$100.

Academic credit may be applied to requirements for a degree. The Colleges of Engineering and Architecture and Design recognize four hours toward their degree requirements. The other colleges recognize 16 hours of the four-year ROTC program.

Military evaluation for credit

An evaluation of military training and experience is conducted in the Office of Admissions for a fee of \$25. A student must be currently enrolled in order to be awarded credit resulting from a military evaluation.

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 insofar as these recommendations apply to a student's degree program.

Military correspondence courses and courses which last less than two weeks are not recognized for college level credit. Active military personnel may have their current, primary MOS evaluated provided it has been validated by an SQT score or performance evaluation within the last 12 months.

Credits resulting from military evaluations granted by other institutions are not transferable to K-State. 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 in lieu of credit for physical education.

The grade of CR, or credit, is assigned to all awarded credit.

Assignment to classes

Students are responsible for fulfilling all requirements of the curriculum in which they are enrolled. They should consult with their advisors or deans in planning their work. Students should be familiar with *General Catalog* statements about assignments and curricula, because the catalog is the official source of information.

Catalogs are given to new students and are maintained for student use in the Office of Admissions, all deans' offices, the library, and all departmental offices. Catalogs may also be purchased at the K-State Union Bookstore.

No student is officially enrolled in classes 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.**

Registration and assignment of courses take place as shown on the calendar earlier in this catalog. Later assignments to

courses are made during regular office hours by the student's dean or advisor. A student may not enroll later than 10 class days after the beginning of a semester (five days for summer session) except by permission of the dean. Students should enroll during regularly scheduled registration periods in order to avoid penalty fees.

An undergraduate student may not enroll for more than 19 Kansas State University 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 or a college or department in which the student is enrolled requires that more than 19 KSU credit hours be taken during a semester, this section does not apply.

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 six credit hours in fall and spring semesters or three credit hours during the summer session.

A student who has paid full fees on campus and who wishes to take a course through the Division of Continuing Education may receive a continuing education fee waiver except in cases of self-supporting courses (e.g., intersession or non-base). The fee waiver form requires the University registrar's confirmation that full fees were paid, 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.

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 prior to the 20th day of class pay a late enrollment fee of \$10.00. However, anyone enrolling after the 20th day of class must pay a \$25.00 late enrollment fee.

Dropping and adding courses

No student may drop a course or change an assignment except by a formal reassignment by the dean or dean's representative.

If an instructor recommends a reassignment, a student should confer with the advisor.

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.

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/her intent to take the course. For purposes of this procedure enrollment in and payment of fees for a course **does not** constitute sufficient 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.

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

Retake policy

Undergraduate students may retake courses in order to improve the grade. If a course is retaken, the original grade is lined out and removed from the grade point average and a retake notice is inserted. Retakes can be accomplished only by re-enrolling in and completing a KSU 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 Kansas 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 shall not affect the credits or the GPA applied to that degree.

A/Pass/F policy

Undergraduate students, except first-semester freshmen and students on probation, may enroll in certain courses for which they have the normal prerequisites under the A/Pass/F option. Under the A/Pass/F option, students 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 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, especially those without a declared major, should be very 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. Students may enroll under the A/Pass/F option for any free elective course offered under this option, that is, in any course which is in no way whatsoever specified even in general terms in the student's curriculum. Courses which are specified by name or number and courses which meet general distribution requirements are not considered free electives.
2. Students 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). General distribution requirements consist of those courses which are listed by areas, for example, three courses in the humanities.
3. Students may not enroll under the A/Pass/F option in any course which is required by name or number as part of their degree programs.

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

Undergraduate students may submit Pass hours for graduation requirements up to and not exceeding 1/6 of the total number of hours required for a bachelor's degree. That is, 5/6 of all hours submitted for the bachelor's degree must be hours submitted on a graded or credit basis.

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 semester. 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.

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 which are normally given for a grade, the designation Credit may be obtained in the case of credit by examination. (See Credit by Departmental Examination earlier in this section.)

At the discretion of the graduate faculty member involved, courses in research numbered 898 (report), 899 (thesis), and 999 (dissertation) may be offered on a letter grade (A, B, C, D, F, Inc., or W) or Credit/No Credit basis. Letter grades are not given for any other such Credit/No Credit courses.

Class attendance

Class attendance policies shall 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 dean.

If a student withdraws during the first 25 days of the semester, no mark will be recorded. Thereafter, a mark of W is recorded. A student may not withdraw after the end of the 10th week of the semester.

Students who find it necessary to withdraw from the University for verifiable nonacademic reasons after the 10th week should consult the office of their academic dean.

Auditing classes

Auditing is attending a class regularly, without participating in class work or receiving credit. Cost is the regular per-hour tuition. 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 and activity courses may not be audited. Audits are not recorded on the permanent record. Students should not enroll in courses they plan to audit. Students 60 years or older may audit on a no-fee, space-available basis.

Dead week

The week before the final examination period (known as dead week) is set aside as a period of curtailed social activity. Examinations covering only the latter portion of course work may be given during regularly scheduled class periods of dead week, or during examination week at the times specified by the University assignment and scheduling committee. Comprehensive examinations for laboratory or studio courses may be scheduled during a regular class period in the week immediately preceding the final examinations period.

Dead day

In fall semesters there is a weekend between the end of regularly scheduled classes and the beginning of final examinations. In spring semesters a single day, called dead day, is allowed between the end of classes and the beginning of final exams. Dead day ends at 4:00 p.m. Normally classes end on Wednesday, dead day is Thursday, and exams begin on Thursday at 6:00 p.m.

Fees

Warren Strauss, 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 session.

Payment of fees. Students must pay the total amount of their semester or summer session 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 registration fees are assessed those who register or pay their fees after the regular registration period.

Students enrolled on a per-credit-hour basis or changing from six or fewer to seven or more credit hours will be assessed for all hours in which 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 KSU 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.

Returned checks. Checks accepted for fee payment which are returned uncollectible by financial institutions will be subject to a \$10.00 charge, in addition to all other fees.

Withholding student records. When necessary, the University withholds students' academic records for nonpayment of fees, loans, and other appropriate charges and for nonreturn of University property.

Incidental fee. This fee is the student's contribution toward the costs of instruction and covers approximately twenty to twenty-five percent of the instructional costs.

Student services support fee. This fee is used to finance adaptation and equipping of Holton Hall for improved delivery of student services programs.

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

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

Student fee revenue bonds. This fee is used to retire the refunding bonds, Series 1985 and the 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.

Recreational Building program. This fee is used for the administration, support, and operation of the student Recreational Building programs.

Activity fee. This fee is used for numerous student functions which include a broad range of student interests and activities. Those enrolling in six credit hours or fewer do not pay a full activities fee and thus are not entitled to student ticket rates for certain activities.

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

Student publications fee. This fee is used to support the *Collegian* and *Royal Purple*.

Recreational Services fee. This fee is used to support the Chester E. Peters Complex (equipment, interior upkeep, supplies, etc.).

KSDB-FM fee. This fee is used to support the student radio station (equipment, means of service to operate the station, recent upgrade of power wattage, etc.).

Fees for fall or spring semesters

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.

For seven or more semester credit hours:

Fees	Resident	Non-resident
Incidental fee (based on classification, not courses):		
Undergraduate	\$550.00	\$1,765.00
Graduate	670.00	1,885.00
Veterinary Medicine	1,275.00	3,825.00
Special fees:		
Student Services Support	3.00	3.00
Student Health	60.00***	60.00***
K-State Union Repair and Replacement	1.25	1.25
Student Fee Revenue Bonds† (Refunding Bonds: \$22.25; Coliseum Bonds: \$8.25)	30.50	30.50
Recreational Building Program	3.00	3.00
Activity Fee	7.75**	7.75**
K-State Union	17.00**	17.00**
Student Publications	4.80**	4.80**
Recreational Services	2.50**	2.50**
KSDB-FM	.85**	.85**
Total Undergraduate	680.65	1,895.65
Total Graduate	800.65	2,015.65
Total Veterinary Medicine	1,405.65	3,955.65

For six or fewer semester credit hours:

Fees	Resident	Non-resident
Incidental fee (based on classification, not courses):		
Undergraduate per credit hour	\$ 37.00	\$118.00
Graduate per credit hour	45.00	126.00
Veterinary Medicine per credit hour	85.00	255.00
Special fees:		
Student Services Support total fee	1.00	1.00
Student Health total fee	60.00****	60.00****
K-State Union Repair and Replacement total fee	.80	.80
Student Fee Revenue Bonds† total fee (Refunding Bonds: \$12.50; Coliseum Bonds: \$3.75)	16.25	16.25
Recreational Building Program total fee	1.00	1.00
Activity Fee total fee	4.45****	4.45****
K-State Union total fee	8.50	8.50
Student Publications total fee	2.40	2.40
Recreational Services total fee	.75	.75
KSDB-FM total fee	.50	.50

*Students enrolled in a spring semester and pre-enrolled for the next fall semester but not attending summer school may use student health center services during the summer by paying a \$15 fee before the first day of summer school classes. The fee will be \$20 after the start of classes for such students, payable during their first visit to the health center. Students who have paid the health fee may elect to have their spouses covered if they pay, within 10 days of their health fee payment, a spouse fee of \$60 for a semester, or \$15 or \$20 (as appropriate) for a summer session.

**Students paying the full incidental fee who will be at off-campus locations during an entire semester and will reside outside of a 30-mile radius of Manhattan during that semester may elect to be exempted from the student health fee, the activity fee, the K-State Union fee, the student publications fee, the recreational services fee, and the KSDB-FM fee.

For employees defined as eligible for resident fees:

Incidental fee (based on classification, not courses):			
Undergraduate	per credit hour	\$	37.00
Graduate	per credit hour		45.00
Veterinary Medicine	per credit hour		85.00

Special fees:

A. If enrolled in seven or more credit hours:			
Student Services Support	total fee		3.00
Student Health	total fee		60.00*
Union Repair and Replacement	total fee		1.25
Student Fee Revenue Bonds† (Refunding Bonds: \$22.25; Coliseum Bonds: \$8.25)	total fee		30.50
Recreational Building Program	total fee		3.00
Activity Fee	total fee		7.75
K-State Union	total fee		17.00
Student Publications	total fee		4.80
Recreational Services	total fee		2.50
KSDB-FM	total fee		.85
B. If enrolled in six or fewer semester credit hours:			
Student Services Support	total fee		1.00
Student Health	total fee		60.00****
K-State Union Repair and Replacement	total fee		.80
Student Fee Revenue Bonds† (Refunding Bonds: \$12.50; Coliseum Bonds: \$3.75)	total fee		16.25
Recreational Building Program	total fee		1.00
Activity Fee	total fee		4.45****
K-State Union	total fee		8.50
Student Publications	total fee		2.40
Recreational Services	total fee		.75
KSDB-FM	total fee		.50

***Students who initially enroll and continue to be enrolled in six or fewer credit hours for a fall or spring semester may elect to be exempt from the student health fee and thereby not be eligible for student health center services except on a fee-per-visit basis. The exception is international students, who must pay the health fee.

****Not a full activity fee and does not entitle student to student ticket rates for certain activities such as athletic events.

†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 bonds.

Fees for summer sessions

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 summer session.

Fees		Resident	Non-resident
Incidental fee (based on classification, not courses):			
Undergraduate	per credit hour	37.00	118.00
Graduate	per credit hour	45.00	126.00
Veterinary Medicine	per credit hour	85.00	255.00
Special fees	per credit hour	10.45	10.45*

*The summer session special fees are assessed only on the first six credit hours for each summer session, and are not applicable to students enrolled in formally organized classes actually conducted at off-campus locations. Includes student services support, student health, student fee revenue bonds, recreational building program, activity, K-State Union, student publications, recreational services, and KSDB-FM.

Persons eligible for resident fees

1. Residents. Usually includes adults who have been residents of Kansas for 12 months or more before registering for any semester or session 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 of 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 sessions

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 session.

(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 Kansas State University.

3. Military. Military personnel stationed and living in Kansas and military personnel assigned to Kansas State University as full-time students.

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:

B.S., M.S., and Ph.D. in bakery science and management

B.S., M.S., and Ph.D. in feed science and management

B.S. in horticulture therapy

B.S., M.S., and Ph.D. in milling science and management

This privilege is granted in exchange for resident fees for Kansas students who enroll in certain programs at the University of Missouri.

Other fees and refund policy

Private music lessons. University students enrolled in a degree program with a major in music, music education, applied music, or music theatre option are exempt from fees for private music lessons. Fees for all others, payable in advance, are as follows

(subject to the availability of staff and facilities).

Two 30-minute lessons a week	
semester	\$75.00
summer session	37.50
One 30-minute lesson a week	
semester	45.00
summer session	22.50
Single lessons, per lesson	7.50
Practice Piano	
semester, one hour daily	9.00
summer session, two hours daily	9.00
Practice Organ	
two manual	
semester, one hour daily	18.00
summer session, two hours daily	18.00
three manual	
semester, one hour daily	37.50
summer session, two hours daily	37.50

Field fee. The fee for the summer geology or archaeology field camp is \$300, which is the additional amount required from all students enrolled in this course for their transportation and lodging for the field camp.

Refund policy. The following table applies to students who completely withdraw from a semester, summer session, field geology, or private music lesson and to the reduction, if any, in fees for students who reduce their enrollments. However, students who drop from full- to part-time fee status during a fall or spring semester will be given the option of receiving no refund of the student health fee and thereby remaining eligible to receive student health center services through the remainder of the semester, or of forfeiting student health center services for the remainder of the semester and receiving a refund of the student health fee based on the time of the reduction in enrollment and the fee refund policy. The activity fee is refunded only if the student fee receipt is returned. 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 the student pays.

Time of withdrawal	Regular semesters	Summer sessions	
		8 weeks	Less than 8 weeks
Before second class meeting	not applicable		100%
On or before the first Friday of classes	100%	100%	no refund
On or before the second Friday of classes	90%	75%	no refund
On or before the third Friday of classes	80%	50%	no refund
On or before the fourth Friday of classes	70%	no refund	no refund
On or before the fifth Friday of classes	60%	no refund	no refund
On or before the sixth Friday of classes	50%	no refund	no refund
After the sixth Friday of classes	no refund	no refund	no refund

Late registration or fee payment (not subject to refund):

After regular registration through 20th day of classes	\$10.00
After 20th day of classes	\$25.00

Exceptions. The \$10 fee begins: after last regular evening registration if registering for evening classes only, after starting date for late starting classes, and after the first Friday of classes for faculty, staff, and public school teachers. When registering by mail or exclusively for research, seminar, or field study, the \$10 fee begins 15 calendar days and the \$25 fee begins 30 calendar days after notification of amount due. For summer sessions the fee increases from \$10 to \$25 after the 10th day of classes. Late fees do not apply to corrections of fee assessments.

Application for admission processing fees

(not subject to refund). The Graduate School does not charge application fees. However, some departments and/or colleges do, and will supply information on application fees for U.S. and international students.

Pre-professional skills test fee (not subject to refund). Administrative fee for each person taking the Pre-Professional Skills Test, Teacher Education Program, College of Education is \$35.00.

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 Kansas State University faculty is \$12.50.

Auditing fee. Auditing is permitted on a space-available basis which 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 continuing education courses. Fees are the same per hour as fees for undergraduate or graduate credit. Students 60 years of age or older may audit on a no-fee, space-available basis.

Student identification card. A fee for the original card is included in the student activities fees. A \$5 fee is assessed for each card replaced.

Military service credit evaluation. Students may have an evaluation completed of their military educational experiences upon payment of a special \$25 fee. Credit hours will be awarded to the students' records if they are actively enrolled at KSU.

Fee covers evaluation of documents to include DD-214, DD-295, certificates of completion, Defense Language Institute transcripts, Community College of the Air Force transcripts, Academy of Health Sciences at Fort Sam Houston transcripts, and AARTS transcripts.

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, insofar as

these recommendations apply to the student's degree program.

Students desiring an evaluation of military educational experiences should contact the Office of Admissions for more information.

Transcript fee. A fee of \$2 is charged for each transcript of academic record requested by a student.

Laboratory fees and course charges or deposits. No laboratory fee, course charge, or deposit may be assessed against or collected from persons enrolled in any regular semester or summer session at Kansas State University, except for geology and archaeology field camps, and for breakage or losses due to personal negligence on the part of the student. Charges for breakage or losses may not exceed the actual fair value of supplies destroyed or lost and are subject to the approval of the appropriate dean or the president.

Loans, misuse fees, and other charges. Kansas State University is authorized to approve loans to students as appropriate and to collect such loans and related interest and charges; and further, to collect library misuse fees, parking misuse fees, rental and use fees for recreational equipment furnished by the Department of Recreational Services, charges for providing copies of public documents, and charges for ROTC property and student health services when such fees and charges are authorized. All such loans, fees, and charges are deemed to be part of this fee schedule.

Correspondence study. Information about correspondence study courses, including the fees charged, is available from the Extramural Independent Study Center, Division of Continuing Education, University of Kansas, Lawrence, Kansas 66045.

Charges to government or private agencies. The fees listed in this catalog do not limit the charges which 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.

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 the incidental fee, for students enrolled in seven or more semester credit hours and will be entitled to use the student health service, K-State Union, and Student Recreational Building, 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	\$ 681*
Books and supplies, approximately	195
Room and board in University housing	1,050
Clothing, laundry, postage, travel, extra meals, phone, social activities (varies with the individual), miscellaneous	1,075
Total estimated expenses (half of academic year)	\$3,001

*Fees for graduate, veterinary medicine, and nonresident students are shown earlier in this section.

Undergraduate Degrees

Common degree requirements

The common requirements for all curricula leading to an undergraduate degree are: English Composition, six credits; Public Speaking, two credits; Concepts of Physical Education, one credit.

Undergraduate 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 an undergraduate degree: (1) at least 2.0 on KSU 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 KSU. Professional curricula may impose additional degree requirements.

Undergraduate students must file an application for graduation clearance in the appropriate college dean's office during the first four weeks of the semester (first two weeks for summer) 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 University Registrar's Office before the end of the semester or summer session degree requirements will be completed.

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

All students 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 undergraduate credit at KSU. 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 Kansas State University; the student must submit satisfactory plans and reasons for completing the degree requirements at another institution, as for medicine, dentistry, law, and medical technology, before earning a degree here.

Resident work includes all regularly scheduled class or laboratory instruction given by the regular University faculty.

At least five-sixths of the credit hours taken at KSU and applied toward a bachelor's 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-sixth's policy.

Candidates for spring graduation are urged to attend commencement. Fall graduates are invited to participate in the December or the following spring commencement exercises. Prospective summer graduates may participate in the spring exercises before graduation. All participants must wear the appropriate cap and gown.

Most students complete degree requirements in the normal four or five academic years allotted for that purpose. However, some may take additional time because of a significant change of educational objective. Others may interrupt their 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 their academic deans as early as possible to determine an appropriate program of study.

Students who are eligible to graduate must file an application for graduation in the academic dean's office during the first four weeks of the semester they plan to complete degree requirements. Summer graduates must file their application for graduation during the first two weeks of the summer session.

Mathematics entry requirements

The degrees shown below are conferred on completion of the prescribed curricula. The letter which precedes each curriculum indicates the suggested high school math courses, listed below. It is recommended that entering freshmen have completed these suggested mathematics courses.

- (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

Undergraduate degrees**College of Agriculture**

Bachelor of science in agriculture

- (E) Agricultural economics
- (E) Agricultural education
- (E) Agricultural journalism
- (E) Agricultural mechanization
- (E) Agronomy (crops and soils)
- (E) Animal sciences and industry
- (E) Bakery science and management (B.S. in bakery science and management)
- (E) Crop protection
- (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) Park resources 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 BFA
- (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.
- (A) Dance, 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.

(B) Journalism and mass communications, B.A. or B.S.

(A) Leisure studies, 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.

(A) Physical education, 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-medicine, B.A. or B.S.

(E) Pre-nursing (nondegree)

(E) Pre-optometry (nondegree)

(E) Pre-pharmacy (nondegree)

(E) Pre-physical 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—Adult

(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—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—Psychology

(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) Textile science

B.S. in consumer and family economics

(C) Consumer affairs

(C) Housing and equipment

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 food science and industry

(F) Food science and industry

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) Family life and human development

Community services

Family studies (pre-law)

Life span human development

Human development and family studies and social world

B.S. in human ecology
(C) General human ecology

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

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

B.S. in vocational home economics education
(C) Home economics education

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 incompletes, equivalent to F
P, for grades of B, C, or D in courses taken under the A/Pass/F option
Cr, for credit in courses for which no letter grade is given (nongraded courses)
NCr, for no credit in courses for which no letter grade is given (nongraded courses)
NR, for no grade reported
NX, for no grade 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 personal emergencies which are verifiable. The student has the responsibility to take the initiative in completing the work, and is expected to make up the I during the first semester in residence at the University after receiving the grade, except for theses, dissertations, and directed research courses. If the student does not make up the I 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.

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.

Report of grades

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

The instructor reports semester grades, based on the examination and class work, to the University registrar.

If a student drops a course after the 25th day of classes, a mark of W is reported. No course may be dropped after the date marking the close of this privilege as shown on the academic calendar. Regardless of the time of withdrawal, however, a final grade is reported and designated as such, if all the required work of the course has been completed.

In case of absence from the final examination, no semester grade is reported until the reason for such absence has been learned; 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 within which the examination may be taken.

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 exams.

Instructors leave all grade books in the proper departments when semester grades have been completed. The head of the department keeps all grade books on permanent file.

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

Students are notified of their scholastic status by their academic deans from information supplied by the University registrar. 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.

Undergraduate students (excluding students in the College of Veterinary Medicine) are placed on probation or dismissal according to the policy statement outlined later in this section.

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

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

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 12 points below a 2.0 for 12 to 60 hours, 11 points below a 2.0 for 61 to 80 hours, 10 points below a 2.0 for 81 to 100 hours, 9 points below a 2.0 for 101 to 120 hours, 8 points below a 2.0 for 121 to 140 hours, and 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.

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. Normally students must wait at least one semester before they will be considered for reinstatement.

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

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.

Students who earn a semester grade point average of 2.2 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.

Scholastic deficiencies chart

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

Grade points			Grade points			Grade points		
Hours completed	Probation less than	Dismissal less than	Hours completed	Probation less than	Dismissal less than	Hours completed	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			

Scholastic honors

Bachelor's 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 KSU 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.

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.

Graduate students are ineligible for these 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
University Chorus	1	4
Concert Choir	1	4
Collegiate Chorale	1	4
K-State Singers	1	4
Concert Jazz Ensemble and Jazz Labs	1	4
Varsity Men's Glee Club	1	4
Women's Glee Club	1	4
Madrigal Singers	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

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

Credits may be counted as electives in the student's curriculum. A student may use no more than eight 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, but only on the written recommendation 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:

Sophomore	Junior	Senior	Fifth-year student*
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 as well as to record interactions with University staff and officials. To protect the students' rights to privacy, and to conform with federal law, the University has an established policy for handling students' records. Interpretation of this policy is based on experience with educa-

tional records, and the policy itself may subsequently be modified in light of this experience. Notice of this policy and of students' rights under federal law is given annually. Copies of this policy are available at the Registrar's Office, 118 Anderson Hall, and it is published in the *General Catalog* and in the *Collegian*.

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 name, Manhattan address and telephone number, permanent mailing address, college, curriculum, year in school, date and place of birth, dates of attendance at KSU, 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 for undergraduates and by the Graduate School office for graduate students to anyone upon inquiry, unless the student has requested within 10 days after registering that specific items 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 University Registrar's Office, which will notify other appropriate University offices.

Confidential information

With the exception of the information noted above, students' 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:

- Academic records: For undergraduates, the Registrar's Office; for graduate students, the Graduate School office.
- Admissions records: For undergraduates, the director of the Office of Admissions; for graduate students, the Graduate School office.
- Financial aid records: director of the Office of Student Financial Assistance.
- Business records: University controller.
- Traffic and security records: head of KSU Police Department.
- Medical records: director, Student Health Service, Lafene Health Center.

g. Counseling records: director, Counseling Center.

h. Actions of academic standards committees: college dean.

i. Academic disciplinary records: chair, Undergraduate Grievance Committee.

j. Nonacademic disciplinary records: dean of students.

k. Housing records: director of Housing.

l. Placement records: director of Career Planning and Placement.

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.

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

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 which 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—\$2.00 per copy.

b. Housing department records—four cents per page.

c. Medical charts—free for medical and/or employment purposes; otherwise \$10.00 to \$25.00.

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 University registrar. Proof of dependency is required. The grades of other students will be sent to their parents only with written permission of the student.

When records may be withheld

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 within a reasonable time to the student and in no event 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 he 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 content of the record. 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.

Student Financial Assistance

Larry Viterna, 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, Manhattan, Kansas 66506.

All aid programs require a student to submit a Family Financial Statement (FFS). Students living in Kansas may obtain the Family Financial Statement (FFS) from any high school counselor, or from KSU. The priority date for submitting the FFS is March 15 before the fall semester in which the student intends to enroll.

Scholarship programs

More than 2,500 Kansas State University undergraduate students receive more than \$2 million of scholarship assistance each year based on their academic record, financial need, and/or leadership qualities. The KSU 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.

Major scholarships

KSU students from throughout the University compete successfully for several well-known scholarship awards each year. In recent years these have included the various grants made for graduate study abroad under the Fulbright Hayes Programs which send students to a country of their choice, usually for a nine-month period of research and/or formal study. The Rhodes Scholarship competition is another opportunity for students to win support for graduate study abroad. Winners are funded for two or three years of study at Oxford University in disciplines of their own selection. Sophomores interested in a career in government may apply for the Truman Award, which is made annually to a student in each of the 50 states and which supports the last two undergraduate years as well as two years of graduate study. Interested students may inquire at the dean's office, College of Arts and Sciences, 117 Eisenhower Hall.

Grants

Approximately 5,000 students are assisted through two federal grant programs. Assistance exceeds \$5 million. The ACT Family Financial Statement is the application for these programs and should be filed by March 15.

Loan programs

KSU has six kinds of student loans: the Perkins Loan, the Guaranteed Student Loan (GSL), 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 GSL is an eight percent interest loan (for new borrowers) which is funded by participating lending agencies. HPSL carries a nine percent interest rate. No interest is charged while you are attending school. At the time you begin repaying these loans, the interest begins accruing on the unpaid balance. The repayment period may be up to ten years.

The Alumni Loan/Foundation Loan charges six percent interest payable annually from the date of the loan, with \$50.00 monthly payments beginning three months after you leave school.

The PLUS/SLS loans are 10.03 percent for 1988-89. 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 at K-State, in 104 Fairchild Hall, 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 as a graduate assistant, graduate research assistant, or graduate teaching assistant, a graduate student must be enrolled in at least six resident semester credit hours at KSU during a fall or spring semester, and at least three resident semester credit hours at KSU during the regular summer session, or have been enrolled in at least six resident semester credit hours at KSU during the preceding spring semester. To be employed on the hourly student payroll, a student must be enrolled in at least six resident semester credit hours at KSU during a fall or spring semester, and at least three resident semester credit hours at KSU during a summer session, or have been enrolled in at least six resident semester credit hours at KSU 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.

Those 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 at Kansas State University.

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.

Policy on satisfactory academic progress
General information
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 (formerly NDSL, National Direct Student Loan), Guaranteed Student Loan (GSL), Supplemental Loan for Students (SLS, formerly ALAS and PLUS loan), Health Professional Loan (HPL), and College Work-Study (CWS).

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

All recipients of student financial assistance will be required to meet at least 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: full time, three-quarters time, half time. At Kansas State University minimum hours are:

Undergraduate
Full time—12 hours
Three-quarters—9 hours
Half time—6 hours

Graduate
Full time—9 graduate hours
Half time—5 graduate hours

(Requirements for part-time students and short courses will be prorated.)

Satisfactory academic progress is determined by the formula:

Hours federal financial aid is awarded on	- Hours completed

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 upon which federal financial aid is awarded:

Undergraduates—per semester
Pell Grant— full time—12 hours
3/4 time— 9 hours
half time— 6 hours

Perkins, SEOG, State of Kansas Scholarships, HPL— full time—12 hours
GSL, SLS (ALAS, PLUS), CWS— Required hours—7 hours

Undergraduates—summer or less than 15-week terms
Pell Grant— full time—6 hours
3/4 time—5 hours
half time—3 hours

Perkins, HPL— full time—6 hours
GSL, SLS (ALAS, PLUS), CWS— half time—3 hours

Graduate Students—per semester
GSL, SLS (ALAS, PLUS), CWS— half time—5 hours
Perkins, HPL— full time—9 hours

Graduate Students—summer or less than 15-week term
Perkins, HPL— full time—5 hours
GSL, SLS (ALAS, PLUS), CWS— half time—3 hours

Students who have received a passing grade of D or higher but retake the course for a higher grade will not have those credit hours counted toward financial aid. Courses in which a grade of F, or incomplete (I, IX), withdrawn (WD), NR, or NC is recorded do not count as hours completed and may be repeated for financial aid. Graduate students will receive credit for incompletes in research that follow the published degree requirements as elective or required courses, or courses taken as a part of developmental studies. 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.

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 from 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(s) will count for the academic year in which KSU accepted the credit. Students must also notify Student Financial Assistance if hours are earned from another institution. Cumulative grade point average is determined by the Registrar's Office. The scholastic deficiencies chart for grade point determination is published in the Kansas State University General Catalog. 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

Students who transfer to Kansas State University from another institution may apply for financial aid. Hours accepted from another institution may not be used as credit for satisfactory academic progress unless the student has a deficiency in hours earned at Kansas State University, attends another institution to make up those hours, and the transfer hours are accepted by Kansas State.

Withdrawals

University refund/repayment policies and procedures will be followed when a student withdraws from the institution for any reason during the semester or summer term in which student aid checks have been disbursed to students. University refund and repayment policies could require a student to make immediate repayment of all or a percentage of the funds received.

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 Student Financial Assistance Office. If an appeal is approved, financial aid (if available) may be reinstated for the term in question. A student's academic progress is measured at the end of the term. Students who withdraw as a result of a documented personal family

emergency or documented medical reason may file an appeal with appropriate documentation for an exception.

Appeal Process

Appeal forms for satisfactory academic progress are available at the Office of Student Financial Assistance on request. Appeals are made in writing to the 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 what action is being taken to improve the student's academic record.

All appeals are reviewed and students who submit an appeal 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. Students may be required to participate in special activities to improve their academic program. Decisions regarding appeals are final and not subject to further review.

Dean of Student Life Office

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

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

Associate Dean of Student Life Office

Susan M. Scott, Associate Dean
Caroline F. Peine, Assistant Dean
102 Holton Hall
532-6432

This 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. Staff coordinate assistance to students and families in time of personal crisis and are available to students for general advice, counsel, and assistance with personal problems.

Student activities

The coordinator of student activities is available to assist students in identifying extracurricular and cocurricular activities

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

Student government

The purpose of the Student Governing Association (SGA) 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 KSU student body.

SGA is divided into three branches: legislative, judicial, and executive. The legislative branch—student senate—is composed of the following 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, which is collected as part of the tuition payment. It is used to assist student and University organizations in providing programming and services for the KSU community.

The judicial branch is composed of judicial council, tribunal, the traffic 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). ASK is a student lobby group which takes the concerns of students in each of the state schools to the Kansas legislature.

Office of Women's Programs and Women's Resource Center

The Office of Women's Programs and the Women's Resource Center (WRC) are in Holton Hall. Their purpose is to promote and foster the fullest academic and personal development of all women through the provision of information, advocacy, programming, and counseling and referral to other campus academic and service agencies. Numerous programs designed to

address issues of interpersonal relationships and to raise the level of awareness regarding changes in men's and women's traditional roles are offered by or coordinated through the WRC. Both men and women are invited to consult with the staff, make use of the center's books and resource files, and participate in program offerings.

Alcohol and Other Drug Education Service

The Alcohol and Other Drug Education Service (AODES) offers information about physical effects and social issues related to alcohol and other drug use or abuse. To accomplish this purpose, a number of campus services are provided, including: various media activities such as newspaper ads, posters, brochures, and radio public service announcements; coordination of and participation in awareness events, such as the campus Alcohol Awareness Week and Wellness Week; support for the DIAL telephone taped information service; and presentations providing information on alcohol and drug-related topics. In addition the Alcohol and Other Drug Education Service initiates resource projects regarding the influence of alcohol and drugs on campus and the effect of these substances on students. AODES can also make referrals to counseling resources for those with concerns about their own or another's possible alcohol and/or other drug use or abuse.

Student organizations

More than 300 organizations are available to students, faculty members, staff, and community members.

The Activities Carnival, usually the first Sunday of the first full week of classes, offers an opportunity for new and old members of the University community to acquaint themselves with campus clubs and organizations.

Any organization desiring to become a registered organization must adhere to the University Activities Board (UAB) constitution and current guidelines, including a statement of purpose or constitution, the names of the organization's officers, a full-time faculty advisor, registration of any fundraising projects, open membership, and an agreement to abide by the rules and regulations of the University.

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

Applications and information about any of the registered organizations may be obtained by contacting the coordinator of student activities.

Student Conduct

Philosophy of student conduct

Students at KSU are expected to obey 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 University 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 judicial structure and process, as well as University policies, are in the student handbook, *Inside KSU*. Copies are free and are available in the SGA Office of the K-State Union.

KSU honor and conduct code

The revised honor and conduct code is available in the Student Government Services office in the K-State Union. It was not complete at catalog press time.

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. This procedure 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.

Procedural levels:

Level I. 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. If a student is charged with cheating or other academic dishonesty that may involve suspension or dismissal, the case will be reviewed by the head of the department in which the alleged violation occurred, and if not resolved to the satisfaction of all parties, or if suspension or dismissal is contemplated as penalty, by the student's dean; if still not resolved to the satisfaction of all parties, or if suspension or dismissal is contemplated, the case will be referred to the Undergraduate Grievance Board for final disposition.

Level II. If a grade change grievance is not resolved by the student and instructor, either party may appeal in writing to the department head concerned who will act as a mediator in the dispute. At this time, the student may petition the dean of his college for an ombudsman. The duties of the ombudsman are to arrange meetings of all concerned parties and report actions taken at each level to the appropriate persons or groups. The ombudsman will not be an advocate for any party but is to be an expeditor for the student.

Level III. If the grievance has not been settled to the satisfaction of both parties at Level II, written appeal may be made to the dean of the college most directly concerned. The dean will act as a second mediator.

Level IV. If the student or instructor still does not feel that an adequate solution has been reached in any academic dispute, he or she may appeal in writing to the Undergraduate Grievance Board which will arbitrate the dispute. If charges of cheating or other academic dishonesty have been made that could lead to suspension or dismissal of a student from the University, the board shall assume final jurisdiction over the case, as described under Level I above.

Further questions regarding procedure should be referred to the Academic Honesty and Undergraduate Grievance Statements, Faculty Senate minutes, May 9, 1978. The student handbook, *Inside KSU*, also provides comprehensive information on both **undergraduate** and **graduate** grievance procedures.

KSU sexual harassment policy

KSU prohibits sexual harassment and has defined sexual harassment as any behavior which, 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. The complete policy and processes for resolution of complaints are available in the student government office, the departmental offices, and the Affirmative Action Office. Students who are sexually harassed by other students should report the incident to the Associate Dean of Student Life Office for appropriate action through the student judicial system.

Any conduct adjudged sexual harassment by appropriate University bodies will be considered a serious breach of the Kansas State University policy and of the Civil Rights Act of 1964.

Pre-Admission Unit

Pat J. Bosco, Associate Vice President/
Dean of Student Life
122 Anderson Hall
532-6237

The pre-admission unit works primarily with prospective students and their families.

Admissions representatives communicate to prospective students through high school visits, college planning conferences, and on- and off-campus special event programming, about the academic program and student life opportunities available at the University.

The Campus Visitation Program offers campus tours to prospective students and their parents. The student visitation guides also conduct a variety of special campus tours for visiting groups and community and civic organizations.

New Student Programs include orientation/enrollment, the KSU scholars program, and the presidential lectures series (K-State faculty presenting lectures to high school audiences without charge). This area also edits several publications for new students including the parent newsletter, *K-State News*, and the popular *Your First Year*.

Department of Housing

Thomas J. Frith, 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 your 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.

Available on-campus housing facilities
Kansas State University provides residence hall living for 4,000 students, and 576 apartments for student families.

Residence halls

Each residence hall has a director who is a full-time professional and a student staff of resident assistants. The total residence hall program is coordinated by the director of housing.

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

The following services and facilities are furnished in residence halls: sheets and pillowcases—laundered weekly; free washers and dryers, areas for hand laundry; pleasant rooms with beds, mattresses, chests of drawers, closets, and study tables. The student furnishes pillow, towels, blankets, bedspreads, and other personal items.

All of the residence halls have quiet study rooms, and several halls have computer terminals. Each hall also has lounges and recreation areas for relaxation and social activities, with televisions, stereo equipment, Ping-Pong tables, and the like.

Accessible rooms are available for students with physical limitations. The Department of Housing is pleased to work with students to accommodate special needs.

With the exception of the Sunday evening meal, three meals are served daily. Most meals are served cafeteria style, but special dinners and buffets add to the variety of the food service program.

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 hall application and fee are received by the Department of Housing, a nine-month housing 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 8.

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

Applications and detailed information are available from the Department of Housing, Pittman Building, Manhattan, Kansas 66506.

Smurthwaite House Women's Leadership Program

The Smurthwaite House Women's Leadership program is a special leadership and personal development experience for Kansas State University women students who would like to become active in leadership positions in student government, academic, 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.

Graduate student housing on campus

Single graduate students are welcome to live in the residence halls. Edwards Hall is reserved for graduate and upperclass students.

Single graduate students also qualify for the Evans Apartments. There are 20 one- and two-bedroom apartments in this building. Furniture, water, and heat are provided. Applications and specific rental/cost information are available from the Department of Housing.

Family housing

Student families at Kansas State University 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 and water (gas heat). 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 students/family members with physical limitations. The Department of Housing is pleased to work with students/family members to accommodate special needs.

Arrangements can be made to see an apartment Monday through Friday, 8:00 a.m. to 4:30 p.m. at the Housing Office, or call 532-6453. Applications and specific rental/cost information are available at the Department of Housing, Pittman Building.

Cooperative Houses

Clovia

Clovia 4-H 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 \$160 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.

The Smith Scholars Program

The Smith Scholars Program provides a broad learning experience for 40 young men each year. Smith Scholars are selected on the basis of academic promise and financial need. 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.

Within that context, the men develop and participate in programs of personal and academic growth in seven areas: academics, culture, University and community, social, physical and mental health, leadership and governance, and vocational planning.

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: Executive Director, Smith Scholars Program, 331 North 17th Street, Manhattan, Kansas 66502; or phone (913) 539-4685.

Off-Campus Housing

The Office of the Associate Dean of Student Life assists students in locating off-campus housing. An up-to-date listing of major apartment complexes, real estate agents, and managers of apartments, as well as mobile home lots and rentals, is available. In addition, currently available units are posted on a bulletin board with information on cost, size, restrictions, etc. This office also assists students who are looking for roommates.

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. These may be obtained by writing to the advisor for Greek Affairs.

House bills in sororities will average approximately \$1,100 a semester. This includes room, board, and sorority dues.

Freshman members, however, live in residence halls and pay sorority dues of approximately \$45 a month.

The following national sororities have established chapters at KSU: Alpha Chi Omega, Alpha Delta Pi, Alpha Gamma Delta, 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 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 \$1,100 a semester. For more information, write to the advisor for Greek Affairs.

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.

Office of Special Services

Veryl A. Switzer, Assistant Vice President
Anne Butler, Assistant Dean and Director of Educational Supportive Services
Director of Upward Bound Program (532-6497) (position vacant)

Ruth Hoefflin, Director of Fenix Program (532-6432)

Gretchen Holden, Director of Services for Students with Physical Limitations (532-6441)

Don Fallon, Coordinator of Religious Affairs (532-6432)

Donna Davis, Director of International Student Affairs (532-6448)

201 Holton Hall

532-6436

532-5642

Several programs are offered to assist with the educational development and matriculation of special student populations, and to promote cultural awareness and appreciation of ethnic diversity in the University community.

Minority and Cultural Affairs

Emphasis is placed on encouraging minority students to seek leadership roles on campus; supporting minority student organizations including the Black Student Union, Mexican American Council of Students, and the Puerto Rican Student organization; and assisting student organizations in sponsoring programs and lectures which bring minority leaders to KSU and heighten multiracial awareness within the community.

Educational Supportive Services

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 KSU are offered educational supportive services including counseling (personal, career, academic, and financial), academic preadvising, individualized tutorial assistance, and a variety of referral services.

Upward Bound Program

This federally funded program provides academic and personal counseling and guidance to disadvantaged high school students from Junction City, Manhattan, St. George, and Westmoreland 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 residential credit-bearing educational program during the summers on the KSU campus.

Fenix Program—Adult Students

The Fenix office serves undergraduate students who are 25 years of age and older. Reentry students often have special concerns which can be addressed by staff specialized in working with older adult students. Fenix expresses the spirit of renewal and regeneration which reentry students exemplify.

Adults considering beginning college for the first time or reentering college, or currently enrolled adult students are urged to meet with the Fenix coordinator in 101A Holton Hall.

Services for Physically Limited Students

Services for Students with Physical Limitations attempts to meet the needs of students with physical limitations and learning disabilities by providing academic, financial, and vocational counseling as well as a range of other supportive services including: tutorial assistance, readers, notetakers, interpreters, text-tape service, and typing and errand service. Special test-taking accommodations can be arranged through this office. Classes scheduled in inaccessible locations will be moved. Individualized help with enrollment is provided.

A shuttle service operates on campus between all buildings and is available to students with either temporary or permanent physical limitations. Special equipment available to students includes a talking computer and calculator, Kurzweil Reading Machine, variable speed tape recorders, and a TTY (telephone for the hearing impaired). Accessible housing is available.

Reading and study skills instruction may be of special interest to learning disabled students. Staff will work as a liaison with student's instructors.

Religious Affairs

Religious life finds expression in 25 student religious organizations and in approximately 40 congregations in Manhattan. The coordinator of religious activities in Holton Hall provides information regarding religious activities and organizations as well as pastoral resources in the community. Pastoral care and counseling are available through the office of the coordinator of religious activities and by referral to campus ministers and local clergy. There are two memorial chapels on campus, Danforth and All Faiths, which are available for student worship, weddings, and private meditation.

International Student Center

The International Student Center provides a comfortable, relaxed atmosphere where people wanting to increase their international perspective can always find new friends. Made possible by a private gift to the University, 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 all that 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 KSU 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. People interested in getting involved with the programs of this office or the activities of the International Student Center are invited to call 532-6448 for more information.

Counseling Center

Fred Newton, Director
Second Floor, Lafene
532-6927, 532-6550

Effective summer 1988, all counseling and mental health services have been merged into one new facility on the second floor of Lafene Student Health Center. Professional counselors, psychologists, social workers, and psychiatrists are available to KSU students.

Individual, couple, and/or group counseling is offered for persons 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 workshop or seminar format are offered to enhance personal growth and skill development. These include: stress management, biofeedback, career life planning, assertiveness training, couples communication, peer sex education, pregnancy counseling, study skills assistance, managing change, and creativity development. Academic credit courses are offered in Career Life Planning (EDAF 511) and Guidance for the Paraprofessional (EDAF 311).

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

Appointments may be made by contacting the receptionist. Urgent matters may be handled by the counselor-on-call during normal office hours.

U-LearN

University Learning Enhancement Resource Network (U-LearN) is a comprehensive walk-in and phone-in resource center. Questions regarding academics, campus, or community activities and information in general may be directed to 532-6442. The

walk-in service is housed in Holton Hall, and is staffed by trained paraprofessionals every afternoon. Information is provided in such areas as career exploration, study skills, sexuality, and wellness.

U-LearN also operates the campus and community information section of the DIAL taped information system. This facility maintains a library of cassette recordings on topics of interest to University staff and students. Brochures listing the tapes available can be found in the lobby of Holton Hall; at the U-LearN office, Holton Hall; at the FONE office, 1221 Thurston Street; and in other public places on campus. To hear the tape of your choice call 532-6907.

Academic Assistance Center

Mike Lynch, Director
Holton Hall
532-6492

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

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

Course Supplement Program. The Course Supplement Program offers students help sessions in a variety of introductory level courses. Any student enrolled in a section of a course to which a supplement is assigned may participate in three or more hours of review sessions each week. In addition to assisting with course content, supplement instructors provide exam reviews and assist students with note-taking, test-taking strategies, and textbook mastery in the specific courses.

Study Skills Lab. The AAC provides instruction in basic academic and study skills through the course Study Skills Laboratory (EDCI 051). Any student may enroll in the Study Skills Lab for one to three 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 (EDAF 111) to new incoming students for one hour of credit. Freshman Seminar provides any student new to Kansas State 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 seminar.

Credit by examination

Kansas State University offers students a wide 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 Testing 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.

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

Lafene Student Health Center

Robert Tout, M.D., Director
532-6544

The Lafene Student Health Center is a Joint Commission Accredited Ambulatory Health Care Unit. It is a modern facility designed to provide for most student health needs. Only those who have paid the Student Health Fee are eligible for care. Spouse eligibility must be made during registration.

The Lafene Student Health Center is centrally located on campus and this fully staffed outpatient unit has services that include a Sportsmedicine Clinic, Lafemme Clinic, and an Allergy/Immunization Clinic. Services are also provided in mental health, health education, nutrition, and physical therapy. Medication, laboratory tests, and X-ray are available at the center at reduced rates.

The center is staffed by full-time physicians with medical supporting 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 through the after-hours clinic of the Lafene Student Health Center. Home calls are not made. The local ambulance service is available to transport patients to the appropriate health care facility.

It is strongly recommended that all students at Kansas State University carry medical insurance, either through the parents' plan at home or through the health insurance program available to students at special rates. This plan supplements the coverage provided free or at reduced costs by the Lafene Student Health Center on campus and covers payable claims for medical expenses if the student requires care away from the campus. Health insurance is mandatory for all international students and their families.

Kansas State University requires a complete medical history, including an up-to-date immunization record, on all new students or transfer students. This history must be completed on the Kansas State University medical history form. A physical examination is not required, but highly suggested, 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 would be helpful for future treatment. Students receiving allergy injections must furnish instructions from their allergist before injections can be administered at the health center.

Students are welcome to visit the health center any time for a personal view of the facilities and are urged to bring their medical questions or concerns to the professional staff. Services and charges are subject to change without notice.

K-State Union

Jack Sills, Director
532-6591

The K-State Union is one of the centers for social, recreational, and cultural activities on the KSU campus.

Built entirely by student fees, the Union features a cafeteria-snack bar, 576-seat auditorium, 280-seat Little Theatre, full-service bookstore, recreational facilities (bowling, billiards, table tennis, and more), art gallery, central information desk, lounges, banquet rooms, copy center, and activities center. The Union also operates on-campus vending machines.

The Activities Center houses Union Program Council, a student volunteer organization that provides more than 300 programs annually for the cultural, educational, and personal growth of students. All students are welcome to participate in the Union Program Council. Student Governing Association offices are also located in the Union.

Open since 1956, the Union is self-supporting with income from eight operating units and student fees.

The K-State Union director and staff operate under the guidelines and policies established by the Union Governing Board of students, faculty, and alumni.

Career Planning and Placement Center

Bruce Laughlin, Director
Holtz Hall
532-6506

Kansas State University is widely known for the outstanding career development services it provides, and the Career Planning and Placement Center is regarded as a regional and national leader in the field. Strong academic programs, capable students, and a campus work ethic combine to give KSU students a distinct advantage over those from many institutions in planning and achieving vocational/professional and graduate study goals.

Accessibly located, the Career Planning and Placement Center occupies all of Holtz Hall and offers assistance to prospective

freshmen, undergraduates, graduating seniors, graduate students, and alumni in career planning and employment. The office provides a centralized placement system for all colleges and departments of the University, bringing together students, faculty members, and employer representatives seeking college-educated personnel. Services include employment vacancy referrals, data sheet and resume preparation assistance, interview workshops, career advisement, self-instructive videotaping, and education/government/industry employer interface workshops.

Career planning is facilitated through the use of SIGI PLUS—a computerized system of interactive career guidance and information that helps students in values clarification, the gathering of occupational information, and the development of strategies for getting from the current situation to appropriate occupational and professional goals.

The center attracts hundreds of business and industry, government, and education recruiters to the campus each year for thousands of employment interviews. Students in curricula not regularly sought for on-campus interviews have access to equally valuable career guidance to develop job search strategies. Guidance is also provided for obtaining summer employment.

In addition to providing career exploration materials, the career library reflects current employment trends and opportunities in business, industry, agriculture, education, and government. A comprehensive collection of materials is maintained to assist students in assessing occupations, professions, and continuing education.

Recreational Services

Raydon H. Robel, Director
532-6980

Recreational Services is the department responsible for many of the intramural, recreational sports, and fitness programs for the campus. With the current interest in and emphasis on recreation and fitness, thousands of participants are involved in programs yearly.

Intramural sports are the scheduled competitive activities of the recreation program. Teams are organized by fraternities, sororities, residence hall floors, off-campus groups, co-rec, and faculty/staff groups. Thousands participate in various activities and engage in both team and individual sports. Over 30 different intramural activities are offered for competition.

KSU has superior facilities to accommodate participants. The natatorium located 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 opened in 1980. It 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; running track; men's and women's locker rooms with showers and saunas; central supervisory and check-out area; and administrative offices. Included in this is the latest fitness and weight training equipment. Many fitness programs are available for the participants as well.

Outdoor facilities available include lighted tennis and handball/racquetball courts, multipurpose playfields, fitness cluster, and running trails. Outdoor recreational equipment, including canoes, tents, sleeping bags, and other camping equipment can be rented at the Outdoor Rental Center.

For students interested in a unique learning experience, the department provides employment as lifeguards, sports officials, building managers, and office assistants.

International Programs

Vernon C. Larson, Assistant Provost for
International Programs
108 Waters Hall
532-5714

Although the first foreign student enrolled at K-State in 1898, it was not until 1955 that a major international thrust began, when KSU deans of agriculture and veterinary medicine were invited to India to investigate ways to make that country self-sufficient in food production. They observed that what the land-grant institutions had accomplished in the United States might be valuable for India. Thus began a new "international" dimension to the University.

K-State is involved in international programs for four major reasons:

Humanitarian. There is much hunger in the world and Americans want to help. When a disaster occurs in some remote area of the world, Americans are often the first to respond.

Self-improvement. An international program enhances the land-grant mission of teaching, research, and extension. KSU faculty with international experience can enrich their teaching, research, and extension programs, and a mix of international students on campus is valuable for K-State students.

Research. The economy of Kansas benefits from collaborative research with developing countries. Overseas research has provided new knowledge and technology for U.S. agriculture, business, engineering, and other areas.

Economic. Having faculty abroad in developmental roles assists the U.S. economy. The demand for food in developed countries, our traditional trading partners, is stagnant. Future markets are in the developing countries. Experience in Asia and Latin America the last two decades shows that American farm exports have benefitted from increased agricultural productivity in third world countries.

In 1986 the position of assistant provost for International Programs was created to give coordination and direction to this area. The function of the office is to provide leadership and administrative support throughout the institution to bring about mobilization and wise use of its resources to contribute to programs abroad, and by the same process bring about an effective on-campus international component.

International offices

Assistant Provost for International
Programs
Vernon C. Larson

International Agriculture
Vernon C. Larson

International Grains Program
Charles Deyoe

International Meat and Livestock Program
Jack Riley

International Trade Institute
Ray Coleman

Food and Feed Grain Institute
Charles Deyoe

Foreign Student Advisor and International
Student Center
Donna Davis

South Asia Center
Aruna Michie

Paraguayan Development Program
Meredith Smith

Area study programs

International Studies
Charles Bussing

Latin American Studies
Bradley Shaw

South Asian Studies
Aruna Michie

Russian and Soviet Studies
Walt Kolonosky

International Trade Studies
Ali Fatemi

Study abroad programs

Agricultural Study Tour
David Mugler

Art History Abroad
Lou Ann Faris Culley

European History
Robert Linder

French Program in Paris
Betty McGraw

Kansas Summer Institute in Germany
Heinz Bulmahn

Mexico Summer Program
Margaret Beeson

Russian Study Tour
Joseph Hajda

Summer Abroad in English Education
Ray Kurtz

Exchange programs

People's Republic of China

Luoyang Institute of Technology, Luoyang,
Henan Province
Vernon Larson

Henan Agricultural University
Vernon Larson

Costa Rica

University of Costa Rica, San Jose
Vernon Larson

Denmark

Aarhus School of Architecture, Aarhus
Robert Burnham

Danish International Student Exchange
Program
Richard Forsyth

France

Ecole Superieure d'Agriculture de Purpan
Vernon Larson

Honduras

Escuela Agricola Panamericana,
Tegucigalpa
Vernon Larson

Ministerio de Recursos Naturales of
Honduras, Tegucigalpa
Vernon Larson

New Zealand

University of Otago, Dunedin
Barbara Stowe

Paraguay

School of Agriculture, National University,
Asuncion
Vernon Larson

Catholic University, Asuncion
Vernon Larson

Switzerland

Eidgenossische Technische Hochschule,
Zurich
Vernon Larson

West Germany

Ludwig Maximilian Universitat, Munich
Robert Kruh

Justus Liebig Universitat, Giessen
Robert Kruh

Technical University, Trier
Eugene McGraw

Regional

Higher Council of Central American
Universities
Vernon Larson

Other international activities and programs

English Language Program
Enid Cocke

International Sorghum and Millet Program
(INTSORMIL)
Kurt Feltner

Memorandum of Understanding with AID
Vernon Larson

Midamerica International Agricultural
Consortium (MIAC)
Vernon Larson and Walter Woods

Mid-America State University Association
(MASUA International)
Vernon Larson

Peace Corps Representative
Vernon Larson

4-H Cross Cultural Program
Lois Redman

Auxiliary Services and Facilities

University Relations

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

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

The News Service (9 Anderson Hall, 532-6415) is the official outlet for print and broadcast news materials relating to KSU policies and administration. News services are available to all KSU departments and activities. News Services also publishes the University's official faculty-staff newsletter, *In-View*, and the KSU research magazine *Perspectives*.

Photographic Services (101 Power Plant, 523-6304) provides support for University related activities. Services include photo-processing, photography on location and in studio, research photography, publicity portraits, and slide reproduction.

Printing Services (8 Kedzie Hall, 532-6308) produces a full range of products supporting the educational and administrative missions of the University. Books, brochures, business cards, envelopes, letterheads, posters, and other printed matter, as well as second and third class mailing services, are available to all KSU departments and affiliated organizations.

Publications (5 Anderson Hall, 532-6419) provides full-service editing, design, and production coordination in the development of printed materials for KSU departments and activities, with the operation's primary responsibilities focusing upon enrollment management, recruitment, and KSU informational publications.

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, religion, national origin, age, or handicap. Any barriers that students encounter for these reasons should be discussed with this office so that we may aid in their removal.

Speech and Hearing Center

Mary Wade, Director
107 Leasure Hall
532-6879, 532-6873

The Speech and Hearing Center provides evaluation, management, and consultation services. Services are extended 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. A purpose of the center is to provide educational and clinical experiences for students who are preparing for careers in speech-language pathology and audiology. Students may call for information or may be referred by instructors.

Child Care

The KSU Child Care Cooperative is a nonprofit corporation formed in June 1985 by parent students and employees of Kansas State University to serve the child care needs of KSU students, faculty, and staff. It is fully licensed by the state of Kansas and is professionally staffed. Its facilities are in building "L" of Jardine Terrace.

The KSU Child Care Cooperative offers full-day programs for infants (ages two weeks to one year and walking), toddlers (ages 12 months and walking through 2½), preschoolers (ages 2½ through 5), and school age children when the public schools are not in session. Limited part-time program spaces are offered to families of toddler through school age children who need regular flexible care.

The goal of the cooperative is the nurturing of the whole child. Continuity with family life is fostered through parent participation, family events, and times for conferring and sharing between parents and caregivers. Quality of care is assured in each program by a consistent caregiver or teacher, a well-planned program, and explicit expectations for the operation of the program.

For further information about the Cooperative and application for enrollment, call the office at 539-1806.

Department of Human Development and Family Studies

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 is on the east edge of campus. The facility integrates children who have speech and language disabilities with nonhandicapped children, and accommodates an age range from 2½ to 5 years. Both full-day and part-day enrollment options are available.

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

Further information and applications for enrollment can be obtained by calling the Department of Human Development and Family Studies at 532-5510.

The 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 state. Sponsored by the College of Human Ecology, 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, family life education, nutritional counseling and consultation, and financial counseling. 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 seminar—Working With Families—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.

The Family Center is open 8:00 a.m. to 5:00 p.m. Monday through Friday. For further information call 532-6984 or 776-6566.

Kansas State University Alumni Association

Larry Weigel, Executive Director
111 Hollis House
532-6260

The Kansas State University Alumni Association, formed on June 24, 1874, is a 28,000-member organization dedicated to promoting K-State. It's not a department of the University devoted to the alumni; rather, it's 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 bimonthly *K-Stater*, and sponsorship of local alumni gatherings and class reunions.

Offices for the association are in Hollis House on the northwest corner of campus.

Kansas State University Foundation

Arthur F. Loub, President
103 Hollis House
532-6266, 532-7150

The Kansas State University Foundation has been designated as the official fund-raising arm of the University and 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 those services which 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 1,950 scholarships and the processing of 32,000 gifts annually, while administering total assets of \$73,000,000. 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.

University Press of Kansas

Fred M. Woodward, Director
329 Carruth
Lawrence, Kansas 66045
KANS-A-N 564-4154

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. KSU joined the consortium in 1967 when the press was officially reorganized by the Kansas Board of Regents. Until mid-1982, the operation was known as the Regents Press of Kansas.

The University Press of Kansas is the first American university press to operate as a statewide consortium under the specific sponsorship of all the state's universities. A member of the Association of American University Presses since its founding in 1946, the press has published over 400 titles, with some 224 currently in print. Its ongoing American Presidency Series, with 19 titles issued to date, has been praised as "one of the most interesting and rewarding historical series in this country."

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.

KSU Police Department

Southeast corner, Memorial Stadium
532-6412 (24 hours)

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

Additionally, parking and traffic control are a part of the overall responsibility delegated to KSU Police Department. A parking information booklet is available, and in part states: "All motor driven vehicles, except mopeds, parked on University property must be identified with a University parking permit or a guest

permit. Permits may be purchased at the KSU Police Department. Driving and parking of motor vehicles are governed by regulations established by a student-employee Traffic and Parking Council, by authority of K.S.A.—74:3211."

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 KSU Central Mail Service in the west end of Dykstra Hall 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.

Student Publications

David Adams, Director
103 Kedzie Hall
532-6555

Student Publications Inc. is a nonprofit student publishing corporation which publishes the daily student newspaper, *The Kansas State Collegian*; the student yearbook, the *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 of the *Collegian* three times each year: fall, spring, and summer terms. The board names a student advertising manager three times annually. The *Royal Purple* editor is chosen in the spring for the following year-long term. The editors and advertising managers hire students for a variety of staff positions, and these persons are directly responsible to the editor or ad manager.

The Collegian and *Royal Purple* are intended as student forums and represent the students' views. They each have faculty advisors, but the content is determined and controlled solely by the editors and student staffs. Both publications have been recognized nationally as the top student publications in America in recent years.

Administrative Faculty

General Administration

BEATTY, DANIEL D., Prof., Personnel (1956). AB 1947, Hope Col.; MBA 1949, U. of Michigan.

BECK, GLENN H., VP Emeritus for Agriculture (1936). BS 1936, U. of Idaho; MS 1938, Kansas St. U.; PhD 1950, Cornell U.

BIRNEY, DEBORAH D., Asst. Dir. of Personnel (1979). BS 1976, Kansas St. U.

CHALMERS, JOHN, VP for Academic Affairs and Prof. Emeritus of Finance and Economics (1963). AB 1938, Middlebury Col.; PhD 1943, Cornell U. (*)

CHASTAIN, MELVIN L., Dir. of Educational Communications Center (1987). BA 1961, MA 1962, U. of Denver; PhD 1970, Texas A & M.

CLEGG, VICTORIA L., Asst. Prof.; Dir. of Office of Educational Improvement, Planning and Evaluation Services (1976). BS 1965, Kansas St. U.; MA 1972, Wichita St. U.; PhD 1979, Kansas St. U.

COCKE, ENID O., Dir. of English Language Program; Instr. (1983). BA 1967, Scripps Col.; MA 1982, Kansas St. U.

COFFMAN, JAMES R., Provost; Prof. of Surgery and Medicine (1981). BS 1960, DVM 1962, MS 1969, Kansas St. U. (*)

COOL, VINCENT, Assoc. Dir. of Facility Planning (1950). BArch 1951, Kansas St. U.

COYNER, SANDRA J., Assoc. Prof.; Dir. of Women's Studies; Women's Studies Faculty (1978). BA 1967, Rice U.; MA 1969, Bryn Mawr Col.; PhD 1975, Rutgers U. (*)

DOWNEY, RONALD G., Prof.; Dir., Educational Research, Planning and Evaluation Services (1975). BA 1966, U. of Texas; MA 1968, PhD 1971, Temple U.

DURAI, DEIVAN, Computer Information Specialist, Planning and Evaluation Services (1987). BS 1976, MS 1978, Indian Agricultural Research Inst.; PhD 1984, Kansas St. U.

GARVIN, W. LAWRENCE, Dir. of Facility Planning (1985). BS 1948, Washington and Lee U.; BArch 1952, Ohio St. U.; MArch 1958, Massachusetts Inst. of Tech.

HOYT, DONALD P., Asst. Provost; Prof. and Dir. of Planning and Evaluation Services (1968). BS 1948, U. of Illinois; MA 1950, PhD 1954, U. of Minnesota. (*)

JOHNSON, CATHERINE B., Asst. Technical Reporting Specialist, Planning and Evaluation Services (1987). BS 1979, Kansas St. U.; MS 1981, Memphis St. U.

JOHNSON, MICHAEL G., Asst. to the Pres. for Governmental Relations (1980). DDS 1963, U. of Missouri-Kansas City.

KISSEL, MARY S., Asst. Dir. of Affirmative Action (1983). BA 1965, Berea Col.; MA 1983, Kansas St. U.

KRUH, ROBERT F., Assoc. Provost; Dean of the Graduate School; Prof. of Chemistry (1967). BA 1948, PhD 1951, Washington U.-St. Louis. (*)

LAMBERT, JOHN P., Assoc. Prof.; Dir. of Public Safety (1964). BS 1959, Lebanon Valley Col.; MS 1963, U. of Michigan; PhD 1975, Kansas St. U.

LARSON, VERNON C., Asst. Provost for International Programs; Prof. of Agriculture (1962). BS 1947, MS 1950, PhD 1954, Michigan St. U.

LINDSEY, LAVERNE B., Asst. Provost for Continuing Education (1983). EdD 1974, Mississippi St. U.

LOONEY, MICHAEL C., Instr., TV Specialist (1985). AA 1976, Dodge City Comm. Col.; BS 1979, Kansas St. U.

MILLER, GEORGE E., VP for Administration and Finance (1984). BS 1961, MEd 1963, EdD 1969, U. of Maryland.

PALLET, WILLIAM H., Coord. of Analytical Studies, Planning and Evaluation Services (1982). MA 1975, U. of Nebraska; PhD 1984, Kansas St. U.

PETERS, CHESTER E., Prof. Emeritus and VP Emeritus for Student Affairs (1947). BS 1947, MS 1950, Kansas St. U.; PhD 1953, U. of Wisconsin.

REAGAN, CHARLES E., Executive Asst. to the Pres.; Prof. of Philosophy (1967). AB 1964, Holy Cross Col.; MA 1966, PhD 1967, U. of Kansas. (*)

ROWLETT, JANE, Asst. Prof.; Dir. of Affirmative Action (1977). BS 1970, MS 1977, PhD 1981, Kansas St. U.

SEATON, RICHARD H., University Attorney (1971). AB 1959, Harvard Col.; LLB 1963, Harvard Law School.

SYKES, ARTHUR E., Dir. of General Services, Physical Facilities (1985). BA 1958, Bowling Green St. U.

TARRANT, DONALD H., Instr.; Planning and Evaluation Services; Dir. of Information Systems (1970). BS 1948, Morningside Col.; MS 1959, Iowa St. U.

THOMPSON, DOROTHY, Assoc. KSU Attorney (1972). BS 1959, Wisconsin St. U.; MA 1965, U. of Wyoming; JD 1978, Washburn U. Law School.

WEFALD, JON, Pres. (1986). BA 1959, Pacific Lutheran U.; MA 1961, Washington St. U.; PhD 1965, U. of Michigan.

Vice President for Administration and Finance

ALLOWAY, JAY E., Assoc. Operating Systems Specialist, Computing and Telecommunications Activities (1970). BS 1970, Kansas St. U.

CONROW, KENNETH, Assoc. Dir. of Academic Users Services, Computing and Telecommunications Activities; Assoc. Prof. of Computer Science (1961). BA 1954, Swarthmore Col.; PhD 1957, U. of Illinois.

ELCOCK, DOUGLAS A., Asst. Dir. of Budget (1983). BS 1971, U. of Kansas; MS 1986, Kansas St. U.

FERCHO, JERRY, Dir. of Personnel Services (1987). BS 1967, MS 1975, North Dakota St. U.

GALLAGHER, TOM L., Dir. of Computing and Telecommunications Activities; Assoc. Prof. of Computer Science (1970). BA 1953, MS 1954, North Texas St. Col.; DSc 1967, Washington U.

GARVIN, RICK L., Assoc. Data Base Administrator of Administrative User Services, Computing and Telecommunications Activities (1972). BA 1970, San Jose St. U.

GATEWOOD, EDGAR C., JR., Asst. Architect, Facilities Planning (1986). BA 1977, U. of Arizona; BA 1970, U. of Randolph-Macon.

HOFFMAN, WALTER C., JR., Asst. Controller, Grants and Contracts (1960). BS 1959, Kansas St. U.

KENNEDY, FAYE L., Coord. of Microcomputing Systems, Computing and Telecommunications Activities (1985). BS 1969, MS 1982, Kansas St. U.

KEPPLE, MELVIN T., Assoc. Dir. of Computer Operations, Computing and Telecommunications Activities (1967). BS 1950, Washburn U.

LUDLOW, SCOTT, Asst. Controller, Accounting Services (1987). BA 1979, U. of Montana.

MILLER, MICHAEL H., Assoc. Dir. of Technical Services, Computing and Telecommunications Activities; Asst. Prof. of Computer Science (1960). BS 1958, MS 1960, Iowa St. U.

RICE, EDWARD D., General Manager of Physical Facilities (1987). BS 1972, U. of Nebraska-Omaha.

SCHELLHARDT, THOMAS G., Asst. VP for Administration and Finance (1986). BS 1967, Southern Illinois U.; MS 1975, Purdue U.

SESLER, WILLIAM H., Dir., Purchasing (1956). BS 1954, Kansas St. U.

STRAUSS, WARREN, Controller (1986). BS 1979, Kansas St. U.

STREETER, JOHN W., Assoc. Dir. of Administrative User Services, Computing and Telecommunications Activities (1985). BS 1973, MBA 1974, Kansas St. U.

STRUVE, JOHN M., Dir. of Budget (1987). BA 1963, Nebraska Wesleyan U.

TAUSSIG, MARK A., Landscape Architect, Facilities Planning (1985). BA 1975, Kansas St. U.

THOMAS, CHARLES E., Dir. of Bramlage Coliseum (1987). BA 1981, U. of South Florida.

THOMPSON, MARVIN A., Dir. of Internal Auditing (1987). BS 1953, Emporia St. U.; MS 1965, Kansas St. U.

YOUNG, ROBERT A., Asst. Dir. of Telecommunications, Computing and Telecommunications Activities (1977). BS 1975, MS 1976, Kansas St. U.

Institutional Advancement

ADLER, KARLA J., Staff Asst./Hall Dir., Housing (1986). BS 1985, U. of Wisconsin-Madison.

AKIN, JAMES N., Assoc. Dir., Career Planning and Placement Center (1966). BS 1962, Kansas St. U.

AMSTEIN, DEANNA, Math Skills Specialist, Academic Assistance (1987). BS 1962, Kansas St. U.

ARCK, WILLIAM, Dir. of Alcohol and Other Drug Educational Services (1982). BS 1978, MS 1979, Kansas St. U.

BASCOM, CHARLES H., Staff Physician, Lafene Student Health Center (1981). MD 1956, U. of Kansas Medical School.

BOLSEN, NANCY F., Dir., KSU Child Care Coop., Housing (1987) PhD 1985, Kansas St. U.

BOSCO, PAT J., Assoc. VP and Dean of Student Life (1971). BS 1971, MS 1973, Kansas St. U.; PhD 1982, U. of Nebraska.

BROOKS, BARBARA L., Staff Asst./Dietitian, Housing (1987). BS 1982, Kansas St. U.

BURKE, CINDY, Health Educator, Lafene Student Health Center (1981). BSN 1978, U. of Virginia; MS 1981, Kansas St. U.

BUTLER, ANNE S., Asst. Dean of Students, Educational Supportive Services, Office of Minority Affairs (1979). BA 1970, E. Kentucky U.; MA 1979, Kansas St. U.

CALDWELL, DIANA, Coord., Minority Affairs (1987). BS 1986, Kansas St. U.

CARR, VERA, Assoc. Dir., K-State Union (1988). BS 1984, Rogers Williams Col.

CONNAUGHTON, JACK, Asst. Dir., K-State Union (1980). BS 1968, MS 1971, U. of Wisconsin-LaCrosse.

COTTER, JOAN E., Staff Asst./Hall Dir., Housing (1987). BA 1986, U. of Wisconsin-Madison.

CRENSHAW, N. CHRISTINE, Assoc. Dir., Student Financial Asst., Operations (1986). BS 1973, SUNY; MS 1982, U. of Iowa.

DAHL, HARVEY O., Dir., K-State Printing Service (1987). BA 1970, U. of North Dakota.

DANSKIN, DAVID G., Prof.; Senior Psychologist, Counseling Center (1959). AB 1950, U. of Redlands; MA 1951, PhD 1954, Ohio St. U. (*)

DAVIS, DONNA J., Dir. of International Student Center (1981). BS 1971, MS 1974, PhD 1982, Kansas St. U.

DAVIS, PAULA J., Staff Physician, Lafene Student Health Center (1985). MD 1976, U. of Iowa.

DAWES, BARBARA E., Assoc. Dir. of Admissions (1979). BS 1961, St. Mary Col., Leavenworth; MS 1979, Kansas St. U.

DEVAULT, GUNILE, Asst. Registrar (1987). BS 1970, Kansas St. U.; MS 1972, U. of Illinois.

DURNFORD, CAROL, Asst. Dir., Student Financial Assistance (1982). BS 1972, U. of Montana.

ECKLUND, ROBERT D., Staff Physician, Lafene Student Health Center (1979). BS 1970, Virginia Polytechnic Inst.; MD 1974, Medical Col. of Virginia.

EDWARDS, A. THORNTON, Dir. Emeritus of Housing (1945). BS 1941, MS 1946, Kansas St. U.

EDWARDS, MARK D., Asst. Instr., Housing (1983). BA 1982, U. of Arkansas; MS 1986, Kansas St. U.

ELKINS, RICHARD N., Dir. of Admissions (1966). BS 1956, MS 1963, Kansas St. U.

ELLIOTT, DENNIS R., Phys. Asst., Lafene Student Health Center (1981). BS 1977, Wichita St. U.; Phys. Asst. Program, 1977, Wichita St. U.

FAIRMAN, JOHN T., Asst. VP, U. Relations (1987). BS 1966, Central Michigan U.

FELDE, ROBERT A., Asst. Dir. of Housing (1979). BA 1972, Luther. Col., Iowa; MSE 1974, U. of Wisconsin-LaCrosse.

FOSTER, DONALD E., University Registrar (1965). BS 1960, MS 1961, Kansas St. U.

FRITH, THOMAS J., Assoc. Prof.; Dir. of Housing (1965). BA 1960, MA 1963, EdS 1965, U. of Iowa.

GERRITZ, ELLSWORTH M., Dean/Prof. Emeritus, Admissions and Records (1954). BE 1937, St. Cloud St. Teachers Col.; MA 1948, PhD 1951, U. of Minnesota.

GREENE, KATHLEEN V., Student Services Admin., Educational Supportive Services (1981). BA 1968, Ottawa U.; BS. Ed, 1971, U. of Kansas; MS 1977, Kansas St. U.

HADEN, DAVID W., Staff Asst./Hall Dir., Housing (1987). BS 1985, Northeast Missouri St. U.

HALVERSON, JOYCE A., Asst. Dir.; Free Recreation Coord., Recreational Services (1982). BA 1976, U. of Northern Iowa; MA 1980, U. of Iowa.

HAWKINSON, DALE P., Math Skills Specialist, Academic Assistance Center (1983). BA 1975, MS 1977, MS 1984, Kansas St. U.

HELLMAN, REBECCA A., Staff Asst./Hall Dir., Housing (1987). BBA 1984, U. of North Dakota.

HOLDEN, GRETCHEN, Coord., Services for Students with Physical Limitations (1982). MA 1968, Rutgers U.

HUTCHISON, MARY LOU, Bookstore Dir., K-State Union (1985). AA 1975, AA 1984, Delaware County Comm. Col.

KEITH, RHONDA C., Publications Editor, U. Publications (1985). BA 1967, MA 1972, U. of Akron.

LACY, BURRITT S., JR., Psychiatrist, Student Health Center (1964). BA 1941, Harvard U.; MD 1944, Cornell U.; 1951, American Board of Psychiatry and Neurology.

LAFENE, BENJAMIN WILLIAM, Dir. Emeritus, Student Health Center (1946). BS 1923, Michigan St. U.; MD 1931, Western Reserve U.

LAMBERT, DORINDA J., Asst. Prof., Div. of Internship Training, Counseling Center (1985). BA 1968, Blackburn Col., Illinois; MA 1977, PhD 1984, U. of Nebraska-Lincoln.

LAUGHLIN, J. BRUCE, Asst. Prof.; Dir., Career Planning and Placement Center (1962). BS 1950, U. of Kansas; MS 1961, Kansas St. U.; JD 1967, Washburn U.

LEWIS, GARLAND G., Asst. Instr.; Admin. Asst., Housing (1973). BS 1972, Kansas St. U.

LOWMAN, KATHLEEN, Asst. Dir., Career Planning and Placement Center (1982). BA 1970, MA 1972, California St. U., Northridge.

LYNCH, JUDITH A., Educational Psychologist; Asst. Dir., Academic Assistance Center (1982). BS 1969, Bethany Col.; MS 1972, MS 1980, PhD 1984, Kansas St. U.

LYNCH, MICHAEL L., Assoc. Prof.; Asst. VP for Personal Dev. Program; Dir., Academic Assistance Center (1972). BS 1967, MS 1968, EdD 1972, Indiana U.

MAGINNESS, PAUL K., Dir. of Photo Services (1968).

MARTIN, DANIEL C., Staff Physician, Lafene Student Health Center (1976). BS 1952, Arkadelphia U.; MD 1958, U. of Kansas; Fellow, American College of Clinical Pharmacology.

MARTINI, STEVE, Asst. Dir.; Intramural Coord., Recreational Services (1980). MA 1977, BA 1974, California St.-Chico.

MAY, CHERYL, Editor, News and Information (1978). BA 1974, U. of Missouri-Kansas City; MS 1985, Kansas St. U.

McGOWAN, REGINLAND, Asst., Minority Affairs (1986). BS 1979, Alcorn U.; MS 1986, Kansas St. U.

McKNIGHT, DAVID E., Consulting Radiologist, Lafene Student Health Center (1972). DVM 1954, Kansas St. U.; MD 1962, U. of Kansas.

McMANIS, HELEN L., Asst. Dir., Food Service; Dietitian, Housing (1966). BS 1941, MS 1972, Kansas St. U.

MILHANDER, MARC T., Staff Psychologist, Lafene Student Health Center (1986). BA 1981, California St. U.; MA 1983, California School of Psych.; PhD 1986, California School Prot. Psych.

MOEDER, LAWRENCE E., Asst. Dir., Student Financial Assistance (1977). BS 1977, MS 1980, Kansas St. U.

MOELLER, LARRY D., Asst. Physician, Lafene Student Health Center (1983). MD 1977, U. of Nebraska-Omaha.

MOLT, MARY, Instr.; Dietitian, Housing (1973). BS 1971, Kearney St. Col.; MS 1973, U. of Oklahoma.

MORROW, SHARON M., Dir., U. Publications (1986). BS 1975, Ball State U.

MUIR, WILLIAM L., Dir. of Economic Development (1987). BS 1977, Kansas St. U.

MURRAY, KIMBERLY, Hall Dir., Housing (1985). BA 1985, Kansas St. U.

NEWTON, FRED, Assoc. Prof.; Dir., Counseling Center (1980). BA 1965, Muskingum Col., Ohio; MA 1967, Ohio St. U.; PhD 1972, U. of Missouri-Columbia.

NICHOLS, KELLY S., Staff Asst./Residence Hall Program, Housing (1986). BS 1985, Kansas St. U.

NOBLE, KATHLEEN, Assoc. Registrar (1987). BS 1967, MS 1972, Fort Hays St. U.

OGG, WILLIAM D., Senior Counselor, Counseling Center, (1965). BS 1956, MS 1964, Kansas St. U.

OLSEN, CHARLOTTE S., Asst. Student Services Admin. (1981). MA 1979, Kansas St. U.

OPPERUD, SARA, Computer Information Specialist, Academic Assistance Center (1985). BA 1983, BBA 1983, Washburn U.

O'NEIL, CAROL, Math Skills Specialist, Academic Assistance Center (1984). BS 1960, MS 1967, Kansas St. U.

PARIS, LARRY, Asst. Foreign Student Advisor, International Student Center (1985). BA 1981, Kansas St. U.

PEINE, CAROLINE F., Senior Student Life Specialist; Asst. Dean of Student Life (1961). AB 1947, Carleton Col.; MS 1951, Kansas St. U.

PENCE, JOHN T., Instr.; Head, Residence Hall Food Services; Asst. Dir., Housing (1963). BS 1963, Purdue U.; MS 1970, Kansas St. U.

PESCI, PATRICK, Instr.; Dietitian, Housing (1975). BS 1973, Indiana U. of Pennsylvania; MS 1981, Kansas St. U.

PETERS, CHESTER E., Prof. and VP Emeritus for Student Affairs (1947). BS 1947, MS 1950, Kansas St. U.; PhD 1953, U. of Wisconsin.

POWELL, SHERYL A., Dietitian, Housing (1984). BS 1978, MA 1980, Washington St. U.

PROCTOR, SANDRA B., Staff Asst./Dietitian, Housing (1987). BS 1977, Kansas St. U.

PROITE, ROSANNE, Asst. Dir. of Housing (1983). BS 1977, U. of Wisconsin-Stevens Point; MA 1979, Western Illinois U.

RENTMEESTER, SHARON, Staff Asst./Hall Dir., Housing (1986). BA 1984, U. of Wisconsin-Madison.

ROBEL, BARBARA K., Greek Affairs Advisor (1974). BA 1965, Kansas St. U.

ROBEL, RAYDON H., Dir., Recreational Services (1970). BS 1965, MS 1970, Kansas St. U.

ROUTSON, SALLY, Student Life Specialist; Coord. of Student Activities (1978). BA 1973, Wittcnberg U., Ohio; MEd 1978, U. of Illinois.

RYAN, THOMAS, Staff Physician, Lafene Student Health Center (1980). BS 1966, William & Mary Col., Virginia; MD 1970, U. of Virginia.

SABATKA, TANYA L., Staff Asst./Dietitian, Housing (1987). MS 1976, Kansas St. U.

SALAHU-DIN, HAKIM A., Asst. Dir. of Admissions (1981). BA 1974, Florida International U.; MS Administration of Justice 1980, Wichita St. U.; PhD 1987, Kansas St. U.

SAND, JAMES, Hall Dir., Housing (1985). BS 1980, MA 1985, Northwest Missouri St. U.

SCHEULE, BARBARA, Dietitian, Housing (1981). BA 1980, U. of Nebraska-Lincoln; MS 1985, Kansas St. U.

SCHUETTE, CLIFFORD G., Asst. Prof.; Assoc. Psychologist, Counseling Center (1975). AA 1967, Del Mar Comm. Col.; BBA 1969, U. of Texas-Austin; MS 1973, EdD 1975, East Texas St. U.

SCOTT, SUSAN, Dir., Assoc. Prof., Asst. Dean of Student Life (1977). BA 1973, MS 1974, Emporia St. U.; PhD 1981, Kansas St. U.

SILLS, JACK L., Dir., K-State Union (1962). AB 1958, Kansas Wesleyan U.

SISSON, MALLEY, Food Service Dir., K-State Union (1980). BS 1971, U. of Missouri-Columbia.

SMITH, GUY M., Staff Physician, Lafene Student Health Center (1980). MD 1971, U. of Virginia.

SPICHER, VALERIE K., Art Dir., U. Publications (1983). Certificate in Commercial Art, Des Moines Area Community Col.

STOVER, ENID H., Learning Skills Specialist, Academic Assistance Center (1983). BS 1942, Northern Colorado U.; MS 1975, Kansas St. U.

SULTEMEIER, PAIGE, Dietitian, Housing (1984). BS 1983, Texas Tech. U.

SWITZER, VERYL A., Asst. Prof.; Asst. VP for Special Services, Office of Minority Affairs and Special Programs (1969). BS 1954, MS 1974, Kansas St. U.

THEOBALD, MICHAEL J., Staff Asst./Hall Dir., Housing (1987). BS 1985, Northwest Missouri St. U.

TOUT, ROBERT C., Dir., Student Health Center (1977). BS 1949, West Texas St. U.; MD 1953, Southwestern Med. School, U. of Texas-Dallas.

TROTTER, MARILYN B., Instr.; Dir. of New Student Programs (1967). BS 1965, MS 1967, Kansas St. U.

URBAN, DIANNE K., Attorney, Student Governing Association (1983). JD 1983, Washburn U.

VITERNA, LARRY L., Dir., Student Financial Assistance (1986). BS 1967, MS 1971, U. of Nebraska-Lincoln.

WAINSCOTT, CY, Dir., News and Information (1985). BA 1957, Wartburg Col.

WEINACKER, EMILY L., Hall Director, Housing (1982). BA 1982, New Mexico St. U.; MS 1985, Kansas St. U.

WILLIAMS, MARY M., Academic Coord., Minority Affairs (1987). BA 1982, Marymount Col.; MS 1985, Kansas St. U.

WISEMAN, DENISE, Dietitian, Housing (1985). BS 1977, Kansas St. U.

YODER, DAVID D., Hall Director, Housing (1982). BS 1973, Kansas St. U.

Alumni Association

HARTENSTEIN TOLENTINO, BETH, Dir. of Publications (1983). BS 1980, MS 1988, Kansas St. U.

HERBIC, VICKI, Dir. of Records (1964).

JOHNSTON, CHRISTINE, Dir. for Administration and Finance (1984). BS 1977, MACC 1984, Kansas St. U.

KLINGLER, BECKY, Dir. of Alumni Club Programs (1987). BS 1986, Kansas St. U.

RENZ, AMY BUTTON, Dir. of Membership (1977). BS 1976, MPA 1986, Kansas St. U.

THIBODEAU, FRED, Assoc. Dir. (1988). MDiv 1977, St. Paul School of Theology.

WALLERSTEDT, PENNIE, Dir. of Administrative Programs (1980).

WEIGEL, LAWRENCE N., Exec. Dir., KSU Alumni Association (1978). BS 1967, MS 1968, Kansas St. U.

Foundation

ANDREWS, RUSTY, Dir. of Communications (1983). BS, Manhattan Christian Col.

BUCHHEISTER, JAMES, Asst. Controller (1984). BS, MBA 1984, Kansas St. U.

CARLSON, GLENNIS, Dir. of Administrative Services (1969).

DOWELL, GORDON R., Asst. Dir. of Communications (1985). BS 1983, Kansas St. U.

DOWNEY, DOROTHY J., Administrative Asst. (1983).

HEAD, MURRAY, Asst. Dir. of Planned Giving (1986). BS 1985, Washburn U.

HELLEBUST, GARY, Dir. of Corporate and Foundation Relations (1986). BS 1969, Kansas St. U.

HEYWOOD, KENNETH M., VP Emeritus (1956). BS 1938, Kansas St. U.

LONGBERG, LESLIE C., Controller (1977). BS 1968, Kansas St. U.; MBA 1973, U. of Western Florida; CPA 1974, Kansas.

LOUB, ARTHUR F., Pres. (1979). BA 1952, Duke U.

MOORE, S. MARK, Dir. of Planned Giving (1979). BS 1974, Kansas St. U.

MUIR, WILLIAM L., Dir. of Economic Development (1987). BS 1977, Kansas St. U.

WEAVER, DAVID L., Property Manager (1983). BS 1970, Kansas St. U.

Student Publications

ADAMS, DAVID L., Dir., Student Publications; Assoc. Prof. of Journalism (1981). BS 1969, Washburn U.; MS 1972, U. of Kansas; EdS 1977, Ft. Hays St. U.; PhD 1984, Kansas St. U.

FREELAND, GLORIA B., Asst. Dir. of Student Publications; Asst. Prof. of Journalism (1983). BA 1975, MBA 1983, Kansas St. U.

Intercollegiate Programs

Secondary Majors

Kansas State University offers secondary majors in American ethnic studies, gerontology, industrial and labor relations, international studies, Latin American studies, South Asian studies, and women's studies. Open to students in all colleges, these secondary majors are designed to be taken concurrently with the student's 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.

As interdisciplinary programs, secondary majors provide students with an opportunity to understand the viewpoints and methodologies of a multiplicity of disciplines as they are focused on a central subject. Secondary majors thus allow the student to participate in the process of the integration of knowledge. For some students, these interdisciplinary programs are career oriented, the special concentration providing extra qualifications for employment.

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, Interim Coordinator

Professors Boyer,* C. Flora,* Lapping,* O'Brien,* H. Ottenheimer,* Rappoport,* Royster,* and Suleiman,* Associate Professors Armagost,* D. Benson,* McElroy,* D. Nieman,* A. Pigno, and R. Taylor,* Assistant Professors A. Cochran, De la Pedraja, and Wigfall.

American ethnic studies, as intercollegiate and interdisciplinary programs, have resulted from a reawakened interest in understanding and accepting the ethnic identity and heritage of the peoples of this nation.

While the discipline of anthropology has traditionally offered courses about Native American Indians, African Americans, and

Hispanic Americans, other disciplines have neglected these groups until recently. In the late 1960s such disciplines as history, sociology, political science, psychology, English, and modern languages brought their particular disciplinary tools to bear on the experiences of these previously neglected peoples. Professional programs in journalism, education, and business also developed courses focused on these ethnic groups.

At Kansas State University, 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 multi-ethnic, multi-racial, multi-cultural 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.

The secondary major

The coordinator of the program will advise secondary majors.

Students completing 24 semester hours of course work in a minimum of two departments of the University may earn a secondary major in American ethnic studies.

The course requirements are:

- DXX 160 Introduction to American Ethnic Studies
(3 hours, DAS/DHE/DED-160-0-0313)
ANTH 200 Introduction to Cultural Anthropology
(3 hours; section especially compatible with the American ethnic studies program)
Senior Research Project (3 hours)

Area courses (15 hours)

- A. Afro-American, Hispanic American, and Native American Indian ethnic groups of the United States (6 hours)
B. Ancestral cultures of Afro-American, Hispanic American, and Native American Indian ethnic groups of the United States (3 hours)
C. Any United States ethnic group or the ancestral culture of a United States ethnic group (6 hours)

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.

The following are courses for which American ethnic studies credit can be earned. Each semester a list of approved courses will be published in the schedule of classes.

Area courses

- A. Afro-American, Hispanic American, and Native American Indian

General

- ANTH 515 Creativity and Culture
JMC 645 The Minority Press 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.

- EDCI 605 Teaching in a Multi-Cultural Society
EDCI 730 Education of the Disadvantaged
EDCI 733 Curriculum Materials for Ethnic Diversity
HDFS 750 Low Income Families
PSYCH 535 Social Psychology

Afro-American

- ANTH 536 Black Cultures of the Americas
ANTH 555, Black Music of the Americas
MUSIC 555
ENGL 651 Twentieth-Century Afro-American Literature
ENGL 659 Literature of the New Black Renaissance
HIST 535 History of the South
HIST 539 Black American History
MUSIC 420 History of Jazz
MUSIC 424 Jazz in Kansas City and the Southwest
MUSIC 425 Topics in Jazz
PE 703 Minority Groups in Sports
PE 745, Sociology of Sport
SOCIO 745
POLSC 616 Discrimination and the Law
HDFS 652 Black Family

Mexican American

- ENGL 652 American Indian and Chicano Literature
HIST 561 Colonial Hispanic America

Native American Indian

- ANTH 533 Indians of Kansas
ANTH 630 Indians of North America
ART 662 Southwestern Indian Arts and Culture
ENGL 652 American Indian and Chicano Literature
HIST 537 History of the Indians of North America

- B. Ancestral cultures of Afro-American, Hispanic American, and Native American Indian ethnic groups of the United States

African

- ANTH 550 Cultures of Africa
ANTH 536 Black Cultures of the Americas
ANTH 555 Black Music of the Americas
POLSC 526 African Politics

Latin American

- ANTH 532 Mexican and Central American Indians
ANTH 634 Indian Cultures of South America
ANTH 673 Pre-Columbian 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
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
POLSC 522 Latin American Politics

Native American Indians

- ANTH 570 American Indian Archaeology
C. Any United States ethnic groups and the ancestral cultures of those groups (all the courses listed under categories A and B and the following)

General

- ANTH 220 Introduction to Linguistic Anthropology
ANTH 515 Creativity and Culture
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 Administration in Developing Nations
SOCIO 510 Social Welfare as a Social Institution
SOCWK 510
SOCIO 740 Comparative Social Systems

Asian

ANTH 505, ECON 505, GEOG 505, HIST 505,
POLSC 505, SOCIO 505

Introduction to the Civilizations of
South Asia I

ANTH 506, ECON 506, GEOG 506, HIST 506,
POLSC 506, SOCIO 506

Introduction to the Civilizations of
South Asia 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
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

Jewish

HIST 596 Holocaust: The Destruction of the
European Jews

Middle Eastern

POLSC 624 Middle Eastern Politics
POLSC 653 International Politics of the Middle East

Russian

GEOG 650 Geography of the Soviet Union
HIST 250, Russian Culture and Civilization
RUSSN 250
HIST 564 The Russian Revolution and the Soviet
System
HIST 591 History of Russia to 1801
POLSC 627 Soviet-Style Regimes

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 KSU validated courses of transfer students will be accepted for American ethnic studies credit upon validation by the American Ethnic Studies Governance Board.

Gerontology

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.

Secondary major in gerontology Undergraduate

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 in five colleges in

the University. 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, Small Business Management (MANGT 202), an approved 480 clock-hour internship (six credit hours, DAS or DHE 515), Long-Term Care Administration (SOCWK 610C), and at least one course in each of 10 training code areas as defined by the Kansas Board of Adult Care Administration. With planning, the emphasis can be completed within 27 credit hours and a six to twelve 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.

Students taking the secondary major in gerontology should consult the Center for Aging staff, One Fairchild Hall, 532-5945.

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. 315-0-4900 (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. 415-0-4900 (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) a weekly seminar that makes use of student's experience to integrate long-term care theory and practice. Concurrent enrollment in a three-credit hour class in long-term care administration is also required. Pr.: Senior standing, enrollment in secondary major in gerontology—emphasis in long-term care administration. DHE-515-0-1301

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)

College of Architecture and Design

Architecture
ARCH 730 Environmental Design and the Aging
Process (codes 1, 7, 9)

Regional and community planning

PLAN 315 Introduction to Planning (Gerontology)
(codes 1, 2, 7, 9)
PLAN 610 Community Development Workshop

College of Arts and Sciences**Biology**

BIOL 240 Structure and Function of the Human
Body (code 5)

(Only three of the six credits for this course count toward the secondary major in gerontology.)

BIOL 310 Biology and the Future of Man

English

ENGL 535 Themes in Literature: Literature of
Aging

Physical education and leisure studies

PE 335 Physiology of Exercise (codes 5, 7)
LS 488 Recreation for Special Populations
(code 6)
LS 493 Therapeutic Recreation Services*
LS 501 Therapeutic Processes in Rehabilitation
Agencies*

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 610C Topics in Long Term Care Administra-
tion (code 6)

Sociology

SOCIO 744 Social Gerontology: An Introduction to
the Sociology of Aging (codes 6, 7)

Speech

SPPAT 605 Communication Disorders of the
Elderly
THTRE 665 Theatre for Special Populations

College of Education**Adult and occupational education**

EDAO 780 Educational Gerontology

College of Human Ecology**Clothing, textiles, and interior design**

ID 751 Designing for Exceptional Needs
(codes 1, 2, 7)

Human development and family studies

HDFS 510 Human Development and Aging (codes
5, 6, 7)
HDFS 654 Death and the Family (codes 5, 7)
HDFS 704 Seminar on Sexuality in Middlecence
and Aging
FEC 770 Economics of Aging

Foods and nutrition

FN 132 Basic Nutrition (code 5)
FN 718 Physical Health and Aging
(codes 1, 2, 5)

*Project approval from the Center for Aging needed.

For more information about the secondary major in gerontology, contact the Center for Aging, One Fairchild Hall, Manhattan, Kansas 66506, (913) 532-5945.

Graduate emphasis in gerontology

The graduate emphasis in gerontology is an interdisciplinary program, designed to be taken concurrently with or in addition to a master's or doctorate degree. The total program requires 14 to 18 credit hours, some of which may overlap with requirements for the student's degree. The specific requirements are as follows: one graduate level (700+) course in gerontology in the student's own discipline (three credit hours); two graduate level (500+) courses in gerontology in disciplines other than the student's own (six credit hours);

practicum-colloquium in gerontological setting (three credit hours); master's project, thesis, or report, or Ph.D. dissertation with gerontological focus or relevant to aging (two to six credit hours).

Departmental course electives

Graduate courses currently offered at KSU included in this emphasis program are:

College of Agriculture

Horticulture

HORT 525 Horticulture for Special Populations

College of Architecture and Design

Architecture

ARCH 730 Environmental Design and the Aging Process

Regional and community planning

PLAN 610 Community Development Workshop

College of Arts and Sciences

English

ENGL 535 Themes in Literature: Literature of Aging

Physical education and leisure studies

LS 501 Therapeutic Processes in Rehabilitation Agencies*

LS 862 Leisure Counseling

Psychology

PSYCH 520 Life Span Personality Development

PSYCH 715 The Psychology of Aging

Social work

SOCWK 566 Social Work in Aging Services

SOCWK 610C Topics in Long Term Care Administration

Sociology

SOCIO 744 Social Gerontology: An Introduction to the Sociology of Aging

SOCIO 944 Seminar in the Sociology of Aging

Speech

THRE 665 Theatre for Special Populations

College of Education

Administration and foundations

EDAF 862 Leisure Counseling

Adult and occupational education

EDAO 780 Educational Gerontology

College of Human Ecology

DHE 515 Long-Term Care Administration Internship

Clothing, textiles, and interior design

ID 751 Designing for Exceptional Needs

Human development and family studies

HDFS 510 Human Development and Aging

HDFS 654 Death and the Family

HDFS 845 Adult Development and Aging

HDFS 704 Seminar on Sexuality in Middle Adulthood and Aging

FEC 770 Economics of Aging

Foods and nutrition

FN 718 Physical Health and Aging

FN 817 Nutrition and the Aging

*Project approval from Center for Aging needed.

For more information about the graduate emphasis in gerontology program contact the Center for Aging, One Fairchild Hall, Manhattan, Kansas 66506, (913) 532-5945.

Industrial and Labor Relations

The secondary major in industrial and labor relations provides students 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.

Secondary major in industrial and labor relations undergraduate

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.

Students interested in the secondary major in industrial and labor relations should contact the Department of Management in the College of Business Administration, 19 Calvin Hall, 532-6296, for additional information and counseling.

I. 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

II. Restricted electives (6 hours)

Two courses from:

ECON 540 Managerial Economics
HIST 554 American Labor History
MANGT 637 Industrial Conflict Resolution
SOCIO 546 Bureaucracy in Modern Societies
PSYCH 550 Group Dynamics

III. 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 Psychology of Women at Work
PSYCH 625 Engineering Psychology
PSYCH 564 Organizational Psychology

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

The international studies program is designed in part to promote understanding of the international community and is characterized by a strong commitment to a multi- and interdisciplinary orientation. The program provides students not only a field of academic study, but also a background for those interested in training for various careers.

The international studies 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.

To complete the secondary major, students must complete the equivalent of four semesters of a modern foreign language. In addition, they must complete 21 hours from the approved course list, as well as the required Senior Seminar in International Studies.

Courses in the program are divided into A and B groups. Group A courses are global, international, or comparative. Group B courses are concerned primarily with some aspect or aspects of a foreign cultural realm. The elective courses must be taken in at least two of the following colleges: agriculture, architecture and design, arts and sciences, business administration, and human ecology. No more than six hours may be applied from a single discipline or a single world region, and no more than six hours may be counted toward both a secondary major in area studies and in international studies.

At least nine hours must be drawn from Group A courses. Courses in the international studies program may also serve to meet general studies requirements for the bachelor's degree. Special topics courses may be included with the approval of the international studies committee. All students working toward a secondary major in international studies will have an advisor who teaches in the international studies program. Careful advising for students in the program is extremely important to achievement of desirable breadth and perspective.

Courses listed below are those for which students may receive credit in the international studies program.

Interdisciplinary

A DAS 425. Senior Seminar in International Studies. (3) I, II. An intercollegiate, interdisciplinary course focusing on a major international issue or issues. In order to complete supervised independent study and discussion, students will present papers which integrate and draw upon their previous academic experience in the international field. Pr.: Completion of 15 hours of course work in international secondary major. DAS-425-0-4903

College of Agriculture

A AGE 015 International Agricultural Development 3

College of Architecture and Design

A PDP 510 Man and His Surroundings 3
B ARCH 655 Foreign Seminar Var.
A PLAN 715 Planning Principles 3

College of Arts and Sciences**Anthropology**

B ANTH 505	Introduction to the Civilization of South Asia I	3
B ANTH 506	Introduction to the Civilization of South Asia II	3
A ANTH 507	Peasant Society	3
A ANTH 511	Cultural Ecology and Economy	3
A ANTH 519	Practical Anthropology	3
B ANTH 536	Black Cultures of the Americas	3
A ANTH 604	Culture and Personality	3
A ANTH 610	Social Organization in Nonliterate Cultures	3
B ANTH 632	Indians of Middle America	3
B ANTH 634	Indian Cultures of South America	3
B ANTH 650	Cultures of Africa	3
A ANTH 685	Race and Culture	3

Economics

B ECON 505	Introduction to the Civilization of South Asia I	3
B ECON 506	Introduction to the Civilization of South Asia II	3
A ECON 636	Capitalism and Socialism	3
A ECON 681	International Trade	3
A ECON 682	Economics of Underdeveloped Countries	3

Geography

A GEOG 440	Geography of Natural Resources	3
A GEOG 450	Geography of Economic Behavior	3
A GEOG 460	Future Worlds	3
B GEOG 620	Geography of Latin America	3
B GEOG 640	Geography of Europe	3
B GEOG 650	Geography of the Soviet Union	3
A GEOG 710	Geography of Hunger	2
A GEOG 715	World Population Patterns	3
A GEOG 720	Resources and Economic Development	3
A GEOG 780	Cultural Geography	3

History

B HIST 505	Introduction to the Civilization of South Asia I	3
B HIST 506	Introduction to the Civilization of South Asia II	3
A HIST 544	History of U.S.-Soviet Relations Since 1917	3
B HIST 560	Latin American Nations	3
B HIST 562	Modern Mexico	3
B HIST 573	Twentieth-Century Europe	3
B HIST 574	Europe Since World War II	3
A HIST 577	European Diplomatic History II	3
B HIST 584	History of France Since 1715	3
B HIST 587	Modern Germany, 1789-1914	3
B HIST 588	Modern Germany, 1914-1945	3
B HIST 592	Grandeur and Decline of Imperial Russia	3
B HIST 623	An End to Empire: The Dynamics of Asian Nationalism	3
B HIST 702	South Asian History II	3
B HIST 766	Modern Eastern Europe	3
B HIST 769	The Russian Revolutions and the Soviet System	3
B HIST 780	Rise and Fall of the House of Hapsburg	3

Journalism and mass communications

A JMC 670	International Communications	3
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Modern languages

B FREN 502	French Literature in Translation	3
B GRMN 503	German Literature in Translation	3
B RUSSN 504	Russian Literature in Translation: The Nineteenth Century	3
B SPAN 505	Spanish Literature in Translation	3
B MLANG 507	European Literature in Translation	3

B RUSSN 508	Russian Literature in Translation: The Soviet Period	3
B FREN 514	French Civilization	3
B GRMN 530	German Civilization	3
B SPAN 565	Spanish Civilization	3
B SPAN 566	Hispanic-American Civilization	3

Political science

B POLSC 505	Introduction to the Civilization of South Asia I	3
B POLSC 506	Introduction to the Civilization of South Asia II	3
B POLSC 511	Contemporary Chinese Politics	3
A POLSC 545	The Politics of Developing Nations	3
B POLSC 721	European Political Systems	3
B POLSC 722	Latin American Politics	3
B POLSC 723	South Asian Political Systems	3
B POLSC 724	Middle Eastern Political Systems	3
B POLSC 725	Southeast Asian Political Systems	3
B POLSC 726	African Political Systems	3
B POLSC 727	The Soviet Political System	3
B POLSC 728	Comparative Security Establishments	3
A POLSC 729	Administration in Developing Nations	3
A POLSC 741	International Relations	3
A POLSC 743	American Foreign Policy	3
A POLSC 745	International Politics of Europe	3
A POLSC 747	International Law	3
A POLSC 749	International Defense Strategies	3
A POLSC 751	International Organization	3
A POLSC 752	International Politics of South Asia	3
A POLSC 753	International Politics of the Middle East	3

Sociology

B SOCIO 505	Introduction to the Civilization of South Asia I	3
B SOCIO 506	Introduction to the Civilization of South Asia II	3
A SOCIO 540	Social Organization	3
A SOCIO 740	Comparative Social Systems	3
A SOCIO 741	Social Differentiation and Stratification	3
B SOCIO 742	South Asian Social Systems	3
A SOCIO 770	Sociology of Dominant-Minority Relations	1-3

College of Business Administration

A MKTG 544	International Marketing	3
A FINAN 654	International Financial Management	3
A MANGT 690	International Management	3

College of Human Ecology

A FN 703	Nutrition in Developing Countries	3
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For more information about the secondary major in international studies, contact Charles Bussing, Department of Geography, 202 Dickens Hall, Manhattan, Kansas 66506, 532-6327.

Latin American Studies

The secondary major in Latin American studies complements course work by students in their chosen majors. Course requirements in at least four disciplines provide a diverse introduction to Latin American culture. The senior seminar allows students to do independent study using information sources from different disciplines.

To complete the course requirements for the secondary major students must complete two years (four semesters) of Spanish or Portuguese or have equivalent competence in either language. Students must also select 21 hours of course work in a minimum of four departments. No more than nine hours in any department may be counted as part of secondary major requirements. The senior seminar in Latin American studies is required.

The following courses are those for which students may receive credit for the secondary degree in Latin American studies. Courses not listed here may be approved as deemed appropriate by the Latin American studies committee, and could be accepted in addition to the approved list.

Language requirement

Two years of Spanish or Portuguese or equivalent competence in either language

Area courses

21 hours; in addition to the Senior Seminar, courses must be taken in a minimum of four departments

Interdisciplinary (required)**College of Arts and Sciences**

DAS 407	Senior Seminar in Latin American Studies
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College of Agriculture**Horticulture**

HORT 505	Comparative Agriculture: Latin America
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College of Arts and Sciences**Anthropology**

ANTH 532	Mexican and Central American Indians
ANTH 536	Black Cultures of the Americas
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
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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

Music

MUSIC 555	Black Music of the Americas
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Political science

POLSC 722	Latin American Politics
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Sociology

SOCIO 733	Gender, Power, and Development
SOCIO 734	Sociology of Agricultural Development
SOCIO 736	Applied Agricultural and Rural Change in Developing Countries

For more information about the secondary major in Latin American studies, contact Bradley Shaw, Department of Modern Languages, Eisenhower Hall, Manhattan, Kansas 66506.

South Asian Studies

Aruna Michie, Director

South Asian studies at KSU focus on the geographic, linguistic, and cultural regions of Afghanistan, Bangladesh, Pakistan, India, Nepal, Sri Lanka, Bhutan, and the Maldives Republic.

The basic South Asia courses at KSU 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. In addition, language training is offered in Urdu (the national language of Pakistan and a major language in India) and Hindi (the official language of India). 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. This secondary major is open to any student at KSU. A student receives, along with the primary major, a broad interdisciplinary education concerning the Indian subcontinent, whose people constitute twenty percent of humanity and who are the inheritors of ancient and highly sophisticated civilizations famous in the West for their religions, philosophy, music, art, literature, architecture, and science. Students are prepared for graduate work on South Asia or may specialize in various careers.

This interdisciplinary 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 within 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 KSU, 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 for the secondary major in South Asian studies:

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 of the 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.

See appropriate college section of this catalog for further description.

Economics

ECON 699	Seminar in Economics: South Asia
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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

Graduate work

Specialization in South Asian studies is possible at the master's level in history, political science, and sociology, and, in selected instances, for Ph.D. students in history and sociology.

Cultural events

In addition to its on-campus instructional program, the center sponsors occasional cultural events, colloquia, visiting public speakers, a film series, and courses and public lectures at other institutions. It also provides audiovisual support, training, and consultation to elementary and secondary teachers interested in developing South Asia units in their curricula.

For further information on South Asian studies, contact the director, South Asia Center, 22 Eisenhower Hall, Manhattan, Kansas 66506, (913) 532-5738.

Women's Studies

Sandra Coyner, Director

Professors Bixler, C. Flora,* J. Flora, Neely,* Oukrop, and Saal; Associate Professors Anderson, Benson, Coyner,* Culley, Gray, Hausmann, McElroy, Richter, and Scott; Assistant Professor Zschoche.

The women's studies program focuses on women, whose changing roles and expectations are the most profound and widespread social phenomenon of our time. All social institutions, from politics and industry to the family and the arts, are affected by these changes, as are all individuals, including men and children as well as women themselves. Traditional expectations no longer hold, as an entire society adjusts to the fact that most women will work outside the family most of their lives, and are entitled to equal opportunity with men in all spheres of human life.

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 which 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.

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. The courses listed below have

been approved for credit toward the secondary major in women's studies.

For more information or advising in women's studies, contact Sandra Coyner, director, 22 Eisenhower Hall, (913) 532-5739.

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, home economics, 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-105-0-4903

*xxx 405. **Senior Seminar in Women's Studies.** (3) II. 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-405-9-4903

*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-505-0-4903

*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

Women's studies courses offered by departments

See appropriate college sections in this catalog for further description.

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")

Biology

- BIOL 397 Topics in Biology (when offered on "Science, Sex, and Society")

English

- ENGL 515 Literature and Society (when offered on "Third World Women Writers")
ENGL 525 Women in Literature
ENGL 699 Special Studies (when offered as "American Women's Autobiographical Writings")

Physical education and leisure studies

- PE 775 Issues of Women and Sports

History

- HIST 512 Women in European History
HIST 533 Topics in the History of the Americas (when offered as "Images of Women in American Popular Culture, 1900-1980," "Women in Latin America," "Gender Roles, Sexuality, and the American Medical Profession, 1800-Present," "A Social History of

American Medicine," "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 "Women, Sex Reform, and Feminism in America" or "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")

Philosophy

- PHILO 397 Experimental Studies in Philosophy (when offered as "Feminist Issues in Philosophy" or "Feminism and Traditional Socio-Political Theory")
PHILO 525 Social-Political Philosophy (when offered as "Women in Western Thought")

Political science

- POLSC 706 Sex and Politics
POLSC 799 Pro-Seminar in Political Science (when offered as "Women, the Constitution, and the Supreme Court")

Psychology

- PSYCH 540 Psychology of Women
PSYCH 543 Women's Mental Health Issues
PSYCH 563 Gender Issues in the Workplace
PSYCH 790 Topics in Psychology (when offered as "Feminist Therapy" or "Nonsexist Psychology")
PSYCH 959 Seminar in Social Psychology (when offered as "Psychology of Women")

Social Work

- SOCWK 543 Women's Mental Health Issues
SOCWK 610 Topics in Social Work (Violence Against Women)

Sociology

- SOCIO 545 The Sociology of Women
SOCIO 633 Gender, Power, and International Development

Speech and theatre

- THTRE 782 Women in Theatre

Journalism and mass communication

- JMC 612 Women and the Media

College of Education

Administration and foundations

- EDAF 686 Topics in Education (when offered as "Programming for Women's Concerns")

Adult and occupational education

- EDAO 650 Women, Education, and Work

Curriculum and instruction

- EDCI 635 Curriculum Materials for Nonsexist Teaching

College of Human Ecology

Human development and family studies

- HDFS 250 You and Your Sexuality
HDFS 300 Problems in Family and Child Development (when offered as "The Mature Woman: Middle Age and Later Years")
HDFS 350 Family Relationships and Sex Roles
HDFS 865 Human Sexuality
FEC 600 Economic Status of Women
HDFS 465 You and Your Sexuality
HDFS 708 Topics in Family and Child Development (when offered as "Patterns of Women's Lives" or "The Legal Rights of Women")

Honors Programs

Students at Kansas State University may enroll in honors programs in seven colleges of the University: agriculture, architecture and design, arts and sciences, business administration, education, engineering, and human ecology.

Questions Honors Students Often Ask:

What is the purpose of KSU honors programs?

First, to identify gifted, enthusiastic, ambitious, highly imaginative students and to provide special courses which relate to but are different from regularly scheduled courses. Second, to provide this group of students with a sense of community by bringing them together in different academic situations so that they may benefit from both academic and social exchanges.

How do honors classes differ from regular classes?

Most honors classes are smaller in enrollment and depend more heavily upon student investigation and reporting than do regular classes. There is likely to be greater opportunity for students to set their own academic directions and to investigate issues and problems of their own particular interests. Honors classes are related to other classes in the University, however, in that they provide important basic introductions to various disciplines. The distinguishing characteristic of honors classes is the students themselves, who are typically more energetic, more critical, more inquisitive, and more committed to intellectual inquiry. Honors students love to learn.

What are the rewards of completing the honors program?

The real answer to this question is, of course, the intangible reward of having learned as much as one can in a course of study which has been challenging and exciting, whatever one's academic interests or professional goals. More specifically, the honors student may expect that critical skills will have been sharpened and investigative powers strengthened by the special projects which the honors program will have provided. The unique emphasis upon independent study and individualized curricular planning are other sources of academic growth for the honors student. Successful completion of the honors program is recorded on a student's transcript and diploma, so that the effort made to complete the undergraduate degree in challenging circumstances will be clear to everyone who looks at an honors student's record.

What honors opportunities are available to me if I am enrolled in an honors program at KSU?

These opportunities may, perhaps, be best described by considering the individual honors programs of the University separately. All honors courses are open to all honors students, regardless of which college they enroll in.

College of Agriculture

The honors program in the College of Agriculture encourages students to recognize and respond to the challenges of scholarly inquiry in various areas of professional and scientific agriculture. It also enables students to investigate some of the related social, political, economic, and international issues which are of concern to agriculturists everywhere.

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 for independent research activities.

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.

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 involved 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.

College of Architecture and Design

The honors program in the College of Architecture and Design is intended for those students who wish to be challenged by scholarly inquiry beyond the requirements of regular courses. Information can be obtained in the office of the Department of Environmental Design, 532-6846.

College of Arts and Sciences

The honors program in the College of Arts and Sciences is available to all students who enroll in the college. Freshmen register for the noncredit seminar, DAS 010, Introduction to the Honors Program in Arts and Sciences, which is offered every semester. In this seminar students become acquainted with the honors program and with the unique opportunities for them in the College of Arts and Sciences. They become acquainted with other students in the program, as well as with many members of the faculty in the college.

Students with high ACT scores may elect special honors sections of lower-division courses including English Composition I. Participants in the program are required to take ENGL 125, English Honors Composition II.

After completing both the orientation course and English Honors Composition II, achieving a grade point average of 3.5 in one semester and an overall grade point of 3.3 for the freshmen year, students are admitted to upper-level honors course work. Sophomore seminars, junior colloquia, and a senior research project provide a rich array of honors experiences.

College of Business Administration

The honors program in the College of Business Administration enables students to develop broad intellectual interests and investigate current issues and research related to business and industry. Seminars, lectures, and convocations on topics of interest to business students will be offered.

College of Education

The honors program in the College of Education is for those 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 that 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 Kansas State University.

Students in the education honors program will: explore at greater depth the professional education topics which are a part of the required program for teacher certification; encounter and pursue issues and special interests within the field of education; engage in forums which enable them to interact in challenging academic settings with faculty and other honor students within the University; and seek greater self-improvement as professional teachers.

Admission to the honors program in education will be granted after the student:

1. Presents a written statement of interest in the program.

2. Submits an ACT composite score of 28 or higher or evidence of a cumulative grade point average of 3.5 in a minimum of nine semester hours of college work.
3. Enrolls in the noncredit course, DED 010, Introduction to the Honors Program.
4. Has a satisfactory interview with a faculty member of the honors program coordinating committee.

The academic work in the program includes a special section of EDAF 315, Educational Psychology; DED 320, Honors Seminars; and DED 420, Honors Research. Honors seminars, offered each semester, focus on topics that broaden the knowledge of future teachers and give them insight into leadership responsibilities in their professions.

Honors Research, DED 420, provides the opportunity for students to work with professors having similar research interests. Research topics may be selected from a wide range and they may reflect the student's particular interests. Students are encouraged to develop creative approaches to problems pertinent to the educational process.

College of Engineering

The honors program in the College of Engineering is open to entering freshmen with high school averages or KSU entrance exam scores within the top five percent of students entering the college. Qualified transfer students and upperclassmen also may join the program, following individual evaluations of their academic records. Honors students are entitled to enroll in special sections of many basic courses that offer them opportunities for close association with faculty and with similarly gifted and motivated students in the College of Engineering.

In the freshman and sophomore years students participate in a variety of seminars and colloquia which enrich and broaden their educational experience. Recent seminar and colloquium topics include "Alternative Energy Sources," "Limits to Growth," "Priorities in the Use of Energy," and "Professionalism in Modern Society." Honors students also are encouraged to individualize their programs of study by a liberal course substitution policy which helps to meet the individual interests of honors students.

The culminating activity of the honors student in the junior and senior years is an independent research or design project which is carried out under the direction of a faculty member. These projects provide not only close association with the faculty advisor but the opportunity to complete an extended investigation into a topic of personal interest and to express the creative

abilities of the individual student. Among others, recent topics have included "The Location of New Power Plants," "The Development of a Walking Robot," and "Response Measurements in Nuclear Detection Equipment."

College of Human Ecology

Students in the College of Human Ecology are selected for membership in the honors program according to ACT scores or, in the case of transfer students and other students who have completed some college course work, achievement of a requisite grade point average.

The program recognizes students for outstanding academic achievement and encourages participation in and appreciation of research. Honors students have the opportunity to explore areas outside their major field of study and to interact with graduate students and faculty members at various events and activities.

In the junior or senior year, students complete an honors project on a topic of their choice. They develop these projects with a human ecology faculty advisor, 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.

Academic honoraries

Major academic honorary societies on the KSU campus include Phi Beta Kappa, the nation's oldest academic honorary, Golden Key, and Phi Kappa Phi. Honors students aspire to membership in these societies, as well as in many others which are more closely related to specific academic disciplines throughout the University.

Graduate School

R. F. Kruh, Dean
F. L. Lee O'Neill, Assistant to the Dean
Robert P. Lowman, Associate Dean
Bert R. Biles, Assistant Dean for Sponsored Programs
John O. Mingle, Executive Vice President,
KSU Research Foundation

101 Fairchild Hall
532-6191

Graduate study

Graduate study requires high academic achievement, and it extends the student's experience and capabilities within advanced, specialized areas of the chosen field. With 68 master's programs and 38 doctoral programs, Kansas State University offers preparation for a variety of scholarly and research careers as well as for a wide range of professional positions.

A common objective is to develop the capacities needed for independent study and research, for research is the mode of learning at the limits of knowledge. All doctoral programs and most master's programs develop such capacities by requiring students to carry out original research under the direction of faculty members expert in their fields. A crucial part of the process involves the preparation and publication of the research study in the form of a thesis or dissertation and a defense of the study before the faculty. In certain professional master's programs the emphasis is on preparation for professional practice, and, although a thorough understanding of research and research methodology is developed, the student may not have to complete a program of original thesis research in such cases.

Students pursuing graduate studies are enrolled in the Graduate School and are subject to the policies of the University's graduate faculty as well as the regulations of their specific programs.

Kansas State University has extensive resources for the conduct of graduate study and research, and the various programs are supported by a combination of state, federal, corporate, and private funding directed through the colleges, the Agricultural Experiment Station, the Engineering Experiment Station, and the Bureau of General Research.

Graduate degrees

Master of science

Agricultural economics
Agricultural engineering
Agricultural mechanization
Agronomy
Anatomy and physiology
Animal sciences
Architectural engineering
Biochemistry
Biology
Chemical engineering
Chemistry
Civil engineering
Clothing, textiles, and interior design
Computer science
Crop protection
Education
Adult, occupational, and continuing education
Agriculture education
Educational administration
Elementary education
Home economics 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
Journalism and mass communications
Mathematics
Mechanical engineering
Microbiology
Nuclear engineering
Physical education
Physics
Plant pathology
Psychology
Recreation
Statistics
Surgery and medicine
Veterinary laboratory medicine
Veterinary pathology

Master of arts

Economics
English
Geography
History
Mathematics
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

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
Educational psychology
Student counseling and personnel services
Engineering
English
Entomology
Food science
Foods and nutrition
Genetics
Grain science
History
Human ecology
Horticulture
Mathematics
Microbiology
Physical education
Physics
Physiology
Plant pathology
Psychology
Sociology
Statistics
Veterinary pathology

Degree requirements

Master's degree. Subject to the approval of the major department,* the candidate may choose one of the following program options: (1) a minimum of 30 semester hours of graduate credit including a master's thesis of six to eight semester hours; (2) a minimum of 30 semester hours of graduate credit including a written report of two semester hours either of research or of problem work on a topic in the major field; or (3) a minimum of 30 semester hours of graduate credit in course work only, but including evidence of scholarly effort such as term papers, production of creative work, and so forth, as determined by the student's supervisory committee. Candidates for the master of public administration must complete at least 42 hours, the master of regional and community planning degree a minimum of 48 hours, the master of business administration 33 hours, and the master of fine arts 60 hours.

The student's program of study is prepared with the assistance of a supervisory committee consisting of the major advisor and two other graduate faculty members. The program is subject to the approval of the dean of the Graduate School upon recommendation of the advisory committee and the appropriate department head or program chairman, and should be submitted to the Graduate School prior to the end of the candidate's second term. The program may be modified on further recommendation of the advisory committee and the approval of the graduate dean.

Three copies of theses and reports are required. All such reports and theses will be bound in cloth in accordance with specifications for Class A binding of the Library Binding Institute. To cover the cost of binding, students must deposit with their reports or theses a money order made out to KSU Library. The University Library will forward manuscripts to the bindery for the candidate. If students desire to publish all or part of their theses before the degree is conferred, major professors should notify the Graduate School in advance by letter. If approved by the major professor, master's theses may be placed on file with University Microfilms, which will also publish an abstract in *Master's Abstracts*. The current fee is \$30. Since master's theses and reports are submitted as a part of degree requirements, the University retains the right to publish any portion as a contribution to knowledge. Patentable items created under University auspices are subject to the Regents' patent policy.

Successful completion of a final oral examination or comprehensive written

examination or both shall be required of all master's degree candidates, the specific form being determined by individual departments. The final examination is administered by the advisory committee and may include a defense of the thesis or report, an interpretation of other scholarly products, or a testing of the student's understanding of the field(s) of study.

Doctoral degrees. Normally, students admitted to doctoral study hold the master's degree, but some programs allow highly qualified students to proceed directly from the bachelor's degree to the doctorate. Completing a master's degree at Kansas State University does not automatically lead to admission to doctoral study, and a separate application must be made to the department and approved by the graduate dean for those intending to continue to the Ph.D.

Award of a doctorate requires the successful completion of the equivalent of at least three years of full-time study beyond the baccalaureate as well as the completion of a major research study reported in a doctoral dissertation. Completion of the program involves more than the accumulation of credits, and its duration is variable because the time required to finish the research study cannot be anticipated. In completing research and the resulting dissertation, students must adhere to the enrollment requirements described in the later section on registration and enrollment.

During the first year of study beyond the master's degree or its equivalent, a supervisory committee is formed for each student. Committee members are proposed by the student and major advisor, subject to approval by the department head and the dean of the Graduate School. The committee consists of at least four members of the graduate faculty, one of whom is the major advisor who serves as chair. At least one member shall be from a program different from that of the major advisor. The committee aids the student in the preparation of the program of study (which must be approved by the dean of the Graduate School) and has charge of the preliminary examination. Before the preliminary examination is arranged, the student must have on file in the Graduate School a program of study approved by the supervisory committee.

Ordinarily, at the close of the second year of graduate study and at least seven months before the final examination, the student must have met the preliminary examination requirement, successful completion of which is a necessary condition for admission to doctoral candidacy. The supervisory committee is responsible for recommending candidacy to the Graduate School. At this time the graduate dean appoints an outside chairperson. Early in the graduate work a dissertation subject is chosen in the major

field and approved by the supervisory committee. The dissertation must represent original investigation, contributing new knowledge or understanding to the candidate's field. On completion of at least three years of graduate study as prescribed by the supervisory committee and on completion of a dissertation, the candidate must pass a final examination. Final dissertation copies with abstracts must be submitted to the dean of the Graduate School as a last requirement to be met for award of the degree. Inasmuch as the dissertation is submitted to the University in satisfaction of degree requirements, the University retains the right to use or publish any portion thereof as a contribution to knowledge. Moreover, patentable items created under University auspices are subject to the Regents' patent policy.

If consistent with departmental policy, the format of theses and dissertations may be in a style suitable for submission to a professional journal. In such cases, additional introductory material, bibliographies, and other supplementary information not to be submitted with the journal manuscript should be included as appendices.

All dissertations will be bound in cloth in accordance with specifications for Class A binding of the Library Binding Institute. To cover the cost of binding students must deposit with their dissertation copies a money order made payable to the KSU Library. The University Library will forward manuscripts to the bindery for the candidate. Each dissertation is microfilmed and an abstract is published in *Dissertation Abstracts*. The current fee is \$40.

If publication of the dissertation, in whole or in part, is to be made before the degree is conferred, the major professor should notify the dean of the Graduate School by letter in advance of such publication. Publication of any part of a dissertation should show, through footnote or otherwise, that the material is from a dissertation presented in partial fulfillment of the requirements for the degree doctor of philosophy in the subject department at Kansas State University. The written approval of the major professor should be filed in the Graduate School office in the case of any student seeking to copyright a dissertation.

Doctor of education. The Ed.D. is offered through the College of Education. While many of the requirements are the same as those for the Ph.D. and noted in another section of this catalog, it has some that are unique. Residence for the Ed.D. may be accomplished by one of the following patterns: four summers within a five-year period in which 27 hours of course work are completed; three summers within a four-year period in which 24 hours of course work are completed, with a minimum of six hours of course work completed in one

*As used in the Graduate School the term "department" refers to interdepartmental graduate groups as well as to departmental faculties in the usual sense.

intervening semester; 24 hours of course work within 12 calendar months.

A total of 94 semester hours must be completed. Up to 30 hours for a master's degree and at least 14 hours of dissertation research may be included as part of the total. See College of Education section for additional specific requirements for the Ed.D.

Doctor of philosophy. Students admitted to Ph.D. programs must complete a year of full-time study in residence at Kansas State University during which time they must complete at least 24 hours of regular degree credit requirements. Furthermore, a minimum registration of 30 hours in research is required, not including work done toward a master's degree. Programs must include at least a total of 90 semester hours. The foreign language requirement for the Ph.D. is determined as a matter of policy by the graduate faculty in each department. There is no such requirement in the following programs: agronomy, animal sciences, economics, education, food science, foods and nutrition, genetics, grain science, human ecology, horticulture, pathology, plant pathology, psychology, and sociology. For all other programs the department should be consulted for details of the foreign language requirement. Where a language is required, it is understood that "foreign language" refers to languages other than English and that the language(s) required would have a significant body of literature relevant to the field. Required foreign language examinations are administered by the Department of Modern Languages. The language requirement must be satisfied before the student is admitted to candidacy.

Student responsibility. Graduate students are held responsible for knowing all published academic policies and degree requirements. They are likewise held responsible for knowing the regulations concerning the degree they plan to take and any special requirements within the department or academic unit. In addition, it is the student's responsibility to be informed regarding the University's policies as to the standard of work required for continued enrollment in the Graduate School. The Graduate School office should be consulted if additional information is needed.

Note to graduate students. Although it is customary for many graduate students to work continuously throughout the year, especially on thesis and dissertation research, the major advisor or certain supervisory committee members may not be available during the summer months. This is especially the case for faculty members on nine-month appointments who may be pursuing other activities off campus during that time. Students should take such possibilities into account in scheduling

various examinations and thesis or dissertation review.

Graduate credit. The course and research requirements for graduate degrees are expressed in terms of graduate credit. Graduate credit may not be earned by examination or by correspondence.

Grades. The following grades are used in the Graduate School: A, B, C, D, F, Credit, No Credit, Incomplete, and Withdrawn. A candidate for an advanced degree must have a 3.0 grade point average and make a grade of B or better in three-fourths of the credit hours attempted at KSU (excluding research, problems, internships, practica, or other individualized study). To count for graduate credit the grade in a course must be C or better and no course may be counted more than once. Retaken courses remain on the transcript and are considered as part of the record. A graduate student's record will be reviewed after completion of six hours of graduate work.

Academic probation and dismissal.

Admission to and continuation in the Graduate School depend upon a high level of achievement. Accordingly, students who do not maintain satisfactory progress in their studies are subject to being placed on probation or denied the privilege of continued enrollment in the University or in a specific graduate curriculum and, in either case, will be so notified by the dean of the Graduate School. No student on probation may receive a graduate degree. A graduate student may be denied continued enrollment in the University or in the graduate curriculum in the case of:

- (a) failure to satisfy conditions necessary for removal from probationary status;
- (b) the accumulation of six or more semester hours of work with grades of less than B, and/or a grade point average less than 3.0 exclusive of problems courses, practica, internships, research, or other individualized study;
- (c) failure to meet published departmental requirements or failure in qualifying examinations, preliminary examinations, or final degree examinations;
- (d) demonstrable lack of diligence in removal of assigned deficiency courses, in meeting published degree requirements, or in maintaining normal progress toward a graduate degree; and
- (e) failure to acquire mastery of the methodology and content of one's field sufficient to complete a successful thesis or dissertation. A student denied the privilege of continued enrollment may petition the graduate dean for reinstatement to the same curriculum or for admission to a different curriculum.

Nongraded work. At the discretion of the graduate faculty of the department concerned, seminars or colloquia in which letter grading conflicts with the objectives intended may be offered on a Credit/No

Credit or Pass/Fail basis rather than for a letter grade. The seminars and colloquia which are to be offered for Credit/No Credit or Pass/Fail shall be listed with the dean of the Graduate School. All courses on the program of study except research (report, thesis, or dissertation) and seminars or colloquia which have been approved for Credit/No Credit or Pass/Fail must be taken for letter grades. All research credit hours must be graded as Credit/No Credit. Independently of the program of study, additional courses may be taken on a Credit/No Credit or Pass/Fail basis with the approval of the major professor and the professor offering the course. These courses may not be applied toward a degree. No more than three hours of Credit/No Credit or Pass/Fail courses may appear on the program of study for the master's degree nor more than six for the Ph.D.

Validation of credits. Kansas State University credits which have been acquired more than six years prior to receiving a master's degree or seven years prior to receiving a Ph.D., require validation either by repeating the course, by passing an advanced course in the subject, or by successfully completing a validation examination. Credits transferred from other universities may not be validated. However, credits in a doctoral program which have been earned as part of a master's degree remain valid and require no further validation. Validation is to be completed at least one semester before the effective date of the degree. The preliminary examinations may not be used for validation.

Assistantships and fellowships

In order to support research, scholarship, and the acquisition of advanced degrees, the University offers several kinds of financial aid for graduate students. These include fellowships, traineeships, teaching assistantships, and research assistantships. Applications for graduate teaching assistantships and graduate research assistantships should be made directly to the department concerned before March 15 for the following academic year.

Graduate teaching assistantships and graduate research assistantships. Award of assistantships is based on the student's ability and promise and is usually made for either nine or twelve months. The maximum appointment is for half time, but appointments for lesser fractions also may be made. Students are eligible for staff fees during each term in which they hold an appointment for at least 0.4 time. In addition, students who have been on appointments for at least 0.4 time during the spring term are eligible for staff fees during the following summer term even though they do not hold assistantships. The

maximum enrollment for assistants is 10 hours for half-time and 12 hours for 0.4-time appointments; the minimum is six hours in the regular terms and three in the summer. The corresponding maximums for a summer term are five and six hours respectively. Students desiring such appointments may obtain application blanks from the head of the department concerned.

All prospective graduate teaching assistants who are non-native speakers of English shall be required to achieve a minimum score of 220 on the TSE to be eligible for employment. All prospective graduate teaching assistants shall have their spoken English competency assessed prior to any teaching assignment through an interview with not fewer than three institutional personnel. Any graduate teaching assistant having classroom or laboratory instructional responsibility and/or direct tutorial responsibilities, other than for courses or sessions conducted primarily in a foreign language, found to be potentially deficient shall be required to achieve a minimum score of 220 on the TSE even if such student has previously achieved such score prior to appointment.

In addition to assistantships the University has a number of fellowships and traineeships available. Several departments also have federally supported traineeships available under the programs of the National Institutes of Health and other agencies.

Admission

Admission to graduate study does not imply admission to candidacy for an advanced degree. For a doctoral degree such candidacy is confirmed only upon successful completion of preliminary examinations.

Correspondence regarding admission to the Graduate School should be addressed to the appropriate department, which will supply application blanks and supplementary information about its program. Applicants should see that each undergraduate or graduate institution previously attended sends official transcripts directly to the appropriate department head. The application and transcripts should be received by the department at least three months before the time the student expects to enroll. All transcripts become part of the student's official file and may not be returned.

All new graduate students are required to fill out a medical history form for Lafene Student Health Center.

Entrance requirements. An application for admission to the Graduate School ordinarily implies the student's intention to work toward an advanced degree. To be considered for admission with full standing the applicant must have:

A bachelor's degree from an institution accredited by one of the regional accrediting associations.

Adequate undergraduate preparation in the proposed major field or equivalent evidence of an appropriate background for undertaking an advanced degree program.

An undergraduate average of B or better in the junior and senior years.

Applicants to the Graduate School at K-State must have a bachelor's degree substantially the same as the ones granted by K-State. These degrees regularly contain a broad range of courses representing the basic academic disciplines. In addition, a major portion of the courses included should be graded by a multilevel system, usually A, B, C, D, F.

Applicants holding degrees not meeting these standards may be denied admission to graduate degree programs in Kansas. Admission will be denied to applicants possessing bachelor's degrees with a significant amount of credit awarded for work experience which was not supervised by a faculty member of an accredited university nor evaluated in units which identify the academic content. On the other hand, a limited amount of credit for experience, when awarded as an acceptable part of a bachelor's degree for internships, field experience, or the like, will not be cause for denial of admission, but it must be clearly delineated as graded work.

For those whose grades do not meet the above standards, probationary admission may be granted, provided there is other evidence that the applicant has the ability to do satisfactory graduate work. Such evidence might include an excellent record of postgraduate work at another institution, or high scores on the Graduate Record Examination or the Miller Analogies Test. Those who wish to take the Graduate Record Examination should apply to Educational Testing Service, Box 955, Princeton, New Jersey 08540. The fee for either test must be paid by the applicant.

Students may be admitted provisionally if there is uncertainty in evaluating transcripts, as in the case of some international students, or if there are undergraduate deficiencies which must be removed.

Once admitted, probationary and provisional students will be advised of other conditions to be met to attain full standing. Full standing is attained automatically upon completion of at least nine hours of course work for graduate credit with a grade of B or better, and upon the removal of any deficiency which was specified at the time of admission. Students admitted on probation may be denied continued enrollment if they do not achieve full standing or if they receive any grade less than a B.

Students who do not plan to work for an advanced degree may be admitted to the Graduate School as special students.

Applications from such students should be sent to the department in which they plan to take courses or directly to the Graduate School together with a copy of the official transcript from the institution which granted the undergraduate degree. A special student who later wishes to enter a degree program must undergo the full review process. No more than nine semester hours earned as a special student may be transferred into a regular degree program.

International students. International applicants for admission to Kansas State University must, in most cases, meet the same academic standards for admission as those required of native students. In addition, international applicants holding nonimmigrant visas are required by U.S. immigration regulations to be enrolled in a full course of study. University regulations require 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.

The Graduate School requires each foreign applicant whose native language is not English to demonstrate facility in the English language by making a satisfactory score on the Test of English as a Foreign Language (TOEFL). This test is required in the interest of assuring that the student's progress toward a degree is not jeopardized by language difficulties. The TOEFL is offered several times a year in the student's home country through the Educational Testing Service, Princeton, New Jersey. Further information is available from the Graduate School office. Foreign students are advised to take the TOEFL as early as possible to avoid delays in processing their applications for admission.

In addition to the TOEFL all international students entering Graduate School will be required to demonstrate proficiency in written and oral English at the time of enrollment. Students who fail to meet this requirement must enroll in and satisfactorily complete ENGL 075, SPCH 065, or both, as appropriate. Those who are determined to need substantial extra work in English will be required to participate in the Intensive Language Program.

A special orientation and advising program is conducted for new international students one week before the date of enrollment.

Registration and enrollment. Students who have been admitted to the Graduate School register and pay their fees during the regular registration period.

Students enrolled in short courses or workshops during the summer session may take regularly scheduled courses as long as they are able to attend all sessions of both. The enrollment should not exceed the maximum number of hours allowed in the summer session.

Not more than 16 hours, including those obtained in research, may be assigned in a single semester, nor more than nine hours during a summer session. If a part of the assignment is for undergraduate credit, a student may be assigned to 17 hours during a semester or ten hours during a summer session. Full-time staff members of the University may not be assigned to more than six hours in one semester, nor more than three hours in a summer session, and may enroll only with the permission of their supervisors. (See section on assistantships and fellowships for limitations applying to students holding assistantships.) These limitations apply to classes audited as well as classes for which credit is earned.

Any change in a student's enrollment should be carried out through the regular procedures and must be accompanied by the approval of the student's advisor and the dean of the Graduate School.

All graduate students who have matriculated at Kansas State University and are using faculty time and/or University facilities for research or other academic pursuits must be enrolled. The enrollment should reflect, as accurately as possible, the demands made on faculty time and use made of University facilities. Further, a graduate degree candidate must be enrolled during the semester in which the requirements for a degree are completed.

A student working for the Ph.D. must enroll during the session in which the preliminary examination is taken and subsequently in each semester (summer sessions excepted) until the degree requirements are met and the dissertation is accepted by the Graduate School. Failure to enroll will result in loss of candidacy. To regain candidacy, the student will be re-examined over the areas covered in his preliminary examinations in a manner to be determined by the supervisory committee. If it is necessary to interrupt progress toward the degree after the preliminary examination has been passed, the student (or the major professor) may petition for leave of absence for up to one year which subsequently may be renewed. Renewals for those who are meeting a military service requirement will be automatic. The petition must be submitted at least one month before the effective date of leave. Approval must be granted by the major professor,

chair of the department or graduate group, and the dean of the Graduate School.

Candidates who do not live in the vicinity of Manhattan, within 30 miles from campus, may make arrangements to enroll by mail but should request permission for doing so by writing the Graduate School office prior to the enrollment period.

Fees. See the general information section in the front of this catalog for detailed information about fees. Graduate teaching assistantships on regularly budgeted positions are eligible for reduction of the incidental fee in proportion to the level of their appointments.

Graduate study by seniors. Seniors at Kansas State University who have a B or better average on prior work and who are within two semesters of receiving a bachelor's degree may take up to nine semester hours of course work for graduate credit. Those wishing to take more than nine semester hours must apply for admission and be accepted by the Graduate School.

MASUA Traveling Scholar Program

As a member of the Mid-America State Universities Association, Kansas State University participates in the MASUA Traveling Scholar Program. Universities cooperating include: Iowa State University; University of Kansas; Kansas State University; University of Missouri at Columbia, Kansas City, Rolla, and St. Louis; University of Nebraska; University of Oklahoma; and Oklahoma State University.

The MASUA Traveling Scholar Program is designed to provide breadth and depth in the opportunities for graduate study offered at MASUA universities by permitting graduate students to study at another MASUA university where they may utilize unique facilities or specializations.

Graduate students at MASUA universities are eligible to participate in this program for a minimum of one term of enrollment. The student's major advisor initiates the proposal for the student's participation by contacting the professor at another MASUA university where the student wishes to study. The graduate dean at each MASUA university involved must concur in proposed participation. During the time of participation, the student will register for the appropriate number of hours and pay fees at the home university. Funds have been available on a competitive basis to pay a small dislocation allowance to MASUA scholars. Additional information concerning the MASUA Traveling Scholar Program is available in the Graduate School office.

Organizations, housing, loans

For information about student organizations, graduate student housing, and loans, see the general information section of this catalog.

Interdepartmental degree programs

The Graduate School recognizes the importance of programs involving interrelationships between fields and has established graduate faculty groups to plan programs and supervise research in interdisciplinary fields. These programs are described in the following paragraphs. For information regarding these programs write to the chair of the appropriate program in care of the Graduate School.

Animal sciences

Jack G. Riley, Chair

The interdepartmental graduate program in animal sciences is offered by faculty members in the Departments of Animal Sciences and Industry, Statistics, Anatomy and Physiology, Grain Science and Industry, and Surgery and Medicine.

Candidates for the master of science or doctor of philosophy degrees in animal sciences may specialize in animal breeding, animal nutrition, animal production and management, animal reproduction, or animal products. The following general requirements will be adhered to:

1. The chair of the student's supervisory committee will be a member of the animal sciences subdivision in which the student wishes to specialize.
2. The student's undergraduate background will include adequate basic courses in animal agriculture and biological and physical sciences. Students may be required to complete additional undergraduate courses in preparation for graduate study when the student's supervisory committee believes it is necessary.
3. The student's supervisory committee will be responsible for development of a program of study which meets any specific requirements established for the subdivision in which the student specializes.
4. The chair of the supervisory committee will direct and advise the student in planning and executing research.
5. There is no foreign language requirement.
6. All requirements of the Graduate School must be met.

Facilities for both basic and applied research include large and small experimental animals, modern laboratories, pilot plants for dairy, poultry, and meat products, and adequate library resources.

Students desiring to specialize in any subdivision should consult the appropriate chair for that area.

Animal breeding

R. R. Schalles, Chair

Professors Craig, Kemp, and Schalles; Associate Professor W. Smith.

The major in animal breeding equips candidates for careers in animal genetics and breeding.

Degree candidates are expected to acquire training in genetics, animal breeding, and statistics. Additional courses may be required from other fields of biological and physical sciences. A typical program of study will include some of the following graduate-level courses: statistical and population genetics; poultry genetics; dairy cattle genetics; population genetics; animal breeding; statistics and experimental design; physiology; anatomy; and computer sciences.

Animal nutrition

L. H. Harbers, Chair

Professors Adams, Bolsen, Brent, Brethour, Deyoe, Frey, Harbers, Hines, Morrill, and Riley; Associate Professors Behnke, Nagaraja, and Shirley; Assistant Professors Cochran, Harmon, Klopfenstein, and Nelssen.

Course work for candidates specializing in animal nutrition will include graduate-level work in areas such as nutrition, biochemistry, physiology, microbiology, statistics, computer science, grain science, and others necessary to meet the specific needs of individual candidates.

Animal production and management

R. H. Hines, Chair

Professors Adams, Allen, Bolsen, Corah, Craig, Dikeman, Hines, Kiracofe, Morrill, Riley, and Schalles; Associate Professor Shirley; Assistant Professors Nelssen and Sigler.

Graduate programs in this area qualify candidates for careers in research, teaching, or extension. Major emphasis is on development of expertise necessary for decision-making in modern animal industries.

Minimum undergraduate preparation for the program is: two courses in chemistry; two courses in mathematics or computer science; two courses in biological science; three courses in economics and/or business administration; and two courses in animal production and management.

Candidates will acquire proficiency in statistics and in two of the following areas: animal nutrition, animal breeding, animal physiology, and animal products.

Courses to complete the program of study may be selected from the following suggested areas (departments) in accord with the interests of the student and upon approval of the student's supervisory committee: animal sciences, agricultural engineering, agronomy, biology, business administration, communications, mathematics, computer sciences, economics, education, food sciences, and grain science.

Animal products

Donald Kropf, Chair

Professors Allen, Cunningham, Dikeman, Fung, Hunt, Kastner, and Kropf; Associate Professor Jeon; Assistant Professor Ikens.

The faculty offers a specialization in meat, dairy, and poultry products as related to their production. Course work will be required to meet the specific needs of students as determined by supervisory committees.

Animal reproduction

G. H. Kiracofe, Chair

Professors Able, Corah, Craig, and Kiracofe; Associate Professors Davis, Blecha, Spire, and Stevenson; Assistant Professors Minton and Sigler.

Degrees equip students for vocations in animal reproduction and related facets of animal physiology. Study will be in reproductive endocrinology, fertilization, the establishment of pregnancy, environmental effects on reproduction, reproductive behavior and related physiology, milk secretion, and applied reproductive physiology.

Degree candidates will receive supportive training in physiology, biochemistry, and statistics. Specific course work may be determined by the supervisory committee to meet the specific needs of individual candidates.

Biochemistry

T. E. Roche, Chair

Professors Burkhard, Clarenburg, Cox, L. Davis, Hedgcoth, W. Klopfenstein, K. Kramer, Nordin, Oehme, Reeck, Roche, Roufa, and Seib; Associate Professors Marchin, Mueller, Muthukrishnan, and L. Takemoto; Assistant Professors Krishnamoorthi, Ochs, Rintoul, D. Takemoto, and Welti.

The graduate biochemistry group has the responsibility for the graduate biochemistry program leading to the M.S. and Ph.D. degrees and is directly responsible to the dean of the Graduate School. The graduate biochemistry group consists of biochemists, regardless of department or college affiliation, who are approved for membership in the graduate biochemistry faculty. An executive committee composed of three members of the graduate biochemistry

group and elected by the group serves an administrative function. One member of the executive committee serves as chairman of the group. Units of the University currently cooperating in the program are biochemistry, physiological sciences, grain science and industry, surgery and medicine, and the Division of Biology.

Entering graduate students must meet the entrance requirements of the Graduate School and must have completed one year of organic chemistry; differential and integral calculus; one semester of analytical chemistry; and a course in biology, including a laboratory. It is preferred that students entering the program have a year of physical chemistry but this requirement may be satisfied by including the year of physical chemistry as a part of the graduate program.

Crop protection

Fred Schwenk, Chair

Professors Blocker, Campbell,¹ Geyer,¹ Schwenk,¹ and Thompson;¹ Associate Professors Bockus,¹ Broce, and Moshier;¹ Assistant Professors Hetrick and Pfender.

¹Crop protection curriculum steering committee

Graduate work leading to a master of science degree in crop protection is offered through an interdepartmental program. It is administered by the crop protection steering committee composed of faculty from the Departments of Agronomy, Entomology, Horticulture, Forestry, and Plant Pathology.

The curriculum trains students to become professional crop protection specialists. Graduates may find employment with federal and state agencies, with industries serving agriculture, as private practitioners, and with individuals and organizations engaged in crop production. A program of study will be developed to meet the needs of each student by a supervisory committee drawn from the crop protection graduate faculty. Course work concentrates on computer science, crop protection, entomology, plant pathology, nematology, statistics, and weed science. Students will generally complete the nonthesis option of the master of science degree.

In addition to meeting the general entrance requirements set by the Graduate School, students must have or complete introductory course work in biology, crops, entomology, plant pathology, and weed management.

Engineering

Richard E. Faw, Chair

Professors Akins, Appl, Azer,¹ Ball, Best, Bissey, Burton, Carpenter, Chung, Clark,¹ Cogley, Cooper, Dahl, Donnert, N. D. Eckhoff, Erickson, Fan, Faw,¹ Gallagher, Gorton, Gowdy, D. L. Grosh, Haft, Hayter, Hodges,¹ Hu, Huang, Hummels, Hwang, Johnson, Kipp, Kirmser, Koelliker, Konz, Kyle, Lee,¹ Lenhart, Lindholm, Lindly, Lucas, Manges, Matthews, Merklin, Miller, Mingle, Rathbone, Russell, Shultis, Simons, Smith, Snell, Spillman, Swartz, Thompson, Tillman, Turnquist, Walawender,¹ Walker, and Williams; Associate Professors Beck, Chang, S. A. Dyer, S. R. Eckhoff, Eggeman, Fenton, Fowler,¹ Glasgow, L. E. Grosh, Jones, Knostman, Krishnaswami, Lamb, Mathews, Schrock, and Steichen; Assistant Professors Cottom, Harms, Lin, Pahwa, Rys, Schlup, Swenson, and Young.

¹Members of College of Engineering graduate committee

The graduate committee of the College of Engineering coordinates the graduate program leading to the Ph.D. in engineering. The committee consists of a representative from each academic department of the college, with the exception of engineering technology, which offers the B.S. degree only. The primary function of the committee is to administer the graduate program policies established by the College of Engineering graduate faculty and the Graduate School.

Within the doctoral program leading to the Ph.D. in engineering, the traditional areas of engineering are represented by the Departments of Agricultural Engineering, Chemical Engineering, Civil Engineering, Electrical and Computer Engineering, Industrial Engineering, Mechanical Engineering, and Nuclear Engineering, with emphases in systems engineering, materials science, energy processes, bioenvironmental engineering, and information processing.

Entering graduate students must meet the entrance requirements of the Graduate School and must have completed the B.S. degree in a field of engineering or a closely related area of science.

Food science

J. M. Faubion, Chair

Professors D. Allen, Bowers, Brent, Chung,¹ F. Cunningham, Deyoe, Dikeman, L. Erickson, Fan, B. Fryer, Fung, Grieg, L. Harbers, Hosney, Hunt, Iandolo, Kastner, Kropf,¹ Kyle, Mugler, P. Nordin, Paulsen, Ponte, Reeck,¹ Seib, Setser,¹ Spears, and Zayas; Associate Professors Canter, A. Davis,¹ S. Eckhoff, K. Grunewald, Jeon,¹ C. Harbers, Pederson, Roach,

and Stone;¹ Assistant Professors Faubion, Iken,¹ and C. Klopfenstein.¹

¹Members of the graduate food science coordinating committee

Graduate work leading to the degrees M.S. and Ph.D. in food science is offered in the Departments of Agricultural Economics; Agricultural Engineering; Agronomy; Animal Sciences and Industry; Biochemistry; Chemical Engineering; Dietetics, Restaurant and Institutional Management; Grain Science and Industry; Foods and Nutrition; Horticulture; and the Division of Biology.

Requirements for entering graduate study in food science are: (1) mathematics, including college algebra; (2) analytical and organic chemistry; (3) a course in physics; (4) an introductory course in microbiology; and (5) a course in botany, zoology, or biology. When the student's committee believes it necessary, the student will be required to take additional undergraduate courses to prepare more completely for the individual program.

Candidates for degrees are expected to select courses so as to give adequate coverage in several food areas, with primary emphasis in one or more areas.

The M.S./Ph.D. program of study shall be expected to include courses in biochemistry, statistics, food microbiology, food chemistry, and food processing/food engineering. No more than six credit hours at the 500 level will be accepted. One credit of Food Science Colloquium (FN 981) for the M.S. degree and two credits of Food Science Colloquium for the Ph.D. degree shall be included. There is no foreign language requirement.

Course requirements will be evaluated by the student's supervisory committee, which will include at least one member of the food science coordinating committee. The chairman of the coordinating committee must approve members of the student's advisory committee and the program of study.

Facilities are available for a comprehensive range of teaching and research activities including pilot plants for milling, baking, dairy products, poultry products, meats, and quantity food production. Laboratories are equipped for research involving food processing, sensory evaluation of food, biochemistry, heat transfer, fluid flow, filtration, evaporation, microbiology, rheology, freeze drying, and nutrition.

Graduate students may select courses from the following lists. See your advisor for details.

Agricultural Engineering

AGE 650 Agricultural Systems Engineering
AGE 700 Agricultural Process Engineering

Animal Sciences and Industry

ASI 502 Principles of Dairy Foods Processing
ASI 550 Dairy Bacteriology
ASI 606 Instrumental Analysis of Food and Agricultural Products
ASI 671 Meat Selection and Utilization
ASI 694 Food Plant Management
ASI 695 Quality Assurance of Food Products
ASI 635 Poultry Meat Technology
ASI 630 Egg Science
ASI 711 Food Fermentation
ASI 713 Rapid Methods and Automation in Microbiology
ASI 715 Chemistry of Foods
ASI 725 Meat Packing Plant Operation
ASI 777 Meat Technology
ASI 818 Fundamentals of Meat Processing and Preparation
ASI 850 Analytical Techniques in Animal Sciences and Industry
ASI 930 Advanced Meat Science

Biochemistry

BIOCH 655 Biochemistry I
BIOCH 656 Biochemistry I Laboratory
BIOCH 670 Principles of Animal Nutrition
BIOCH 790 Physical Biochemistry
BIOCH 830 Animal Nutrition Techniques
BIOCH 840 Intermediary Metabolism
BIOCH 910 Lipids
BIOCH 930 Proteins
BIOCH 940 Chemistry of Carbohydrates
BIOCH 950 Enzyme Chemistry
BIOCH 960 Advanced Animal Nutrition

Biology

BIOL 520 Microbiology of Foods

Chemical Engineering

CHE 530 Transport Phenomena
CHE 550 Chemical Reaction Engineering
CHE 715 Biochemical Engineering
CHE 725 Biotransport Phenomena
CHE 805 Selected Topics in Biochemical Engineering

Engineering Technology

ET 640 Food Processing Operations

Foods and Nutrition

FN 501 Food Science
FN 502 Principles of Nutrition
FN 610 Nutrition Needs Throughout the Life Cycle
FN 612 Principles of Food Product Development and Control
FN 620 Sensory Analysis of Foods
FN 700 Community Nutrition
FN 712 Diet Therapy
FN 750 Nutritional Aspects of Food Processing and Preparation
FN 760 Fundamentals of Food Flavor Analysis
FN 790 Food Research Techniques
FN 814 World Nutrition
FN 816 Application of Food Flavor Analysis
FN 817 Nutrition and Aging
FN 710 Bionutrition
FN 720 Food Systems
FN 960 Proteins in Food Systems
FN 907 Food Dispersions
FN 908 Carbohydrates in Food Systems
FN 910 Advanced Nutrition: Carbohydrates and Lipids
FN 911 Advanced Nutrition: Proteins and Amino Acids
FN 912 Advanced Nutrition: Minerals
FN 913 Advanced Nutrition: Vitamins
FN 981 Food Science Colloquium

Grain Science and Industry

GRSC 500 Milling Technology I
GRSC 602 Cereal Science
GRSC 625 Flour and Dough Testing
GRSC 634 Bakery Technology
GRSC 635 Baking Science I
GRSC 737 Baking Science II

GRSC 651	Food and Feed Plant Sanitation
GRSC 661	Qualities of Feed and Food Ingredients
GRSC 730	Milling Technology II
GRSC 810	Advanced Cereal Chemistry
GRSC 710	Fundamentals of Grain Storage
GRSC 711	Principles of Food Analysis
GRSC 715	Fundamentals of Processing Grains for Food
GRSC 801	Enzyme Applications

Horticulture

HORT 700	Vegetable Crop Physiology
HORT 792	Handling and Processing Fruits and Vegetables

Hotel, Restaurant, Institution Management and Dietetics

DRIM 635	Foodservice Equipment and Layout
DRIM 665	Foodservice Administration
DRIM 805	Computer-Assisted Foodservice Management
DRIM 890	Food Production Management

Genetics

G. H. Liang, Chair

Professors Barnett, Bode, Brent, Clayberg,¹ Craig,¹ Davis,¹ Denell, Gill,¹ Hatchett, Liang,¹ Manney,¹ Nassar,¹ Pittenger, Reeck, Schalles, Sorenson, and Wassom; Associate Professors Browder, Muthukrishnan, Schapaugh, Sears, and Tomb; Assistant Professors Eversmeyer, Leslie, White, and Williams.

¹Members of the genetics coordinating committee

Graduate work leading to the M.S. and Ph.D. degrees in genetics is administered through an interdepartmental program. The program is supervised by a genetics coordinating committee of faculty from participating departments which sets the academic requirements for degrees and assigns one or more of its members to the supervisory committee of each student. A graduate student is associated with the department to which the major professor belongs, but the graduate degree is awarded in genetics.

In addition to the general entrance requirements set up by the Graduate School, students in genetics should have two courses of inorganic chemistry, one course of organic chemistry, an introductory course in genetics, and six additional hours of biological sciences. Students who do not meet these requirements may make up these deficiencies either by examination or by enrolling in the necessary courses during the first year of graduate study. Although the program of study is determined by each student's supervisory committee, the genetics coordinating committee has outlined certain specific requirements. Depending on the area of specialization, a student should fulfill the minimum course requirements in either of the following broad categories:

Genetics Option 1**Master's degree**

A statistics course (700 level)
A course in molecular biology or molecular genetics
Two additional genetics courses from those listed below
A minimum of one hour of graduate-level seminar

Ph.D. degree

A statistics course (700 level)
A course in molecular biology or molecular genetics
A biochemistry course (500 level or above)
Four additional genetics courses from those listed below
A minimum of three hours of graduate-level seminar

Genetics Option 2**Master's degree**

A statistics course (500 level or above)
A course in classical genetics or breeding (crops and animals)
Two additional genetics courses from those listed below
A minimum of one hour of graduate-level seminar

Ph.D. degree

A statistics course (500 level or above)
A course in classical genetics or breeding (crops and animals)
A biochemistry course (700 level)
Four additional genetics courses from those listed below
A minimum of three hours of graduate-level seminar

Selected genetics courses**Agronomy**

AGRON 770	Plant Genetics
AGRON 785	Applied Plant Breeding
AGRON 830	Quantitative Genetics in Relation to Plant Breeding
AGRON 850	Advanced Plant Breeding I
AGRON 940	Genetic Manipulation of Crop Plants

Animal sciences and industry

ASI 749	Advanced Animal Breeding
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Biochemistry

BIOCH 521	General Biochemistry
BIOCH 522	General Biochemistry Lab
BIOCH 755	Biochemistry I
BIOCH 765	Biochemistry II

Biology

BIOL 540	Molecular Biology
BIOL 615	Cytogenetics
BIOL 651	Molecular and General Genetics
BIOL 675	Genetics of Microorganisms
BIOL 750	Molecular and Cellular Biology
BIOL 858	Regulation of Gene Expression

Entomology

ENTOM 745	Insect Control by Host Plant Resistance
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Horticulture

HORT 740	Horticultural Plant Breeding
HORT 910	Topics in Plant Breeding
HORT 930	Topics in Plant Genetics

Plant pathology

PLPTH 711	Plant Tissue Culture and Regeneration
PLPTH 815	Advanced Techniques in Plant Cytogenetics
PLPTH 860	Host Plant Resistance to Diseases
PLPTH 927	Fungal Genetics

Statistics

STAT 950	Statistical Genetics (taught on demand)
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Descriptions of these courses can be found in the respective departmental sections of this catalog.

The participating departments are agronomy, animal sciences and industry, division of biology, biochemistry, horticulture, physics, plant pathology, and statistics.

No foreign language is required; however, if the supervisory committee believes a reading knowledge of foreign languages is essential to a particular research problem, it may be required.

Human ecology

Elizabeth A. McCullough, Chair

Professors Bollman, Hoeflin, Jurich, Murray, Reagan, Russell, Setser, and Spears; Associate Professors Bergen, Canter, Holcomb, McCullough, Peterson, Poresky, Roach, Scheidt, Schumm, and Wanska; Assistant Professors Balk, Barnes, Briggs, Deegan, Gregoire, McNeil, Munson, and Wright.

The Ph.D. program in human ecology presents the opportunity for specialized study in one of five areas. Interdisciplinary studies within a specialization may be developed in the College of Human Ecology, and with other supporting disciplines at Kansas State University. The Ph.D. program is offered by the graduate faculty members of the Departments of Clothing, Textiles, and Interior Design; Hotel, Restaurant, Institution Management and Dietetics; and Human Development and Family Studies. A separate Ph.D. program is offered by the Department of Foods and Nutrition. Each student must identify an approved specialization when applying.

The following specializations are offered:

Family life education and consultation

The family life education and consultation specialization prepares candidates to conduct, administer, and evaluate programs for enhancing the quality of family life. This specialization requires course work in human development, family studies, family life education, research methods, evaluation, and applied practice in family and community service organizations. Graduates are qualified for positions in colleges and universities, cooperative extension, human service agencies, and similar professions.

Institution management

The institution management specialization focuses on the systems approach for providing quality food in quantity at a reasonable cost and provides graduates with a knowledge base and skills to assume leadership in the education of institutional and commercial food service professionals, and leadership roles in industry and government.

Life span human development

The life span human development specialization emphasizes the growth and development of the individual over the course of a lifetime, the varying contexts of human development, and the processes underlying development throughout the life cycle. The program encompasses theory and research in child and adolescent development, adult development, gerontology, family studies, and thanatology. Graduates may prepare for careers in research, applied human services, or academic positions.

Marriage and family therapy

The marriage and family therapy specialization prepares professionals to conduct and critically evaluate therapy with marital and family groups. Students pursue a program of study which includes human development, family studies, marital and family therapy, statistics, and research methods. The doctoral program in marriage and family therapy is accredited by the Commission on Accreditation for Marriage and Family Therapy Education.

Textiles and apparel

The textiles and apparel specialization focuses on the historic, sociopsychological, economic, chemical, or functional design aspects of textiles and apparel. Research problems are approached from a systems perspective incorporating human and environmental factors. The specialization prepares students for positions in higher education, business, industry, extension, museums, and/or government.

Programs of study

Each student, with the guidance of an advisor and a graduate committee, prepares an individualized program of study to meet the student's goals, as well as program requirements. Programs of study include a minimum of 90 credit hours beyond the bachelor's degree, with at least 30 hours course work in the major area, 30 hours in dissertation research, and the remainder in supporting courses. Inquiries should be directed to: Chair, Ph.D. Coordinating Committee, 119 Justin Hall, College of Human Ecology, Kansas State University, Manhattan, Kansas 66506.

Veterinary pathology and laboratory medicine

H. C. Minocha, Chair

Professors Anderson, Bailie, Coffman, Cook, Dennis, Keeton, Kennedy, Kruckenberg, Leipold, Leland, Minocha, Moore, Mosier, Oehme, Phillips, Smith, Strauss, and Vestweber; Associate Professors Fenwick, Ridley, and Schoning; Assistant Professors Troyer and Weingand.

Graduate programs are offered by the Departments of Pathology, Laboratory Medicine, Surgery and Medicine, and Veterinary Diagnosis in the College of Veterinary Medicine leading to the degree(s) of master of science and doctor of philosophy.

Areas of study in this program include veterinary microbiology, virology, parasitology, public health, toxicology, and clinical and anatomic pathology. Requirements for entering graduate study in pathology and clinical pathology are completion of the degree of doctor of veterinary medicine or equivalent and approval of the executive committee of the pathology group and the dean of the Graduate School.

Center for Aging

George R. Peters, Director
Edith L. Stunkel, Assistant Director

The Center for Aging coordinates gerontology education, research, and service across six of the eight University colleges: agriculture, architecture and design, arts and sciences, business administration, education, and human ecology. In addition, faculty and staff from the Division of Cooperative Extension, Division of Continuing Education, and the University for Man participate on the three center committees of education, research, and outreach. The education committee oversees the graduate emphasis in gerontology program and the undergraduate secondary major in gerontology.

Gerontology

The graduate emphasis in gerontology program provides students the opportunity to integrate knowledge received in their major professional disciplines with a program of academic study and field experience in gerontology. It is designed to be taken concurrently with, or in addition to, a disciplinary graduate degree program at either the master's or doctorate level. The total program requires 14 to 18 credit hours, some of which may overlap with degree requirements for the student's disciplinary degree. Specific requirements include:

One upper-level graduate gerontology course (700 or above) in the student's own discipline (three credit hours).

Two graduate-level gerontology courses (500 or above) in disciplines other than the student's own (six credit hours).

Practicum-colloquium in a gerontological setting (three credit hours).

Gerontological focus integrated into master's project, thesis, report, oral examination, or Ph.D. dissertation (two to six credit hours).

Currently 19 graduate-level gerontology courses are offered regularly by departments across campus. Departments also create special offerings to meet student interest. The education committee can review unique requests by individual students.

Center for Aging programs. The undergraduate secondary major in gerontology and emphasis in long term care administration are also offered through the Center for Aging. Further details are located in the gerontology section under intercollegiate secondary major programs. In addition to the graduate and undergraduate curricula, the Center for Aging offers a wide range of educational services including a newsletter, small gerontological library, seminar series, undergraduate assistantships, and programs for older adults. Inquiries about curricula or other programs should be

directed to the Center for Aging, 1 Fairchild Hall, Manhattan, Kansas 66506, (913) 532-5945.

International trade studies

Ali Fatemi, Committee Chair

Professors Bussing, Deyoe, Fatemi, Frey, Gormely, Hadja, Kelley, and Murray.

International trade has grown more rapidly since World War II than the world's output of goods and services. As a result, the world's economy has become increasingly internationalized. Foreign trade has become progressively important both for U.S. industry and agriculture.

Kansas State University's mission as a land-grant university is irrevocably linked to this internationalization and its impact on economic, political, and social processes. Recognizing that the whole character of the modern world is influenced by past and present international trade, the University provides students with the opportunity to broaden their knowledge and understanding in this important area. KSU offers a full range of academic programs reflecting the notion that international trade exchanges goods, capital, and services and fosters the transmission of ideas about technological advance and scientific achievement, standard of living and ways of life, and political, diplomatic, and economic arrangements. Several departments focus on developing appropriate skills and interests at the graduate level. Students desiring to develop a proficiency in international trade can choose from the following master's programs:

Agricultural economics

The master of science in agricultural economics offers students opportunities for careers in international trade. Students interested in such careers may include in their programs of study trade-related elective courses in agricultural economics, economics, and other departments. The courses listed below are suggested for consideration.

Business administration

The master of business administration (M.B.A.) degree offers students strong preparation for careers in international trade and international business management. Most courses in the M.B.A. program are carefully structured to contain the worldwide dimension required by the AACSB accreditation standards. Additionally, students are allowed to choose international trade as their area of concentration in the M.B.A. program. The program consists of 33 hours, 24 hours of which are specified. The other nine hours can be taken from courses which relate to the student's area of concentration. Those concentrating in international trade can take ECON 823, Advanced International Economics; FINAN 820, Advanced

International Financial Management; and ECON 681, International Trade.

Economics

The master of arts in economics offers students opportunities for careers in international trade. Students interested in such careers may include in their programs of study trade-related elective courses in agricultural economics, economics, and other departments. The courses listed below are suggested for consideration.

Geography

The master of arts in geography offers students an opportunity to prepare for a career in international trade. Students must complete all requirements for the M.A. degree as set forth in the geography section of this catalog. The following courses are required: GEOG 740, Geography of Transportation; a 600-level regional geography course; and a minimum of six hours of trade-related courses from outside the department from those listed below.

Grain science

The master of science in grain science may prepare students for a career in international trade. Required departmental courses give students a background in grain quality and processing. In addition students should take AGECE 623, Export Marketing and Agricultural and Food Products, and additional hours from the following list that are directly related to international trade.

Political science

The master of arts in political science and the master in public administration degrees prepare students for careers in international trade. Students working on the M.A. degree should take the required courses in political science. In addition, they may take a minimum of six hours from trade-related courses outside the department, such as ECON 681, International Trade, and ECON 823, Advanced International Economics. Students in the M.P.A. program may focus on international trade by taking a minimum of 12 hours from among illustrative courses listed below.

Sociology

The master of arts in sociology may prepare a student for a career in international trade when based upon undergraduate work in basic economics as well as sociology and other social sciences to assist the student in analyzing societal trends, risks, and developments which influence the bases of international transfers of goods, services, and technologies, and assist in anticipating needs and consequences of these transfers. In addition to those required for a master's degree, courses may be selected from those listed below.

Selected courses dealing with international trade:

AGECE 615	International Agricultural Development
AGECE 623	Export Marketing of Agricultural and Food Products
AGECE 631	Principles of Transportation
AGECE 710	Quantitative Methods in Agricultural Marketing Firms
AGECE 840	Marketing Strategies and Policies in International Grain Markets
ANTH 511	Cultural Ecology and Economy
ECON 681	International Trade
ECON 823	Advanced International Economics
FINAN 554	International Financial Management
FINAN 820	Advanced International Financial Management
GEOG 740	Geography of Transportation
MANGT 690	International Management
MKTG 544	International Marketing
POLSC 541	International Relations
POLSC 543	American Foreign Policy
POLSC 647	International Law
SOCIO 951	Social and Institutional Dynamics

Also, a minimum of 12 hours of study of a modern language is recommended for those interested in international trade.

Administration

BILES, BERTRAM R., Asst. Dean, (1972). BA 1963, PhD 1976, Kansas St. U.

KRUH, ROBERT F., Assoc. Provost and Dean of the Graduate School; Prof. of Chemistry (1967). AB 1948, PhD 1951, Washington U., St. Louis. (*)

LOWMAN, ROBERT P., Assoc. Dean; Asst. Prof. of Psychology. AB 1967, U. of Southern California; MA 1969, PhD 1973, Claremont Col. (*)

MINGLE, JOHN O., Exec. Vice Pres. of KSU Research Foundation; Prof. of Nuclear Engineering (1960). BS 1953, MS 1958, Kansas St. U.; PhD 1960, Northwestern U.; JD Law 1980, Washburn U. (*)

NOONAN, JOHN P., Prof. of English and Assoc. Dean Emeritus (1968). BS 1947, Rockhurst Col.; MS 1948, Kansas St. U.; PhD 1955, Denver U. (*)

O'NEILL, F. L. "LEE," Asst. to the Dean (1987). BS 1950, Pittsburg St. U.; MEd 1956, U. of Idaho.

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 Resident Instruction
Lawrence H. Erpelding, Associate Director
John B. Riley, Assistant Director

117 Waters Hall
532-6151

The College of Agriculture offers one
associate of agriculture degree, 14 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. Some of the B.S. programs have
four options such as: business and industry,
production, science, and communications.
Other curricula such as milling science and
management and food science and industry
offer three options. The many programs
and options provide flexibility to meet the
needs of students who will be entering the
many careers in the food chain and related
agribusinesses. All programs are designed
to bring about changes in students in the
following areas:

Objectives

Knowledge and understanding. Help
students to master one or more important
areas of scientific agriculture, and to gain
knowledge and understanding of support-
ing academic areas, so they will be able to
understand and assimilate new technologi-
cal developments and apply new knowledge
to problem solving.

Skills. Help students to develop appropriate
skills and abilities to perform tasks
efficiently and expertly in various areas of
professional agriculture.

Professional attitudes and orientation. Help
students to identify with and understand
the ethics and goals of professional
agriculture and to continue learning
throughout their lives.

Personal and leadership development.
Develop in students an appreciation of
present-day civilization; demonstrate that
an understanding of many subjects is
required to solve problems; help students
develop and understand a philosophy of life
and values; and help students develop their
abilities to work with others.

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 develop-
ment, and related fields.

The 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. Such
integration of teaching, research, and
extension helps insure 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 experimen-
tal 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 in agriculture

Agricultural economics—B.S., M.S.,
Ph.D.

Agricultural education (teaching)—B.S.

Agricultural journalism—B.S.

Agricultural mechanization—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.

Crop protection—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.

Plant pathology—M.S., Ph.D.

Pre-forestry—two years

Pre-veterinary medicine

Retail floriculture—two years, associate of
agriculture degree

General Requirements

Selection of a major

Students usually select a curriculum or
major at the time 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 who is a representative of the dean's
office or an advisor in one of the academic
departments. These students are urged to
choose majors before the close of the
freshman year.

A student may change curriculum or major
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 an
academic program most effective and
valuable.

Many students work part time in the KSU
laboratories, greenhouses, and on the
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 of the typical
options include:

A business and industries option prepares
students to enter off-farm agribusiness.
Many students should take courses to
prepare them to compete in industry.
Suggested course areas include: account-
ing, labor relations, corporation law, sales
psychology, and journalism.

A production option is for students who
plan to go into farming or ranching. Those
who plan to enter these areas should
consider their future community responsi-
bilities and the changing characteristics of
farming as they select their courses.
Farmers need to understand state and local
government, principles of taxation, and
corporation law as applied to farms, in
addition to the technology of crop and
livestock production.

A science/professional option prepares
students for research and graduate study.
About 20 percent of recent graduates are in
graduate school, aiming for M.S. or Ph.D.
degrees. Graduate students will do best if
their undergraduate programs were strong
in the basic sciences: mathematics, botany,

biology, physics, chemistry, statistics, computer science, and economics; and in communications.

A **communication option** provides students with some professional skills in journalism and mass communications. These courses give students an introduction to news writing and editing. Students may select more advanced communications courses according to interests and needs. Such additional skills and abilities will make students more effective in active citizenship roles and more proficient in their profession.

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	1
ENGL 200	Intermediate Composition	3
ENGL 516	Written Communications for the Sciences	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
JMC 350	Agricultural Journalism	3
RTV 240	Radio-Television Audio I	3
RTV 250	Television Video I	3
MKTG 442	Sales Communications	3
EDAO 606	Principles of 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	English Composition I	3
GENAG 101	Ag Orientation	1
ASI 102	Principles of Animal Science	3
MATH 100	College Algebra	3
HORT 200	Plant Science	4
PE 101	Concepts in Physical Education	1
		15

Example II:		
AGEC 100	Principles of Agricultural Economics	3
GENAG 101	Ag Orientation	1
CHM 110	General Chemistry	5
	or	
CHM 210	Chemistry I	4
MATH 010	Intermediate Algebra	3
HORT 153	Home Horticulture	3
PE 101	Concepts in Physical Education	1
		15-16

Example III:		
SPCH 105	Public Speaking 1A	2
GENAG 101	Ag Orientation	1
ECON 110	Economics I	3
AMC 151	Agricultural Mechanics Practices ..	2
AGRON 220	Crop Science	4
ASI 302	Introduction to Food Science	3
		15

Natural resource management

Students interested in natural resource management can pursue programs in park resource management, range management, and soil and water conservation.

A bachelor of science degree in agriculture under the park resource management curriculum can be earned in the Department of Forestry.

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 humans and their environmental surroundings, courses in the physical and biological sciences to help them understand and solve environmental problems, and courses in communications which assist them to interpret, convey, and employ solutions.

Park resource management. The park resource management program prepares students for a wide range of positions working directly with the public and using natural resources for recreation. Positions include ranger, naturalist, recreation planner, park director, and other recreation resource specialists. For additional information, refer to the park resource management curriculum in the Department of Forestry.

Range management. Studies in range management prepare students for careers in ranch operation, consulting, industry, and service in governmental agencies such as the Soil Conservation Service, Forest Service, and Bureau of Land Management.

Courses in biological, physical, and animal sciences support the major courses in range science. For additional information, refer to the range management option in the Department of Agronomy.

Soil and water conservation. The soil and water conservation program prepares students for careers related to conservation of soil and water resources, environmental impact analysis, soil erosion, and land use. For additional information, refer to the soil and water conservation option in the Department of Agronomy.

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	English Composition I	3
ENGL 120	English Composition II	3
SPCH 105	Public Speaking 1A	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 555	Microbiology (with lab)	5
ASI 102	Principles of Animal Science	3
ASI 104	Poultry Science	1
ASI 103	Dairy Science	1
ASI 105	Animal Sciences and Industry	1
ASI 500	Genetics	3
ASI 200	Fundamentals of Nutrition	3
Humanities and/or social science		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 KSU. 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 would allow 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 would earn a bachelor of science degree in agriculture.

Agriculture honors program

Agriculture students with high academic records are invited into the honors program. It encourages students to recognize and respond to the challenges of scholarly inquiry into aspects of professional and scientific agriculture as well as to investigate some of the related social, political, economic, and international issues.

The honors program is a method of intensive self-directed study. The student wishing to enter the program should have fairly definite educational goals.

Program objectives are: to increase the scope of educational attainment by providing a program in greater breadth and depth; to provide special recognition for outstanding scholastic achievement; to foster a sustained interest in advanced education and research.

Eligibility. 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 for 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 honor's 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.

Secondary major in gerontology

Certain departmental courses have been approved for credit toward the secondary major in gerontology. A listing of the approved courses may be found under Academic Programs in this catalog.

Agricultural Economics

Marc A. Johnson, Head
Barry L. Flinchbaugh, Program Leader—
Extension

Professors Biere,* Buller,* Erickson,* Fausett, Figurski,* Flinchbaugh, Johnson,* Kelley,* Koudele,* Langemeier,* Maxon,* Norman,* Orazem,* Phillips,* Pretzer, Riley,* Schlender, Sjo,* and Sorenson;* Associate Professors Barnaby, Barton, Brandsberg, Grunewald,* Kiser, McReynolds, Parker, Schurle,* and Williams;* Assistant Professors Borsdorf, Burton,* Darling, Duncan, Dhuyvetter, Featherstone,* Gallagher,* Goodwin, Hugo, Mintert, Nelson, Schroeder, and Tierney; Instructor Beech; Emeriti: Professors Coolidge, Dunbar, Hess,* Knight,* Manuel,* McCoy,* Pine,* Schruben,* Sobering, Thomas, and Walker.

Undergraduate study

Bachelor of science in agriculture—
127 semester hours

Agricultural economics, as a social science, is concerned with administration and management of resources in the various phases of agriculture. Curriculum flexibility permits the student and advisor to develop a program of study meeting the interests, needs, and career objectives of each student.

The curriculum in agricultural economics offers the following options:

Agricultural business/agribusiness option emphasizes agriculture, economics, and business administration as related to off-farm agribusiness management.

Agricultural business/farm management option includes course work in livestock and crop production or agricultural mechanization, plus studies in agricultural economics applied to farm production management.

Specialty option allows students to combine agricultural economics with a specialty of 15 hours in any other department in the University.

Professional option requires additional mathematics, statistics, or computer science to prepare the student for advanced degree studies in agricultural economics.

Graduate study

Master's and doctoral programs are offered in agricultural economics. Students take course work in agricultural economics, general economics, statistics, and interest areas, which may include marketing, farm management, agricultural finance, prices, production economics, taxation, agricultural policy, international development, and agricultural business and industry.

Department requirements

General requirements

ENGL 100	English Composition I	3
ENGL 120	English Composition II	3
SPCH 105	Public Speaking IA	2
MATH 100	College Algebra	3
ACCTG 211	Financial Accounting	3
CHM 110	General Chemistry	5
BIOL 198	Principles of Biology	4
PE 101	Concepts in Physical Education ...	1
ECON 110	Economics I	3
SOCIO 211	Introduction to Sociology	3
PSYCH 110	General Psychology	3
POLSC 110	Introduction to Political Science ...	3
	or	
POLSC 325	United States Politics	3
STAT 330	Elementary Statistics for Social Science	3
	or	
STAT 350	Business and Economics Statistics I	3
	and	
STAT 351	Business and Economics Statistics II	3

Communications—one of the following:

ENGL 200	Intermediate Composition	3
ENGL 516	Written Communication for the Sciences	3
SPCH 321	Public Speaking II	3
SPCH 325	Argumentation and Debate	3
	English (any course numbered 250 or above)	3

Humanities—history, music (no performance courses), philosophy, English literature, or theatre (no performance courses)

(Modern language (8) may substitute for additional communications and humanities courses.)

Public economics—two of the following with at least one being ECON 510 or ECON 530:

AGEC 510	Agricultural Policy	3
AGEC 525	Natural Resource Economics	3
AGEC 736	Natural Resource Policy	3
ECON 510	Intermediate Macroeconomics	3
ECON 530	Money and Banking	3

Major requirements

AGEC 100	Principles of Agricultural Economics	3
AGEC 500	Production Economics	3
AGEC 505	Agricultural Market Structures ...	3

Option and requirements**1. Agricultural business—farm management**

AGEC 490	Computer Applications in Agricultural Economics	3
AGEC 512	Farm Management	3
AGEC 513	Farm Resource Acquisition and Finance	3

Additional agricultural economics* 12
with at least one from:

AGEC 605	Price Analysis	3
AGEC 623	Export Marketing of Agricultural and Food Products	3
AGEC 710	Quantitative Methods in Agricultural Marketing Firms	3
AGEC 712	Economic Analysis of Farm Firms ..	3

Agricultural requirements

ASI 102	Principles of Animal Science	3
and one of the following labs:		
ASI 103	Dairy Science Laboratory	1
ASI 104	Poultry Science Laboratory	1
ASI 105	Animal Science Laboratory	1
AGRON 220	Crop Science	4
AGRON 301	Soils	4
AMC 300	Engineering in Agriculture	4
or select one of the following:		
AMC 351	Engine and Tractor Power	3
AMC 511	Agricultural Building Systems	3
AMC 563	Electrical Systems and Controls	3

Select nine hours from the following:

AGRON 330	Weed Management	3
AGRON 375	Soil Fertility	3
AGRON 501	Range Management	3
ASI 318	Fundamentals of Nutrition	3

or

ASI 300	Principles of Livestock Feeding	3
ASI 400	Farm Animal Reproduction	3
ASI 515	Beef Science	3
ASI 535	Swine Science	3
AMC 324	Tillage-Planting Machinery	2
AMC 325	Crop Harvesting and Handling Systems	2
AMC 351	Engine and Tractor Power	3
AMC 511	Agricultural Building Systems	3
AMC 563	Electrical Systems and Controls	3
AMC 630	Agricultural Machinery Management	3
ENTOM 300	Economic Entomology	3
PLPTH 500	Principles of Plant Pathology	3

MATH 205	General Calculus and Linear Algebra	3
General electives		

15-16

2. Agricultural business—agribusiness

AGEC 490	Computer Applications in Agricultural Economics	3
AGEC 515	Marketing of Agricultural and Food Products	3
AGEC 518	Economic Principles of Agricultural Business Firms	3

Additional agricultural economics* 12
with at least two from:

AGEC 512	Farm Management	3
AGEC 605	Price Analysis	3
AGEC 623	Export Marketing of Agricultural and Food Products	3
AGEC 710	Quantitative Methods in Agricultural Marketing Firms	3
AGEC 712	Economic Analysis of Farm Firms ..	3

Agricultural and food products electives

Select 11-12 hours from the following:

AGRON 220	Crop Science	4
or		
HORT 200	Plant Science	4
AGRON 305	Soils	4
AGRON 330	Weed Management	3
AGRON 340	Market Grading of Cereals	2
AMC 300	Engineering in Agriculture	4
ASI 102	Principles of Animal Science	3
and one of the following labs:		
ASI 103	Dairy Science	1
ASI 104	Poultry Science	1
ASI 105	Animal Sciences and Industry	1

ASI 350	Meat Science	3
ASI 361	Meat Processing	2
ASI 300	Principles of Livestock Feeding	3
ASI 302	Introduction to Food Science	3
ASI 305	Fundamentals of Food Processing ..	3

or

GRSC 305	Fundamentals of Food Processing ..	3
ENTOM 300	Economic Entomology	3
FOR 285	Introduction to Forestry	3
GRSC 100	Principles of Milling	3
GRSC 120	Introductory Bakery Technology ...	2
GRSC 121	Introductory Bakery Technology Lab	1
HORT 520	Fruit Production	3
HORT 560	Vegetable Crop Ecology	3
PLPTH 500	Principles of Plant Pathology	3
FN 132	Basic Nutrition	3
FN 301	Trends in Food Products	3

MATH 205	General Calculus and Linear Algebra	3
ACCTG 221	Managerial Accounting	3

Business Administration—two of the following:

ACCTG 331	Intermediate Accounting	3
FINAN 450	Business Finance	3
MANGT 420	Management Concepts	3
MKTG 400	Marketing	3

Elective from accounting, finance, marketing, or management 3
General electives 16-17

3. Specialty

AGEC 490	Computer Applications in Agricultural Economics	3
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Additional agricultural economics* 18
with at least two from:

AGEC 512	Farm Management	3
AGEC 605	Price Analysis	3
AGEC 623	Export Marketing of Agricultural and Food Products	3
AGEC 710	Quantitative Methods in Agricultural Marketing Firms	3
AGEC 712	Economic Analysis of Farm Firms ..	3

Agriculture electives:

Select a minimum of 6 hours from College of Agriculture courses listed under agriculture and food products electives in the agribusiness option (does not include FN 132 or FN 301)

MATH 205	General Calculus and Linear Algebra	3
ACCTG 221	Managerial Accounting	3
Specialty electives:		

All hours from one department within the University other than agricultural economics, at least 6 hours of 500+ level courses 15
General electives 16

4. Professional agricultural economics

Additional agricultural economics* 21
with at least two from:

AGEC 512	Farm Management	3
AGEC 605	Price Analysis	3
AGEC 623	Export Marketing of Agricultural and Food Products	3
AGEC 710	Quantitative Methods in Agricultural Marketing Firms	3
AGEC 712	Economic Analysis of Farm Firms ..	3

Agriculture electives:

Select a minimum of 6 hours from College of Agriculture courses listed under agriculture and food products electives in the agribusiness option (does not include FN 132 or FN 301)

ACCTG 221	Managerial Accounting	3
CMPSC 200	Fundamentals of Computer Programming	2

Computer science lab—one of the following:

CMPSC 201	FORTRAN Language Lab	2
CMPSC 202	PL/1 Language Lab	2
CMPSC 206	BASIC Language Lab	2
MATH 220	Analytical Geometry and Calculus I	3

* Courses numbered 500 or above to be selected in consultation with advisor.

MATH 551	Applied Matrix Algebra	3
STAT 350	Business Economics Statistics I	3
STAT 351	Business Economics Statistics II ...	3
ECON 510	Intermediate Macroeconomics	3
General electives		20

Courses in agricultural economics**Undergraduate credit**

AGEC 100. Principles of Agricultural Economics. (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-100-0-0111

AGEC 101. Short Course in Agricultural Economics. (2) II. The general objective is to provide operating farmers with improved business management tools. The topics are farm business organization; farm financial management; production management; and marketing options and decisions. Practical application is made of the concepts to the farm business situation of the enrollees. Open to enrollees in a College of Agriculture short course. Lec. and lab classes. AGEC-101-1-0104

AGEC 441. Agricultural Economics Seminar. (Var.) Seminars of special interest will be offered upon sufficient demand in (a) farm management, (b) marketing, (c) land economics, (d) policy, (e) other selected areas. Pr.: Consent of the instructor. AGEC-441-0-0111

AGEC 445. Agricultural Economics Internship. (1-3) I, II, S. Approved and supervised work-study programs in various areas of agricultural economics. Project reports required. Pr.: Junior standing and prior departmental approval. AGEC-445-2-0111

AGEC 490. Computer Applications in Agricultural Economics. (3) I, II. Application of microcomputers to problems in agricultural economics. Emphasis on budgeting, cash flow, record keeping, financial analysis, and information analysis. Two hour rec. and three hours lab a week. Pr.: AGEC 100 or ECON 120, and MATH 100. AGEC-490-1-0111

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. AGEC 505 is a continuation of this course and they are intended to be taken in consecutive semesters. Three hours rec. a week. Pr.: AGEC 100 or ECON 120. AGEC-500-0-0111

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.: AGECE 100 or ECON 120. AGECE-505-0-0111

AGEC 508. Farm and Ranch Management. (3) I. Organization and management of a farm and ranch; selection of livestock or crop system; economies of size of business; financial management of the business. Intended for nonmajors. Two hours rec. and two hours lab a week. Pr.: AGECE 100. AGECE-508-1-0111

AGEC 510. 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.: Junior standing. AGECE-510-0-0111

AGEC 512. Farm Management. (3) II. Principles and practices of organization and management; nature and structure of business; functions and operations; management tools; decision-making processes. Three hours rec. a week. Pr.: AGECE 500. AGECE-512-1-0111

AGEC 513. Farm Resource Acquisition and Finance. (3) I. Acquisition of resources needed for farms and ranches through purchasing, leasing, and other contractual arrangements; financing resource acquisition; resource market structure and pricing; financial management. Three hours rec. a week. Pr.: ECON 110, AGECE 100 or ECON 120, ACCTG 211. AGECE-513-0-0111

AGEC 515. Marketing of Agricultural and Food Products. (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 100 or ECON 120. AGECE-515-0-0111

AGEC 516. 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, intergeneration 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. AGECE-516-0-0111

AGEC 517. Rural Banking. (3) II. Management of banks in rural areas including organization and personnel, sources and uses of funds, credit, and services, particularly to farmers and agricultural businesses; role of rural banks in the U.S. banking system. Two hours rec. and two hours lab a week, including field trips and guest bankers. Pr.: ECON 110, ACCTG 211, and junior standing. AGECE-517-1-0111

AGEC 518. Economic Principles of Agricultural Business Firms. (3) I, II. A study of the concept of agribusiness and its relationship to the economy as a whole. Particular attention is given to the application of economic principles in the management of marketing and farm supply firms. Three hours rec. a week. Pr.: AGECE 100 or ECON 120 and ACCTG 211. AGECE-518-0-0111

AGEC 520. Grain Marketing. (3) I. Price influences and relationships, market structure, buying and selling problems, domestic and export trade; grain trade organization and regulation. Three hours rec. a week, including field trips. Pr.: ECON 110. AGECE-520-0-0111

AGEC 521. Livestock and Meat Marketing. (3) 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. Three hours rec. a week. Pr.: ECON 110. AGECE-521-0-0111

AGEC 522. Commodity Futures Markets. (3) 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; and sources, uses, and interpretation of commodity market information. Three hours rec. a week. Pr.: AGECE 100 or ECON 120. AGECE-522-0-0111

AGEC 524. Agricultural Cooperatives. (3) I. A study of the nature and role of cooperatives and other types of group action with emphasis on agricultural cooperatives. Particular attention to the unique economic decision problems in organization, finance, and marketing. Three hours rec. a week. Pr.: AGECE 100 or ECON 120, and ACCTG 211. AGECE-524-0-0111

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. AGECE-525-0-0111

AGEC 541. Agricultural Economics Seminar. (Var). Seminars of special interest will be offered upon sufficient demand in (a) farm management, (b) marketing, (c) land economics, (d) policy, (e) other selected areas. Pr.: Consent of instructor. AGECE-541-0-0111

Undergraduate and graduate credit

AGEC 605. Price Analysis. (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. AGECE-605-0-0111

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. AGECE-615-0-0111

AGEC 623. Export Marketing of Agricultural and Food Products. (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. AGECE-623-0-0111

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. AGECE-631-0-0111

AGEC 632. Principles of Traffic Management. (3) I. Planning for efficient use of transportation facilities in the movement of raw materials and products, controlling shipments in coordination with warehouse and handling operations, and scientific selection of routes, schedules, and equipment. Pr.: ECON 110 and junior standing. AGECE-632-0-0111

AGEC 641. Agricultural Economics Seminar. (Var.). Seminars of special interest will be offered upon sufficient demand in (a) farm management, (b) agricultural finance, (c) marketing, (d) land economics, (e) policy, (f) other selected areas. Pr.: Consent of instructor. AGECE-641-0-0111

AGEC 710. Quantitative Methods in Agricultural Marketing Firms. (3) I. Application of mathematical programming and other operations research techniques to practical management problems in agriculture. Two hours rec. and two hours lab a week. Pr.: AGECE 505 or consent of instructor. AGECE-710-1-0111

AGEC 712. Economic Analysis of Farm Firms. (3) II. Analysis of optimum resource use in agriculture; application of linear programming and related topics for decision making. Pr.: AGECE 500. AGECE-712-0-0111

AGEC 736. Natural Resource Policy. (3) II. 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. AGECE-736-0-0111

AGEC 750. Agricultural Economics Problems. (Var.) I, II, S. Pr.: Consent of instructor. AGECE-750-3-0111

Graduate credit

AGEC 805. Agricultural Marketing. (3) S. The study of the demand for supply of agricultural commodities, alternative market structures, the dynamics of marketing institutions that affect market structures, governmental intervention in agricultural markets, futures markets in agriculture, and international agricultural commodities trade. Three hours rec. a week. Pr.: AGECE 505 or ECON 520. AGECE-805-0-0111

AGEC 810. Price and Income Policies for Agriculture. (3) I. A study of the effects of government price, regulatory, and tax policies on (1) farm income levels and variability, (2) farm productivity and output, (3) economic structure of farming, and (4) performance of agricultural markets. Three hours rec. a week. Pr.: AGECE 500 or ECON 520, ECON 510. AGECE-810-0-0111

AGEC 812. Advanced Farm Economics. (3) I. A study of managerial techniques and processes applied to farm firms involved in production and marketing of agricultural products. This study includes managerial planning, evaluation, and control of farm businesses. Three hours rec. a week. Pr.: AGECE 512. AGECE-812-0-0111

AGEC 823. Production Economics II. (3) I. Economic theories of choice under conditions of imperfect knowledge (i.e. under risk and uncertainty) and the application of these theories to production decisions. Pr.: AGECE 500 or consent of instructor. AGECE-823-0-0111

AGEC 831. Agricultural Marketing Management and Analysis. (Var.) I, II, S. Marketing problems of firms that market or process farm products or handle farm supplies, with special emphasis on tools of analysis for solving marketing problems. Supervision of students' internship programs. Pr.: Consent of instructor. AGECE-831-0-0111

AGEC 840. Marketing Strategies and Policies in International Grain Markets. (3) I. Modeling price information processes in imperfect world food and feed grains markets with special reference to structure, government policies, and international exchange rate effects. Reaction strategies of firms and nations considered. Resulting domestic agricultural price and trade policies of major trading nations explored. Three hours rec. a week. Pr.: ECON 815 and ECON 861. AGECE-840-0-0111

AGEC 898. Agricultural Economics Master's Report. (Var.) I, II, S. Master's report. AGECE-898-4-0111

AGEC 899. Agricultural Economics Master's Research. (Var.) I, II, S. Research for master's thesis. AGECE-899-4-0111

AGEC 901. Research Methods in Economics. (3) I. A study of scientific methodology in economic research including the history of various debates regarding methodology in economics. The course also deals with problem definition, formulation of hypotheses, listing of hypotheses, and presentation of research results. Three hours rec. a week. Pr.: Graduate standing. AGECE-901-0-0111

AGEC 905. Agricultural Demand and Price Analysis. (3) II. A study of the demand for and supply of farm products, price formation and markets, the causes of price variation and instability, the dynamic analysis of agricultural prices. Three hours rec. a week. Pr.: ECON 730, AGECE 805, ECON 945. AGECE-905-0-0111

AGEC 922. Seminar in Agricultural Marketing. (Var.) On sufficient demand. Analysis of special problems and current developments faced by firms and agencies associated with the marketing process for agricultural products. Pr.: Consent of instructor. AGECE-922-0-0111

AGEC 923. Economics of Agricultural Production. (3) I. A study of agricultural production response to prices; methods of estimating supply response and price expectations; the effects of government and institutions on agricultural supply and the role of risk, technical change, and the number and size of farms on agricultural supply. Three hours rec. a week. Pr.: ECON 730, AGECE 823, ECON 945. AGECE-923-0-0111

AGEC 936. Quantitative Topics in Agricultural Economics. (3) II, in even years. A study of recent developments reported in the literature concerning quantitative methods of analysis in agricultural economics and economics. The study will include assigned projects to apply selected techniques of analysis. Three hours rec. a week. Pr.: ECON 935. AGECE-936-0-0111

AGEC 940. Seminar in Agricultural Economics. (Var.) On sufficient demand. Problems and current developments in agricultural economics. Pr.: Consent of instructor. AGECE-940-0-0111

AGEC 955. Independent Study of Advanced Topics in Agricultural Economics. (Var.) I, II, S. Advanced independent study of an agricultural economics topic based upon a student proposal approved by the student's supervisory committee. Pr.: Completion of 24 credits of graduate study. AGECE-955-0-0111

AGEC 999. Agricultural Economics Ph.D. Research. (Var.) I, II, S. Research for Ph.D. dissertation. AGECE-999-4-0111

Agricultural Education

Advisors—Harbstreet, Parmley, and Welton

Undergraduate study

Bachelor of science in agriculture—130 semester hours

Students who entered Kansas State University in the fall semester of 1985 or who entered other colleges or universities in the fall semester of 1985 and later transfer to KSU will follow this curriculum for graduation. Other students should check with their advisor for graduation requirements.

Agricultural education is for those who are interested in teaching agriculture in schools or industry.

Freshman

First semester

BIOL 198	Principles of Biology	4
EDAO 319	Agricultural Education Colloquium	2
ENGL 100	English Composition I	3
MATH 100	College Algebra	3
PE 101	Concepts in Physical Education	1
Agricultural science elective*		4
		17

Second semester

CHM 110	General Chemistry	5
ENGL 120	English Composition II	3
PSYCH 110	General Psychology	3
HORT 200	Plant Science	4
or		
AGRON 220	Crop Science	4
		15

Sophomore**First semester**

AGEC 100	Principles of Agricultural Economics	3
AMC 151	Agricultural Mechanics Practices ..	2
ECON 110	Economics I	3
EDAF 215	Educational Implications of Growth and Development	3
SPCH 105	Public Speaking 1A	2
General electives		2
Humanities electives		2
		17

Second semester

AGRON 305	Soils	4
AMC 351	Farm Power	3
Agricultural management		3
Social science electives		3
Humanities electives		3
		16

Junior**First semester**

EDAF 315	Educational Psychology	3
EDAF 323	Exceptional Students in the Secondary School	2
Social science electives		3
Humanities electives		3
Agricultural science electives*		4
		15

Second semester

EDAO 620	Principles of Vocational Education	3
EDAO 621	Program Planning in Vocational Education	3
EDCI 318	Instructional Media and Technology	2
EDCI 477	Middle Level/Secondary Reading ..	2
Agricultural science electives*		2
Agricultural engineering electives		3
		15

Senior**First semester**

AMC 659	Agricultural Mechanics Methods ...	3
EDAF 525	Interpersonal Relations in the Schools	1
EDAO 500	Methods of Teaching Agriculture ..	2
EDAO 576	Professional Development Seminar	2
EDAO 586	Teaching Participation in Secondary School	8
EDCI 455	Teaching in a Multicultural Society	1
		17

Second semester

AMC 553	Agricultural Machinery Operations and Maintenance	3
Agricultural science electives*		8
Agricultural engineering electives		2
General electives		5
		18

*A minimum of three hours of animal science course work must be completed as part of the 18 hours of agricultural science electives.

Specialty certification. Special certification is available for those who wish to prepare for positions in departments with more than one teacher. The combination of 16 required and elective credit hours in agricultural sciences from one of the following areas is required for specialty certification: animal sciences; crops and soils; horticulture; agricultural mechanics; agribusiness (credit from AGECE and business administration). A minimum of three hours of animal science course work must be completed in 23 hours required for specialty certification.

Eight 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 eight weeks of the semester. When student teaching is taken in the spring, fall semester courses are moved to spring semester.

Because state certification requirements are currently being revised, completion of degree requirements as listed for agricultural education may not meet state certification requirements to teach vocational agriculture as specified by the Kansas Department of Education.

See the College of Education section of this catalog.

Agricultural Journalism

Advisor—Erpelding

Undergraduate study

Bachelor of science in agriculture—127 semester hours

The major in agricultural journalism prepares students for specialties in newspaper, magazine, radio-television, or agricultural information. Students in agricultural journalism use the Associated Press wire service, FM radio facilities, television studio and portable equipment, modern electronic editing terminals, photographic equipment and laboratory, and computer-operated typesetting equipment.

Students majoring in this curriculum take the following courses:

General requirements

ENGL 100	English Composition I	3
ENGL 120	English Composition II	3
SPCH 105	Public Speaking IA	2
GENAG 101	Ag Orientation	1
MATH 100	College Algebra	3
ECON 110	Economics I	3
CHM 110	Chemistry I	4
	or	
CHM 210	General Chemistry	5
PE 101	Concepts in Physical Education	1
Humanities and/or social sciences		12

Department course requirements

Students must complete a total of 30 credit hours in agricultural courses. Some of the courses below will count toward the 30 hours of agriculture. Area requirements are:

Agriculture core, choose any four courses from the following:

AGRON 305	Soils	4
HORT 200	Plant Science	4
	or	
AGRON 220	Crop Science	4
ASI 102	Principles of Animal Science	3
AGEC 100	Principles of Agricultural Economics	3

Any course in agricultural engineering

ENTOM 300	Economic Entomology	3
	or	
ENTOM 305	Livestock Entomology	2
	or	
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, two courses:

Required:		
BIOL 198	Principles of Biology	4
	or	
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, one course from the following:

CMPSC 110	Introduction to Personal Computing	3
CMPSC 200	Fundamentals of Computer Programming and	2
CMPSC 20-	Computer Language Lab	2
STAT 340	Biometrics I	3
STAT 350	Business and Economic Statistics I	3
	or	
STAT 330	Elementary Statistics for the Social Sciences	3

Physical science, one course from the following:

BIOCH 120	Introductory Organic and Biological Chemistry	5
BIOCH 201	Elementary Biochemistry	3
BIOCH 521	General Biochemistry	3
CHM 190	Elementary Organic Chemistry	3
CHM 230	Chemistry II	4
CHM 350	General Organic Chemistry	3
CHM 531	Organic Chemistry I	3
GEOL 100	Introductory Geology	3
GEOG 220	Environmental Geography I	4

Business administration and agricultural economics:

Required:		
ACCTG 211	Financial Accounting	3

One of the following:

ACCTG 221	Managerial Accounting	3
AGEC 518	Economic Principles of Agricultural Business Firms	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 AGECE with a 500 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).

Agriculture 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 hours.

Journalism core—these 18 hours are required of all students.

JMC 235	Introduction to Mass Communications
JMC 275	News and Feature Writing
JMC 280	Editing and Design
JMC 380	Advanced News and Feature Writing
JMC 665	Law of Mass Communications

JMC 660	History of Journalism or
JMC 685	The Mass Communicator: Ethics and Issues

Journalism electives—remaining 12 to 18 hours in journalism may be chosen by the student in consultation with the faculty advisor. Note: The course JMC 350, Agricultural Journalism, is not open to majors in agricultural journalism.

Agricultural Mechanization

Advisors—Baugher, Chung,* Clark,* Heber,* Manges,* Schrock,* Slocombe,* Spillman,* Steichen,* and Young.*

Undergraduate study

Bachelor of science in agriculture—
127 semester hours

Agricultural mechanization involves the application of power units, machines, buildings, equipment, and engineered production systems for agriculture. It also stresses the productive use and conservation of our soil, water, and energy resources. Courses deal with learning how to acquire and use information needed for problem solving and how to develop independent and logical thought processes. Courses concentrate on cultivating the student's confidence in being able to apply familiar concepts from the agricultural and mechanical sciences and computer technology to a broad range of agri-mechanical and agribusiness problems. A background in production agriculture is useful but not essential.

Academic programs may be planned to emphasize economics and business, some area of production agriculture, and the agricultural food industry. Additional electives may be used to enhance mechanical skills or to concentrate on some special area of interest.

Agricultural mechanization is administered through the Department of Agricultural Engineering in the College of Engineering. The agricultural engineering curriculum and courses of engineering are presented in the College of Engineering section of this catalog.

Students specializing in other fields may elect one or more of the agricultural mechanization courses to complement their academic programs. The courses are directed toward engineering applications, planning, servicing, and management rather than toward engineering design.

General requirements

ENGL 100	English Composition I	3
ENGL 120	English Composition II	3
SPCH 105	Public Speaking 1A	2
PE 101	Concepts of Physical Education	1
GENAG 101	Ag Orientation	1
MATH 100	College Algebra	3

MATH 150	Plane Trigonometry	3
ECON 110	Economics I	3
CHM 210	Chemistry I	4
or		
CHM 110	General Chemistry	5
PHYS 113	General Physics I	4
PHYS 114	General Physics II	4
PE 101	Concepts in Physical Education	1
	Communications electives	2-3
	Social sciences and humanities	12

Major courses

AMC 324	Tillage-Planting Machinery	2
AMC 325	Crop Harvesting and Handling Systems	2
AMC 351	Farm Power	3
AMC 563	Farmstead Utilities	3
AMC 554	Planning and Management of Agricultural Buildings	3
AMC 558	Conservation Surveying and Planning	3

At least nine hours of the following:

AMC 151	Agricultural Mechanics Practices	2
AMC 326	Agricultural Machinery Hydraulics	2
AMC 330	Agricultural Machinery Management	3
AMC 340	Computer Applications in Agricultural Mechanization	2
AMC 352	Agricultural Machinery Construction	3
AMC 552	Farm Building Construction	3
AMC 651	Managing Farm Grain and Forage	3
AMC 653	Irrigation Practices	3
AMC 660	Farm Animal Waste Management	3

Supporting courses

ASI 102	Principles of Animal Sciences	3
AGRON 305	Soils	4
HORT 200	Plant Science	4
or		
AGRON 220	Crop Science	4
AGEC 100	Principles of Agricultural Economics	3
or		
ECON 120	Economics II	3
ACCTG 211	Financial Accounting	3
ME 212	Engineering Graphics I	2

Additional requirements

Production option

BIOL 198	Principles of Biology	4
or		
BIOL 210	General Botany	4
BIOCH 120	Introductory Organic and Biological Chemistry	5

An additional course in biology, plant pathology, entomology, or genetics

Students select a minor area to give a total of 12 hours in one of the following:

Agricultural economics and journalism; agronomy, entomology, horticulture, and plant pathology (courses taken to fulfill this requirement may not be used to fulfill biological science requirement); and animal sciences and industry.

Communication option

Requirements are the same as for the production option, except that communication courses as listed under communication option must be included in the minor area or as other electives.

Business and industry option

One mathematics, statistics, or computer science course;* at least two courses in business administration; and three courses in agricultural economics beyond those listed in supporting courses.* At least eight more hours selected from courses in the following colleges or departments: economics, agricultural economics, business administration, and industrial engineering.*

Irrigation specialization. A specialization in irrigation is available in any of the options by including the following courses in the electives selected:

AGEC 500	Production Economics	3
or		
AGEC 508	Farm and Ranch Management	3
AGRON 625	Management of Irrigated Soils	3
PLPTH 520	Principles of Field Crop Pathology	3
ENTOM 300	Economic Entomology	3
AMC 653	Irrigation Practices	3

*Selected by the student with the consent of advisor.

Graduate study

Graduate study is offered leading to the master of science degree. Prerequisite is the completion of an undergraduate curriculum substantially equivalent to requirements for one of the options shown above.

Agricultural mechanization courses for students in agriculture

Undergraduate credit

AMC 101. Agricultural Engineering Applications. (2). Principles and applications of farmstead and farm facilities planning; energy use and control in agricultural production; alternate energy sources; grain drying, storage, and handling; soil and water conservation and control; irrigation; selection of power units and machines based upon specific program needs. Two hours rec. and four hours lab a week for eight weeks. Open only to students in agriculture short course program. AMC-101-1-6-0998

AMC 151. Agricultural Mechanics Practices. (2) I, II. Introduction to mechanics practices and techniques basic to the repair, maintenance, and construction of agricultural facilities and equipment, including oxyacetylene and arc welding, tool conditioning, soldering, power tool operation such as drill press and metal lathe. Six hours lab a week. AMC-151-1-0998

AMC 300. Engineering in Agriculture. (4) I, II. Engineering principles as applied to farm power and machinery, soil and water conservation, irrigation, farm electrification, farm structures, and the farmstead. Three hours rec. and three hours lab a week. Pr.: MATH 100. AMC-300-1-0998

AMC 324. Tillage-Planting Machinery. (2) I. Primary and secondary tillage machinery, power requirements, field operation, planting equipment, herbicide placement and incorporation, fertilizer application, tillage-planting systems, and cost analysis. Two hours rec. a week. Pr.: AGRON 305 or AGRON 150. AMC-324-0-0998

AMC 325. Crop Harvesting and Handling Systems. (2) II. Hay, forage, and crop residue handling systems; machinery components, machinery operation and maintenance, system selection and cost;

grain harvesting machinery, fundamentals of operation, adjustment, and maintenance. Two hours rec. a week. AMC-325-0-0998

AMC 326. Agricultural Machinery Hydraulics. (2) I, II. Basic hydraulics as it applies to agricultural machinery. Major emphasis will be given to hydraulic principles, system components, circuiting, and system maintenance. Two hours rec. a week. Pr.: MATH 100. AMC-326-0-0998

AMC 330. Agricultural Machinery Management. (3) II. Selection, adjustment, operation, servicing, economics, and application of agricultural machines. Two hours rec. and three hours lab a week. Pr.: AMC 300 or PHYS 113. AMC-330-1-0998

AMC 340. Computer Applications in Agricultural Mechanization. (2) I. Introduction to problem solving in agricultural mechanization. Emphasis will be on using computers to analyze data, solve problems, and prepare illustrations for reporting data related to agricultural systems. Four hours lab a week. Pr.: MATH 100. AMC-340-1-0998

AMC 351. Farm Power. (3) I, II. A study of small engines and farm tractors; ignition, injection, carburetion, fuels, lubricants, power transmission, control systems, tune-up, and maintenance. Two hours rec. and three hours lab a week. Pr.: MATH 100. AMC-351-1-0998

AMC 352. Agricultural Machinery Construction. (3) II. Advanced shop processes and techniques for constructing and maintaining agricultural machinery; advanced welding, metallurgy, and selection of materials for construction. Two hours rec. and four hours lab a week. Pr.: AMC 151. AMC-352-1-0998

AMC 410. Farm Electrification and Soil Conservation. (3) II. For students pursuing the curriculum in agricultural education. Introduction to methods of planning for efficient utilization of electric energy for farm production and to farm surveying including checking of conservation practices applied to soil and water. Two hours rec. and two hours lab a week. Pr.: MATH 100. (Student cannot apply credit for both AMC 410 and AMC 563 towards a bachelor of science degree.) AMC-410-1-0998

Undergraduate and graduate credit in minor field

AMC 552. Farm Building Construction. (3) I. Construction practices related to buildings and materials used in agriculture; application of procedures for design of concrete mixtures, framing and fastener requirements, material selection; and cost estimation. Two hours rec. and four hours

lab a week. Pr.: MATH 100. AMC-552-1-0998

AMC 553. Agricultural Machinery Operation and Maintenance. (3) I, II. Emphasis upon shop skills as applied to machine operation, adjustment, and maintenance principles of power transmission, draft, alignment, timing, and calibration of tillage, harvesting, planting, and spraying equipment. Three hours rec. and six hours lab a week for eight weeks. Pr.: AMC 151, AMC 352, and junior standing. AMC-553-1-0998

AMC 554. Planning and Management of Agricultural Buildings. (3) II. Concepts and fundamentals required in the planning of livestock production facilities including the evaluation of strength and durability of a structure, planning for an efficient functional layout, and planning for environmental modification needed in animal shelters plus site selection and farmstead planning. Three hours rec. a week. Pr.: MATH 100 and junior standing. AMC-554-0-0998

AMC 555. Dairy Mechanics. (3) On sufficient demand. Installation, adjustment, and operation of dairy plant equipment; boilers, engines, motors, pumps, refrigeration machinery, water supply, and waste disposal. Two hours rec. and three hours lab a week. Pr.: Junior standing. AMC-555-1-0998

AMC 558. Conservation Surveying and Planning. (3) II. Agricultural surveying; laying out and checking waterways, terraces, and farm ponds; conservation planning from aerial photographs. Two hours rec. and three hours lab a week. Pr.: MATH 100. AMC-558-1-0998

AMC 563. Farmstead Utilities. (3) II. Utilization of energy for light, heat, and power on the farmstead; planning for distribution of electric power and water; motors and controls. Two hours rec. and three hours lab a week. Pr.: MATH 100. AMC-563-1-0998

Undergraduate and graduate credit
AMC 615. Problems in Agricultural Mechanization. (Var.) I, II, S. Problems in the application of technical principles to agricultural mechanization. Pr.: Approval of instructor. AMC-615-3-0998

AMC 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. AMC-651-1-0998

AMC 652. Soil and Water Conservation Practices. (3) II. The hydrological cycle; rainfall-runoff relationships; structural conservation practices for conserving water and controlling erosion; drainage of

agricultural lands. Two hours rec. and three hours lab a week. Pr.: AGRON 305, AMC 300, or AMC 558. AMC-652-1-0998

AMC 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 or AGRON 150. AMC-653-1-0998

AMC 654. Agricultural Facilities and Machinery Management. (2) II. Analytic study of functional and economic feasibility when matching farm production operations and labor-saving facilities and equipment; special emphasis on selection of equipment. Six hours lab a week. Pr.: AGECE 100 and AMC 651. AMC-654-1-0998

AMC 659. Agricultural Mechanic Methods. (3) I, II. Methods of teaching agricultural mechanics in high school including the organization and equipment for school shop; preparation of instruction sheets, organization and presentation of demonstrations. One hour rec. and six hours lab a week. Pr.: Conc. enrollment in student teaching. AMC-659-1-0998

AMC 660. Farm Animal-Waste Management. (3) II. Current practices, technology, knowledge, and problems relating to disposal or use of farm animal wastes. Attention is given to environmental, ecological, and socioeconomic 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. AMC-660-0-0998

AMC 701 A-G. Advanced Farm Mechanics. (5-7) This course set includes the following courses: (A) Advanced Oxyacetylene Welding; (B) Advanced Techniques in Arc Welding; (C) Advanced MIG and TIG Welding; (D) Advanced Skills in Agricultural Construction; (E) Farm Machinery Calibration and Maintenance; (F) Care and Maintenance of Shop Equipment; (G) Agricultural Surveying. This course set is directed specifically to the needs of vocational agriculture instructors and instructors interested in agricultural mechanics. Instructional materials and advanced methodology with respect to agricultural shop and related mechanics skills are developed. Three of the courses will be offered during each summer session, one credit hour each. Ten hours rec. and 20 hours lab for one week per course. (Agricultural Surveying is not available to students who have taken AMC 410.) Pr.: AMC 553 and AMC 659. AMC-701-1-0998

AMC 703 A-F. Advanced Farm Power. (5-6) This course set includes the following courses: (A) Agricultural Machinery Hydraulic Systems; (B) Tractor and

Machinery Electrical Systems; (C) Farm Tractor Diesel Fuel Systems; (D) Chain Saw Operation, Repair, and Maintenance; (E) Small Gas Engine Power; (F) Electricity in Agriculture. This course set is directed specifically to the needs of vocational agricultural instructors and instructors interested in agricultural mechanics. Instructional materials and advanced methodology are developed with respect to operation, service, and maintenance of small engines, chain saws, and tractor hydraulic, diesel, and electrical systems. Three of the courses will be offered during each summer session, one credit hour each. Ten hours rec. and 20 hours lab each week per course. (Electricity in Agriculture is not available to students who have taken AMC 410.) Pr.: AMC 351 and AMC 659. AMC-703-1-0998

Graduate credit

AMC 810. Research in Agricultural Mechanization. (Var.) I, II, S. Research problems in agricultural mechanization. Pr.: Approval of department head. AMC-810-4-0998

AMC 815. Graduate Seminar in Agricultural Mechanization. (1) I, II. Presentation and discussion of research philosophies, procedures, and results. One hour rec. a week. Required of all graduate students in agricultural mechanization. AMC-815-0-0998

AMC 896. Internship. (1-4) I, II, S. Creative technical work at an appropriate educational level with agriculturally related sponsoring industries under faculty supervision. Training projects are selected by mutual agreement among the student, the sponsor, and the student's advisory committee. Pr.: AMC 330, AMC 651, or AMC 653. AMC-896-2-0998

AMC 898. Master's Report. (Credit arranged.) I, II, S. Topics selected with approval of major professor and department head. AMC-898-4-0998

AMC 899. Master's Thesis. (Var.) I, II, S. Topics selected with approval of major professor and department head. AMC-899-4-0998

Agronomy

(Crops, soils, range management, soil and water conservation)

G. E. Ham,* Head
G. L. Posler,* Assistant Head—Teaching
D. A. Whitney,* Extension State Leader

Professors Barnett,* Ham,* Kanemasu,* Kilgore, Kirkham,* Kissel,* Liang,* Nilson, Owensby,* Paulsen,* Posler,* Russ,* Skidmore,* Sorensen,* Stone,* Thien,* Vanderlip,* Wassom,* Whitney,*

and Withee;* Associate Professors Armbrust,* Ehler,* Fick,* Lamond,* Maddux, Mikesell, Moshier,* Ohlenbusch, Raney, Regehr,* Schapaugh,* Sears,* Shroyer, Swallow, and Walter; Assistant Professors Bramel-Cox,* Brotmarkle, Burchett, Claassen, Cole, Cox,* Devlin, Fjell, Greenland, Hagen,* Havlin,* Heer, Hickman, Janssen, Long, Mosier, Ransom,* Schwab,* Sisson,* and TenEyck; Instructor Bonczkowski; Assistant Agronomist Schaffer; Emeriti: Professors Anderson,* Bidwell,* Bieberly, Bohannon, Casady,* Dicken, Edelblute, Heyne,* Hobbs,* Jones,* Lind, Lyles,* Mader,* Smith,* and Woodruff;* Associate Professors Atkinson, Harper, and Overley; Assistant Professors Lundquist and Moore; Instructor Dickerson.

Undergraduate study

Bachelor of science in agriculture—
127 semester hours

Agronomy includes crop, soil, and range sciences. Students in agronomy have diverse interests including crop production and physiology; crop breeding; soil management, fertility, and conservation; physical and chemical properties of soils; forages; and range management.

Students majoring in agronomy are required to complete the following basic courses, plus those in the option below that the student selects.

ENGL 100	English Composition I	3
ENGL 120	English Composition II	3
SPCH 105	Public Speaking IA	2
GENAG 101	Ag Orientation	1
MATH 100	College Algebra	3
ECON 110	Economics I	3
AGRON 220	Crop Science	4
AGRON 305	Soils	4
CHM 210	Chemistry I	4
CHM 230	Chemistry II	4
Organic chemistry	.....	3-5
PHYS 115	Descriptive Physics	4
BIOL 198	Principles of Biology	4
BIOL 210	General Botany	4
ENTOM 300	Economic Entomology	3
CMPSC 110	Introduction to Personal Computing	3
CMPSC 200	Fundamentals of Computer Programming	2
CMPSC 20-	Computer Language Laboratory ...	2
PE 101	Concepts in Physical Education ...	1
Humanities and/or social sciences	.....	9
Communications	.....	2-3

Additional courses required for specific options:

Production option		
ASI 500	Genetics	3
BIOL 500	Plant Physiology	4
STAT 340	Biometrics I	3
AGEC 100	Principles of Agricultural Economics	3
PLPTH 500	Principles of Plant Pathology	3
ACCTG 211	Financial Accounting	3
ASI 102	Principles of Animal Science	3
Agricultural mechanization electives	.....	3-4

One of the following:

BIOL 529	Fundamentals of Ecology	3
BIOL 220	Bacteriology and Man	3
PHYS 193	Descriptive Meteorology	3
GEOL 100	Introductory Geology	3

Business and industry option

AGEC 100	Principles of Agricultural Economics	3
ASI 102	Principles of Animal Science	3
STAT 350	Business and Economics Statistics I	3
Agricultural economics or business	.....	12
ACCTG 211	Financial Accounting	3
PLPTH 500	Principles of Plant Pathology	3

One of the following:

BIOL 529	Fundamentals of Ecology	3
ASI 500	Genetics	3
BIOL 220	Bacteriology and Man	3
BIOL 500	Plant Physiology	4

Science option

AGEC 100	Principles of Agricultural Economics	3
ACCTG 211	Financial Accounting	3
PLPTH 500	Principles of Plant Pathology	3
BIOL 500	Plant Physiology	4
ASI 500	Genetics	3
or		
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
or		
BIOL 500	Plant Physiology	4
BIOL 529	Fundamentals of Ecology	3
Mathematics or statistics	.....	3-4
BIOL 220	Bacteriology and Man	3
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 635	Soil Conservation	3
or		
AGRON 525	Crop and Soil Management	3
AGRON 515	Soil Genesis and Classification	3
AGRON 375	Soil Fertility	3
AGRON 746	Physical Properties of Soils	3
AGRON 501	Range Management	3
AGRON 360	Crop Growth and Development ...	3
Humanities/social science elective	.....	3

Range management option

MATH 150	Plane Trigonometry	3
PHYS 115	Descriptive Physics	4
or		
PHYS 113	General Physics I	4
BIOL 500	Plant Physiology	4
BIOL 529	Fundamentals of Ecology	3
BIOL 551	Taxonomy of Flowering Plants	4
GEOL 100	Introductory Geology	3
POLSC 110	Introduction to Political Science ...	3
SOCIO 211	Introduction to Sociology	3
AGRON 501	Range Management	3
ASI 102	Principles of Animal Science	3
AGRON 790	Range Management Planning	3
AGRON 681	Range Ecology	3
AGRON 660	Range Research Techniques	3
AGRON 560	Field Identification of Range and Pasture Plants	1
AGRON 670	Range Management Problems	3
AGRON 515	Soil Genesis and Classification	3
ASI 515	Beef Science	3

One of the following:

AGRON 762	Range Grasses	2
AGRON 760	Field Course in Range Management	2
ASI 545	Range Livestock Management	2

All students majoring in agronomy must take Crop Science and Soils plus 18 additional hours in agronomy based upon the students' interest and career intentions.

Research center, laboratory, and greenhouse facilities are used by the Department of Agronomy for both research and instruction.

Graduate study

Graduate studies leading to master of science and doctor of philosophy degrees are offered in crop production, crop physiology, crop ecology, range science, forage management, plant breeding, weed science, plant genetics, soil chemistry, soil fertility, soil physics, soil management, soil-plant-water relations, erosion, irrigation, and soil classification.

A prerequisite for graduate study is the completion of an undergraduate curriculum similar to that required for undergraduate students majoring in agronomy.

Undergraduate credit

AGRON 101. Short Course in Agronomy. (2) II. Introduces the basic principles and practices concerning soil management, quality seed, crop growth and development, weed control, insects, and diseases in field crops. Time will also be devoted to topics in range management and tame forage production. AGRON-101-1-0102

AGRON 220. Crop Science. (4) I, II. 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-220-0-0102

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 CHM 210. AGRON-305-0-0103

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-315-0-0103

AGRON 330. Weed Management. (3) I, II. 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-330-1-0102

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-340-1-0102

AGRON 350. Crop and Seed Quality. (2) II. Identification of crops and weeds by seed and vegetative characteristics. Grain grading of soybeans, corn, and wheat. Four hours lab a week. AGRON-350-1-0102

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-360-0-0102

AGRON 375. Soil Fertility. (3) II. Study of the relationship of chemical and physical properties of soils to plant nutrition; forms of essential elements in soils and their role in plant nutrition; fertilizer materials and application. Three hours rec. a week. Pr.: AGRON 220 and 305. AGRON-375-0-0103

AGRON 385. Soil Fertility Laboratory. (2) II. Laboratory course to familiarize students with analytical processes associated with the chemical and physical procedures commonly used in conjunction with determination of fertility status of agricultural soils. One hour lec. and two hours lab a week. Pr.: AGRON 375 or conc. enrollment. AGRON-385-1-0103

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-400-0-0102

AGRON 405. Internship in Agronomy. (1-2) 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 two hours may be applied to a B.S. in agronomy. Pr.: AGRON 220 and 305. AGRON-405-2-0102

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 two hours. AGRON-415-1-0103

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-420-1-0102

AGRON 430. Tropical Agronomy. (2) II. 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-430-0-0103

AGRON 455. Computer Applications in Agronomy. (3) 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 AGRON 305. AGRON-455-0-0102

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-501-0-0102

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-515-1-0103

AGRON 520. Grain Production. (3) I. 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 AGRON 375. AGRON-520-0-0102

AGRON 525. Crop and Soil Management. (3) II. Production management of crops and soils in semiarid, subhumid, and humid areas. Selection of cropping systems and appropriate practices to achieve maximum production and conservation of soil resources. Three hours lec. a week. Pr.: AGRON 220 and AGRON 305. AGRON-525-0-0103

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-550-0-0102

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-551-1-0102

AGRON 560. Field Identification of Range and Pasture Plants. (1) I. Offered fall 1989 and alternate 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-560-1-0102

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. AGRON-599-0-0102

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-600-3-0102

AGRON 615. Soil Problems. (Var.) I, II, S. Studies may be chosen in: chemistry, physics, conservation, fertility, genesis, morphology, or classification. AGRON-615-3-0103

AGRON 625. Management of Irrigated Soils. (3) I. Methods of irrigation, soil water retention, movement and measurement, and consumptive use of water by crops. Consideration of irrigation water quality and problems of saline and sodic soils. Three hours rec. a week. Pr.: AGRON 220 and 305. AGRON-625-0-0103

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-630-1-0102

AGRON 635. Soil Conservation. (3) I. Principles and practices of water and wind erosion control. Operation of conservation programs. Land-use planning, soil conservation legislation. Two hours rec. and one three-hour lab a week. Pr.: AGRON 305. AGRON-635-1-0103

AGRON 660. Range Research Techniques. (3) II. Offered spring 1989 and alternate 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-660-1-0102

AGRON 670. Range Management Problems. (Var.) I, II, S. AGRON-670-3-0102

AGRON 681. Range Ecology. (3) II. Offered spring 1990 and alternate 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-681-1-0102

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-705-0-0103

AGRON 716. Herbicide Interactions. (3) II. 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-716-0-0102

AGRON 725. Soil and Plant Analysis. (3) I. Offered fall 1989 and alternate years. Theories and procedures for the chemical analysis of soils and plant materials. Applications of analysis in soil fertility evaluations and in research work are discussed. One hour rec. and six hours lab a week. Pr.: AGRON 305, CHM 271. AGRON-725-1-0103

AGRON 735. Chemical Fertilizers. (3) II. A study of the processes involved in the formulation of chemical fertilizers, the physical and chemical properties of various fertilizer materials, and the technology of fertilizer use. Three hours rec. a week plus a field trip to inspect fertilizer manufacturing facilities. Pr.: AGRON 220, 305, and 375. AGRON-735-0-0103

AGRON 740. Plant-Water Relations. (3) II. Properties of water, terminology in plant and soil water relations, environmental aspects of plant-water relations, soil as a water reservoir, water as a plant component, water movement through the plant, special aspects of transpiration, development and significance of internal water deficits, drought resistance mechanisms, water consumption by crop plants. Pr.: AGRON 220 and 305, BIOL 500. AGRON-740-0-0102

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-746-1-0103

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-760-2-0102

AGRON 762. Range Grasses. (2) I. Offered fall 1988 and alternate 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-762-3-0102

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-770-0-0102

AGRON 785. Applied Plant Breeding. (3) II. This course considers in detail the mechanics of an applied plant breeding program for agronomic crops. Pr.: AGRON 630 or HORT 740, AGRON 770, and STAT 703. AGRON-785-0-0102

AGRON 790. Range Management Planning. (3) I. 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. AGRON-790-1-0102

Graduate credit

AGRON 810. Agronomy Seminar. (1) I, II. A discussion of agronomic developments. Pr.: Graduate standing. AGRON-810-0-0102

AGRON 815. Soil-Root Environment. (2) I. A study of plant roots and the soil influenced by them; with emphasis on their chemical, microbiological, and physical interactions in the rhizosphere. Pr.: AGRON 375 and BIOL 500. AGRON-815-0-0103

AGRON 830. Quantitative Genetics in Relation to Plant Breeding. (3) I. Offered fall 1989 and alternate years. Application of statistical principles to biological popula-

tions in relation to gene and zygotic frequencies, mating systems, and effects of mutation, migration, and selection on equilibrium populations; partitioning of genetic variance, concept and methods of estimating heritability, theoretical basis of heterosis, diallel cross and combining ability, genotype by environment interaction, genetic advance under selection, models on phenotypic expression of various crops; genetics of autopolyploids. Pr.: AGRON 770, STAT 703, 704, and 705 or equiv. AGRON-830-0-0102

AGRON 840. Crop Physiology. (3) II. Offered spring 1989 and alternate years. Principles of nitrogen metabolism, mineral nutrition, photosynthesis, growth substances, and hardness applied to crop production. Three hours rec. a week. Pr.: BIOL 500. AGRON-840-0-0102

AGRON 895. Nutrient Cycling Models. (2) I. Offered fall 1989 and alternate years. This course examines several computer simulation models that describe individual nutrient cycling processes and a crop model incorporating several process models. The models examined will deal primarily with cycling of nitrogen and phosphorus. Pr.: AGRON 375 and 705 and one introductory computer programming course. AGRON-895-0-0103

AGRON 898. Master's Report. (2) I, II, S. Preparation of a written report either of research or of problem work on a topic in the major field. AGRON-898-4-0102

AGRON 899. Master's Research. (Var.) I, II, S. Research on a problem which may extend throughout the year and furnish data for a master's thesis. AGRON-899-4-0102

AGRON 905. Soil Physical Chemistry. (3) I. Offered fall 1988 and alternate years. Application of physical chemistry to soils; cation and anion equilibria, cation activities, electrokinetics, sorption, and other physiochemical reactions in soils. Two hours rec. and three hours lab a week. Pr.: AGRON 705, 746, and CHM 585. AGRON-905-1-0103

AGRON 910. Topics in Plant Breeding. (Var.) I, II, S. Discussion and lectures on important papers and contributions in this field. Pr.: Consent of instructor. Joint listing with Department of Horticulture. See HORT 910. AGRON-910-0-0102

AGRON 916. Advanced Soil Physics. (3) II. Offered spring 1989 and alternate years. An advanced study of prominent theories concerning the physical behavior of soils. Three hours rec. a week. Pr.: AGRON 746, MATH 222, PHYS 211. AGRON-916-0-0103

AGRON 920. Agricultural Climatology. (2) II. Offered spring 1990 and alternate years. Concepts and applications of basic atmospheric principles governing the climate near the ground and the interrelationships between the physical environment and living organisms. Includes discussions on the implications of modifying the microclimate by management practices, plant-water relations, and remote sensing. Two hours rec. a week. Pr.: PHYS 193, MATH 222, AGRON 746. AGRON-920-0-0102

AGRON 925. Advanced Soil Genesis and Classification. (2) II. Offered spring 1989 and alternate years. An advanced study of processes of soil formation and systems of soil classification including soil taxonomy. Two hours rec. a week. Pr.: AGRON 515. AGRON-925-0-0103

AGRON 930. Topics in Plant Genetics. (Var.) I, II, S. Discussion and lectures on important papers and contributions in this field. Pr.: Consent of instructor. Joint listing with Department of Horticulture. See HORT 930. AGRON-930-0-0102

AGRON 935. Topics in Soils. (Var.) I, II, S. Discussion and lectures on important papers and contributions in this field. Pr.: Consent of instructor. AGRON-935-0-0103

AGRON 940. Genetic Manipulation of Crop Plants. (3) I. Offered fall 1988 and alternate years. Crop evolution, gene pools and origin of species, genetic distance, use of exotic germplasm, breeding techniques, genome organization in plants, and use of biotechnology in plant breeding. Three hours rec. a week. Pr.: BIOL 540; AGRON 770, 830. AGRON-940-0-0102

AGRON 950. Advanced Crop Ecology. (3) II. Offered spring 1990 and alternate years. Principles of growth and development of crops in relation to the environment. Three hours rec. a week. Pr.: BIOL 500, 529, and STAT 704, 705. AGRON-950-0-0102

AGRON 960. Topics in Crop Physiology and Ecology. (Var.) I, II, S. Discussion and lectures on important papers and contributions in this field. Pr.: Consent of instructor. AGRON-960-0-0102

AGRON 970. Advanced Plant Breeding. (3) II. Offered spring 1990 and alternate years. Single and multiple trait selection, mating designs, recurrent and single-cycle selection theory, stability analyses, resource allocation theory, breeding for host plant resistance. Pr.: AGRON 785 and AGRON 830. AGRON-970-0-0102

AGRON 999. Ph.D. Research. (Var.) I, II, S. Research on a problem which may extend throughout the year and furnish data for a doctoral dissertation. AGRON-999-4-0102

Animal Sciences and Industry

Jack G. Riley,* Head
Curtis L. Kastner,* Research Coordinator
Larry R. Corah,* State Leader Extension
Miles McKee, Teaching Coordinator

Professors Able,* Adams,* Bolsen,* Brent,* Call, Corah,* Craig,* Cunningham,* Dikeman,* Drake, Dunham, Fung,* Harbers,* Henderson, Hines,* Hunt,* Kastner,* Kiracofe,* Kropf,* McKee, Morrill,* Norton,* Riley,* Schafer, Schalles,* and Zoellner; Associate Professors Brazle, Davis,* Jeon,* Kuhl, Laudert, Nagaraja,* Nichols, Roberts, Shirley, Simms, W. Smith,* Spaeth, and Stevenson;* Assistant Professors Clarke, Cochran, Gibbs, Hancock, Harmon,* Hoover, Ikins,* Michaels, Minton,* Nelssen,* Ritter, and Sigler;* Instructors Anderson, Heikes, W. Jackson, and Lewis; Emeriti: Professors Bassette, Bonewitz, Claydon, Farmer, Francis, Good, M. Jackson, Kahrs, Koch, McAdams, McCormick, Moyer, Orwig, Richardson, Sanford, E. Smith, Ward, and Wheat.

Undergraduate study

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	English Composition I	3
ENGL 120	English Composition II	3
SPCH 105	Public Speaking IA	2
GENAG 101	Ag Orientation	1
MATH 100	College Algebra	3
ECON 110	Economics I	3
CHM 210	Chemistry I	4
	or	
CHM 110	General Chemistry	5
PE 101	Concepts in Physical Education	1
BIOL 198	Principles of Biology	4
ASI 102	Principles of Animal Science	3
ASI 318	Fundamentals of Nutrition	3
ACCTG 211	Financial Accounting	3
	Humanities and/or social sciences*	9
	Communications*	3
ASI	Seminar elective*	1

* To be selected from the approved list in consultation with advisor.

Additional courses required for specific options:

Animal products option

ASI 302	Introduction to Food Science	3
ASI 500	Genetics	3
	or	
ASI 533	Anatomy and Physiology	4
B10L 220	Bacteriology and Man	3
	or	
B10L 555	Microbiology	5
CHM 230	Chemistry 11	4
BIOCH 120	Introductory Organic and Biological Chemistry	5
Agriculture electives		4-8
Agricultural economics or business electives		6
Mathematics/statistics/computer science electives		6
ASI 103	Dairy Science	1
	or	
ASI 104	Poultry Science	1
	or	
ASI 105	Animal Sciences and Industry	1
ASI 311	Introductory Food Chemistry	3
ASI 550	Dairy Bacteriology	4
ASI 695	Quality Assurance of Food Products	3

Select 17 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 405	Fundamentals of Milk Processing	3
ASI 430	Food Products Evaluation	3
ASI 502	Principles of Dairy Foods Processing	4
ASI 599	Animal Science Internship/Meats	2
ASI 630	Egg Science	2
ASI 635	Poultry Meat Technology	2
ASI 694	Food Plant Management	2
ASI 777	Meat Technology	4

Select one of the following:

ASI 515	Beef Science	3
ASI 524	Sheep Science	2
ASI 535	Swine Science	3
ASI 621	Dairy Management	3
ASI 645	Poultry Management	3

Business option

AGEC 100	Principles of Agricultural Economics	3
ASI 500	Genetics	3
ASI 533	Anatomy and Physiology	4
ACCTG 221	Managerial Accounting	3
Agriculture electives		6-12
Business electives		6
Agricultural economics electives		12
Mathematics/statistics/computer science elective		3
ASI 103	Dairy Science	1
	or	
ASI 104	Poultry Science	1
	or	
ASI 105	Animal Sciences and Industry	1
ASI 320	Principles of Feeding	3
ASI 400	Farm Animal Reproduction	4

Select one of the following:

ASI 350	Meat Science	3
ASI 361	Meat Processing	2
ASI 601	Milk Secretion*	3
ASI 630	Egg Science**	2

Select one of the following:

ASI 315	Livestock and Meat Evaluation	3
ASI 405	Fundamentals of Milk Processing*	3
ASI 502	Fundamentals of Dairy Foods Processing*	4
ASI 550	Dairy Bacteriology*	4
ASI 635	Poultry Meat Technology**	2

Select two of the following:

ASI 515	Beef Science	3
ASI 521	Horse Science	3
ASI 524	Sheep Science	2
ASI 535	Swine Science	3

ASI 621	Dairy Cattle Management*	3
ASI 645	Poultry Management**	3

Required for dairy students*:

ASI 396	Dairy Cattle Judging	2
ASI 510	Animal Breeding Principles	3
ASI 609	Dairy Cattle Nutrition	2

Required for poultry students**:

ASI 310	Poultry Judging	2
ASI 613	Poultry Nutrition	2

Communications option

ASI 500	Genetics	3
ASI 533	Anatomy and Physiology	4
Agriculture electives		8-16
Agricultural economics or business elective		3
Mathematics/statistics/computer science elective		3
JMC 235	Introduction to Mass Communications	3
JMC 275	News and Feature Writing	3
JMC 280	Editing and Design	3
JMC 380	Advanced News and Feature Writing	3
JMC 665	Law of Mass Communications	3
RTV 230	Radio-Television and Society	3
Communications electives		6
ASI 103	Dairy Science	1
	or	
ASI 104	Poultry Science	1
	or	
ASI 105	Animal Sciences and Industry	1
ASI 300	Principles of Livestock Feeding	3
ASI 400	Farm Animal Reproduction	4

Select one of the following:

ASI 350	Meat Science	3
ASI 361	Meat Processing	2
ASI 601	Milk Secretion	3
ASI 630	Egg Science	2

Select one of the following:

ASI 315	Livestock and Meat Evaluation	3
ASI 405	Fundamentals of Milk Processing	3
ASI 550	Dairy Bacteriology	4
ASI 635	Poultry Meat Technology	2

Select one of the following:

ASI 510	Animal Breeding Principles	3
ASI 655	Behavior of Domestic Animals	3
ASI 735	Environmental Physiology of Farm Animals	3

Select two of the following:

ASI 515	Beef Science	3
ASI 521	Horse Science	3
ASI 524	Sheep Science	2
ASI 535	Swine Science	3
ASI 621	Dairy Management	3
ASI 645	Poultry Management	3

Pre-veterinary/science option

ASI 103	Dairy Science	1
ASI 104	Poultry Science	1
ASI 105	Animal Sciences and Industry	1
ASI 320	Principles of Feeding	3
ASI 400	Farm Animal Reproduction	4
Agriculture electives		9
Agricultural economics or business elective		3

Select seven hours from the following:

ASI 500	Genetics	3
ASI 533	Anatomy and Physiology	4
B10L 510	Embryology	4
B10L 555	Microbiology	5

Select 12 hours from the following:

CHM 230	Chemistry 11	4
CHM 350	General Organic Chemistry	3
CHM 351	General Organic Chemistry Laboratory	2
BIOCH 201	Elementary Biochemistry	3
BIOCH 521	General Biochemistry	3
BIOCH 522	General Biochemistry Laboratory	2

Select two of the following:

PHYS 113	General Physics I	4
PHYS 114	General Physics II	4
STAT 340	Biometrics 1	3
MATH 205	General Calculus and Linear Algebra	3

MATH 210	Technical Calculus 1	3
MATH 220	Analytic Geometry and Calculus 1	4

Select one of the following:

ASI 350	Meat Science	3
ASI 361	Meat Processing	2
ASI 601	Milk Secretion	3
ASI 630	Egg Science	2

Select one of the following:

ASI 315	Livestock and Meat Evaluation	3
ASI 405	Fundamentals of Milk Processing	3
ASI 550	Dairy Bacteriology	4
ASI 635	Poultry Meat Technology	2

Select one of the following:

ASI 510	Animal Breeding Principles	3
ASI 655	Behavior of Domestic Animals	3
ASI 735	Environmental Physiology of Farm Animals	3

Select two of the following:

ASI 515	Beef Science	3
ASI 521	Horse Science	3
ASI 524	Sheep Science	2
ASI 535	Swine Science	3
ASI 621	Dairy Management	3
ASI 645	Poultry Management	3

Production-management option

AGEC 100	Principles of Agricultural Economics	3
ASI 500	Genetics	3
ASI 533	Anatomy and Physiology	4
BIOCH 120	Introductory Organic and Biological Chemistry	5
Agriculture electives		6-12
Agricultural economics or business electives		12
Mathematics/statistics/computer science elective		3
ASI 103	Dairy Science	1
	or	
ASI 104	Poultry Science	1
	or	
ASI 105	Animal Sciences and Industry	1
ASI 320	Principles of Feeding	3
ASI 400	Farm Animal Reproduction	4
ASI 510	Animal Breeding Principles	3

Select one of the following:

ASI 350	Meat Science	3
ASI 361	Meat Processing	2
ASI 601	Milk Secretion*	3
ASI 630	Egg Science**	2

Select one of the following:

ASI 315	Livestock and Meat Evaluation	3
ASI 405	Fundamentals of Milk Processing*	3
ASI 502	Principles of Dairy Foods Processing*	4
ASI 550	Dairy Bacteriology*	4
ASI 635	Poultry Meat Technology**	2

Select three of the following:

ASI 515	Beef Science	3
ASI 521	Horse Science	3
ASI 524	Sheep Science	2
ASI 535	Swine Science	3
ASI 621	Dairy Management*	3
ASI 645	Poultry Management**	3
ASI 655	Behavior of Domestic Animals	3

Required for dairy students*:

ASI 396	Dairy Cattle Judging	2
ASI 609	Dairy Cattle Nutrition	2

Required for poultry students**:

ASI 310	Poultry Judging	2
ASI 613	Poultry Nutrition	2

*For students pursuing dairy interest

**For students pursuing poultry interest

Graduate study

Graduate study leading to the M.S. and Ph.D. degrees in animal sciences is offered in the fields of animal breeding, animal production and management, animal products, animal reproduction, animal nutrition, and genetics. Prerequisites to major graduate work in these fields are completion of a four-year curriculum substantially equivalent to that required of undergraduate students majoring in animal sciences and industry and acceptance by the department and the Graduate School.

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-061-3-0104

ASI 101. Short Course in Animal Sciences. (2) II. On sufficient demand. Introduction to the basic requirements of food animal species with respect to environment, nutrition, breeding, reproduction, lactation, marketing, and management for satisfactory production under contemporary agricultural conditions. Three hours lec. and three hours lab a week during an eight-week session. Limited to short course program participants. ASI-101-0-0104

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-102-0-0104

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-103-1-0105

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-104-1-0106

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-105-1-0104

ASI 110. Bovine Artificial Insemination. (1) On sufficient demand. Designed to make student proficient in artificially inseminating the cow. ASI-110-1-0104

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 agricul-

ture and other fields. Three hours lec. a week. Pr.: ASI 102 or equiv., ASI 533, and sophomore standing. Same as SM 235. ASI-235-0-0104

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. Student cannot apply credit for both ASI 300 and 320 toward a B.S. degree. Pr.: CHM 110 or equiv. ASI-300-0-0104

ASI 302. Introduction to Food Science. (3) I, II. Introduce and survey relationships of food raw materials and their methods of handling, manufacturing, distribution, and consumption. ASI-302-0-0101

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-305-0-0104

ASI 310. Poultry Judging. (2) I. Apply basic knowledge of judging birds for egg and meat production on the basis of physical characteristics and use the latest USDA standards to grade ready-to-cook poultry as well as eggs on their exterior, interior, and broken-out appearance. Two two-hour labs a week. Pr.: ASI 104. ASI-310-1-0106

ASI 311. 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 120; or 201 and 202. ASI-311-1-0105

ASI 315. Livestock and Meat Evaluation. (3) I, II. Evaluation of slaughter livestock and their carcasses as related to economic merit. Evaluation of breeding livestock based on visual appraisal, performance, and progeny test records. Modern techniques of livestock and carcass evaluation including ultrasonic sound and tenderometer devices will be demonstrated. One hour lec. and four hours lab a week. Pr.: ASI 102 and 105; or consent of instructor. ASI-315-1-0104

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-318-0-0104

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 or equiv. ASI-320-0-0104

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. Two two-hour labs a week. Pr.: ASI 105. ASI-325-1-0104

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-340-0-0104

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-350-0-0104

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-361-1-0104

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-370-1-0104

ASI 385. Wool Grading and Classification. (1) I. A study of factors determining the commercial classes and grades of wool and the desired fleece qualities of the breeds of sheep; practice in judging, grading, and scoring wool. Three hours lab a week. Pr.: ASI 102. ASI-385-1-0104

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-395-1-0104

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-396-1-0104

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 two credits earned in this course may apply towards graduation. ASI-399-2-0104

ASI 400. Farm Animal Reproduction. (4) II. 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-400-0-0104

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-405-1-0105

ASI 410. 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. Pr.: ASI 311. ASI-410-1-0105

ASI 420. Advanced Dairy Cattle Judging. (1) I. Three hours lab a week. Pr.: ASI 396. ASI-420-1-0105

ASI 422. Livestock Sales Management. (1) On sufficient demand. Hands-on experience in the planning, promotion, and production of a purebred livestock sale. Pr.: ASI major or consent of instructor and junior standing. ASI-422-1-0104

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-425-1-0104

ASI 430. Food Products Evaluation. (3) II. Fundamentals of sensory evaluation of dairy, egg, poultry, 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 or consent of instructor. ASI-430-0-0105

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 breeding animals. Four hours lab a week. Pr.: ASI 315. ASI-450-1-0104

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-470-1-0104

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. ASI-490-1-0104

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-500-0-0104

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 311. ASI-502-0-0105

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 or equiv. Same as AP 500. ASI-503-1-0104

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-510-0-0104

ASI 512. Gestation of Farm Animals. (2) I. A detailed study of the gestation of farm animals including management and nutritional factors affecting the physiological events of gestation such as fertilization, ova transport, placenta attachment,

growth, and parturition of the fetus. The laboratory provides practical training in following the development of the bovine fetus. Pr.: Senior standing and consent of instructor. ASI-512-1-0104

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, carcasses, merchandising, and related areas. Special emphasis on management systems of raising, growing, and finishing beef cattle. Pr.: Senior standing. ASI-515-0-0104

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-521-0-0104

ASI 524. Sheep Science. (2) I. Application of basic management principles to the sheep industry; economic aspects of commercial sheep production. Pr.: Junior standing. ASI-524-0-0104

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-533-0-0104

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-534-0-0104

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 general overall management of swine production units of varying sizes. Three hours rec. a week. Pr.: Senior standing. ASI-535-0-0104

ASI 545. Range Livestock Management. (2) II. A study of breeding, growing, and finishing livestock under range conditions. Two hours lec. a week. Pr.: AGRON 501. ASI-545-0-0104

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 120 or equiv. ASI-550-1-0105

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-580-0-0104

ASI 581. Dairy Seminar. (1) II. Study of dairy periodicals, bulletins, books, other dairy literature. One hour rec. a week. Pr.: Junior standing in dairy production. ASI-581-0-0105

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. ASI-599-2-0104

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-601-0-0105

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-605-1-0104

ASI 606. Instrumental Analysis of Food and Agricultural Products. (2) Spring intersession. This course will present modern instrumental methods currently available for analysis of food and agricultural products. The course will last two weeks during summer intersession. Pr.: PHYS 115 and BIOCH 201. ASI-606-1-0113

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-609-1-0104

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-610-1-0104

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-611-1-0104

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-612-1-0104

ASI 613. Poultry Nutrition. (2) II. Gives the student knowledge of the objects and principles in feeding poultry and a working knowledge of an adequate diet for poultry, and how it is prepared and fed for most economical growth, egg production, and reproduction. Pr.: BIOL 198, ASI 320. ASI-613-0-0104

ASI 614. Swine Nutrition. (2) II. A detailed study of the nutrient requirements of swine for various stages of production. Emphasis will be placed on the interrelationships between nutrition, disease, management, and environment. Evaluation of feed ingredients, diets, premixes, and base mixes. Discussion of current research in swine nutrition. One hour lec. and two hours lab a week. Pr.: ASI 320. ASI-614-1-0104

ASI 620. Livestock Production and Management. (2) II. Student involvement in laboratory exercises related to practical livestock production and management principles for beef, horse, sheep, or swine. Four to six hours lab a week. Pr.: Appropriate ASI course (515, 521, 525, or 535) and consent of instructor for specific area. ASI-640-2-0104

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. Three hours rec. a week. Pr.: ASI 102 and 103 and senior standing. ASI-621-0-0105

ASI 630. Egg Science. (2) I, in even years. Emphasis on the technical problems in processing and distribution of shell eggs and egg products, egg chemistry, microbiology, preservation, and product development. Two hours lec. a week. Pr.: ASI 102 and 104. ASI-630-0-0106

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 meat products. Two hours lec. a week. Pr.: ASI 102 and 104. ASI-635-0-0106

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-645-1-0106

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-665-0-0106

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-661-3-0104

ASI 671. Meat Selection and Utilization. (3) I. Emphasis on meat cut identification, muscle and bone anatomy, grades, fabricated meat, institutional cuts, specification writing, processing, meat preparation, and shrinkage costs. Two hours lec.-rec. and two hours lab a week. Pr.: FN 300 or 501, or DRIM 440. ASI-671-0-0104

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. Not open to business option students in food science and industry. Pr.: Junior standing. ASI-694-0-0105

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-695-1-0105

ASI 700. Animal Nutrition. (3) I. Graduate-level course in animal nutrition. An in-depth study of digestion, absorption, and metabolism in both monogastric and ruminant species. Three hours rec. a week. Pr.: BIOCH 521 or equiv. ASI-700-0-0104

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-702-0-0104

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-710-1-0104

ASI 711. Food Fermentation. (4) II. Application of the principles of microbiology to the understanding of the fermentation of various categories of foods. Chemical, biochemical, and microbiological changes under controlled and uncontrolled conditions. Two hours lec. and six hours lab a week. Pr.: A course in biochemistry and a course in microbiology. ASI-711-1-0105

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-713-1-0113

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-715-0-0105

ASI 720. Avian Metabolism. (3) I, in even years. Special emphasis on the physiological processes in reproduction, digestion, absorption, circulation, respiration, excretion, and internal secretions. Three hours rec. a week. Pr.: ASI 104, 318, and BIOL 198. ASI-720-0-0106

ASI 730. Techniques in Domestic Animal Behavior. (2) II. A combined seminar and laboratory. Current and classical studies reported and discussed, relationships between behavior and other disciplines explored, and methods of data collection examined. Small-scale demonstration experiments planned, executed, and reported orally and/or in scientific written style. One hour rec. and two hours lab a week. Pr.: ASI 655 and one statistics course. ASI-730-0-0104

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-735-0-0104

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. and one hour rec. a week. Pr.: ASI 500 and three hours in statistics. ASI-749-0-0104

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-750-0-0106

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-777-0-0104

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. ASI-799-2-0104

Graduate credit

ASI 800. Topics in Animal Reproduction. (1) I. This is a seminar that involves both oral and written reporting of current literature in reproductive physiology. One hour rec. a week. Pr.: ASI 400. ASI-800-0-0104

ASI 801. Hormonal Control of Reproduction, Lactation, and Growth. (2) II, in even years. Basic study of endocrine glands and their hormone secretions that control reproduction, lactation, and growth in farm animals. One hour rec. and three hours lab a week. Pr.: BIOCH 521. ASI-801-1-0104

ASI 802. Gametes, Fertilization, and Pregnancy in Farm Animals. (2) II, in odd years. A basic study of underlying mechanisms of gamete production and fertilization, embryonic and fetal development, and the establishment, maintenance, and termination (abortion or parturition) of pregnancy. Emphasis will be on current theories and the research techniques required for testing their validity. One hour rec. and three hours lab a week. Pr.: BIOCH 521. ASI-802-1-0104

ASI 806. Topics in Meat Science and Muscle Biology. (2) II. Seminar and discussion involving written and oral analyses of classical and current literature in meat science and muscle biology. Two hours rec. a week. Pr.: One course in meat science or muscle biology and BIOCH 521. ASI-806-0-0104

ASI 818. Fundamentals of Meat Processing and Preparation. (1-2) S. Inspection, grading, processing, and preparation in relation to chemical and physical characteristics, cost, safety, quality, and palatability of red meat. Pr.: FN 601 or equiv.; and conc. enrollment in FN 818. ASI-818-1-0104

ASI 820. Rumen Metabolism. (3) I. Metabolism, absorption, digestion, and passage of nutrients in the rumen; factors affecting the environment of the rumen; certain aspects of rumen function and dysfunction; techniques used in rumen research. Three one-hour rec. a week. Pr.: ASI 318; BIOCH 521 or 655. ASI-820-0-0105

ASI 825. Rumen Microbiology. (3) II. Two hours lec. and two hours lab a week dealing with the diverse kinds of microorganisms in the rumens of cattle and sheep. Classification and morphology of bacteria and protozoa; anaerobiosis, methanogenesis, and microbial metabolism of carbohydrate, nitrogen, and lipid; and the involvement of rumen microorganisms in major disorders of the rumen will be discussed. Pr.: BIOL 555. ASI-825-1-0411

ASI 830. Silage Technology. (2) I. A study of silage fermentation, nutrient conservation, aerobic deterioration processes; factors affecting silage quality; and chemical analyses used to evaluate silage. Discussion of techniques used in silage research and assigned readings within the silage literature. Two hours lec. a week. Pr.: BIOCH 521. ASI-830-0-0104

ASI 850. Analytical Techniques in Animal Sciences and Industry. (3) I. Principles of analytical procedures used in research in animal sciences and industries. One hour rec. and six hours lab a week. ASI-850-1-0104

ASI 886. Comparative Animal Nutrition. (5) I. A study of the veterinary medical aspects of nutrition, including principles of feeding and nutrition of common domestic species of food-producing and companion animals; consideration of material relative to therapeutic nutrition as related to clinical management of diseased and convalescent animals. Taught in cooperation with the Departments of Anatomy and Physiology, and Surgery and Medicine. Pr.: Third-year standing in College of Veterinary Medicine or ASI 700. ASI-886-0-0104

ASI 890. Graduate Seminar in Animal Sciences and Industry. (1) I, II. Discussion of research and technical problems in the discipline. Attendance required of all departmental graduate students. Maximum of two hours may be applied toward an advanced degree. ASI-890-0-0104

ASI 898. Master's Report. (2) I, II, S. Pr.: Consult major professor. ASI-898-4-0104

ASI 899. Master's Research in Animal Sciences and Industry. (Var.) I, II, S. Pr.: Consult major professor. ASI-899-4-0104

ASI 900. Topics in Ruminant Nutrition. (2) II, in even years. Advanced consideration of theoretical and applied ruminant nutrition—classical and current development of feeding standards; energy and nutrient metabolism. Emphasis on discussion of advanced topics of current interest in ruminant nutrition. Pr.: ASI 700, 820. ASI-900-0-0104

ASI 901. Topics in Monogastric Nutrition. (2) I, in even years. Lectures and assigned readings concerned with determination of nutrient requirements; nutrient utilization and metabolism; nutrient interrelationships; feeding frequency; feed processing; appetite factors; methods of determining design and techniques useful in monogastric nutrition research. Pr.: ASI 700 or equiv. ASI-901-0-0104

ASI 905. Topics in Animal Breeding. (2) On sufficient demand. Lectures and assigned reading concerned with animal breeding research techniques. Emphasis on discussion of advanced topics of current interest in animal breeding. Pr.: ASI 749. ASI-905-0-0104

ASI 907. Techniques in Animal Nutrition Research. (3) II. Use of animals, markers, and in vitro methods for the evaluation of feedstuffs. In vivo techniques for measuring absorption and metabolism. Two hours lec. and three hours lab a week. Pr.: BIOCH 521 and ASI 850. ASI-907-1-0104

ASI 930. Advanced Meat Science. (3) I. On sufficient demand. Basic biochemical, physiological, and histological properties of muscle and related tissues; muscle contraction, rigor mortis, and muscle hydration; maturation; processing by thermal, dehydration, and cold sterilization techniques; meat flavor chemistry; meat research techniques. Three hours rec. a week. Pr.: ASI 777 or equiv.; and a course in biochemistry. ASI-930-0-0104

ASI 961. Graduate Problem in Animal Sciences and Industry. (Var.) I, II, S. In-depth study of a topic supervised by a member of the graduate faculty. Pr.: Permission of supervising faculty member. ASI-961-3-0104

ASI 990. Seminar in Animal Sciences Research. (1) I, II. The scientific reasoning underlying the selection of research problems, the formulation and testing of hypotheses, and the evaluation and presentation of results. Pr.: Approval of major professor. ASI-990-0-0104

ASI 999. Doctoral Research in Animal Sciences and Industry. (Var.) I, II, S. Pr.: Consult major professor. ASI-999-4-0104

Crop Protection

Advisors: Fred W. Schwenk, Coordinator; Agronomy: Moshier; Entomology: Blocker and Broce; Forestry: Geyer; Grain Science: Pedersen; Horticulture: Hellman; Plant Pathology: Bockus, Hetrick, Pfender, and Schwenk.

Undergraduate study

Bachelor of science in agriculture—127 semester hours

Crop protection deals with the proper use of various types of control of crop pests (insects, plant diseases, weeds, and nematodes), and is often termed pest management or integrated control. The goal is to minimize cost and produce nutritious food and good fiber, while avoiding adverse effects on man, wildlife, and the environment.

The crop protection curriculum is administered by a committee of faculty from the Departments of Agronomy, Entomology, Forestry, Horticulture, and Plant Pathology. Persons interested in the curriculum should contact the dean, College of Agriculture, for additional information and assignment of an advisor. It offers options as discussed below.

The pest management option is designed to prepare a student 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 crop protection are required to complete the following basic courses:

General requirements

ENGL 100	English Composition I	3
ENGL 120	English Composition II	3
SPCH 105	Public Speaking 1A	2
GENAG 101	Ag Orientation	1
MATH 100	College Algebra	3
CHM 210	Chemistry I	4
	and	
CHM 230	Chemistry II	4
	or	
CHM 110	General Chemistry	5
MKT 443	Sales Communication or equivalent course	2-3
ECON 110	Economics I	3
PE 101	Concepts in Physical Education	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
PLPTH 651	Internship in Crop Protection	1-2
PLPTH 701	Seminar in Crop Protection	1

Supporting courses—agriculture and biological sciences:

HORT 200	Plant Science	4
	or	
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
	or	
BIOL 210	General Botany	4
BIOL 529	Fundamentals of Ecology	3
AMC 653	Irrigation Practices	3
	or	
AGRON 625	Management of Irrigated Soils	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
FOR 275	Farm Forestry	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 120	Introductory Organic and Biological Chemistry	5
CMPSC 110	Introduction to Personal Computing	3
	or	
CMPSC 200	Fundamentals of Computer Programming	2
	and	
CMPSC 20-	Computer Language Lab	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
	or	
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	
	or	
AGEC 480	Agricultural Economics Statistics ..	3
PHYS 115	Descriptive Physics	4
BIOCH 120	Introduction to Organic and Biological Chemistry	5
CMPSC 110	Introduction to Personal Computing	3
	or	
CMPSC 200	Fundamentals of Computer Programming	2
	and	
CMPSC 20-	Computer Language Lab	2

Supporting courses—business administration and economics:

ACCTG 211	Financial Accounting	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 221	Managerial Accounting	3
ECON 530	Money and Banking	3
ECON 620	Labor Economics	3
ECON 631	Principles of Transportation	3
AGEC 518	Economic Principles of Agricultural Business Firms	3

All other courses in AGECE with a 500 or higher course number.

Entomology

R. G. Helgesen,* Head

Professors Blocker,* Broce,* Brooks, Cress, Elzinga,* Harvey,* Hatchett,* Helgesen,* Hopkins,* Horber,* Mock,* and Wilde;* Associate Professors Bauernfeind,* Beeman,* Buschman,* DePew, Kadoum,* Lippert, McGaughey,* Reese,* and Sloderbeck; Assistant Professors Black,* Harris,* Hagstrum,* Higgins,* Howard,* Margolies,* Nechols,* and Wright;* Emeriti: Professors Gates, Mills, Thompson, and Wilbur; Assistant Professor Eshbaugh.

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 which provide training for research, teaching, and administration in colleges, experiment stations, health services, and agencies of the state and federal govern-

ments, 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, 325, and 327 are recommended.

Undergraduate study

Bachelor of Science in Agriculture under the crop protection curriculum, which includes the entomology science option.

Students interested in the general field of protecting plants from insects, plant diseases, and weeds should consider the pest management or business and industries option of the crop protection 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 crop protection curriculum.

Entomology science option of the crop protection curriculum

Students majoring in this option take, in addition to the general requirements for the 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 555	Microbiology	5
BIOL 529	Fundamentals of Ecology	3
	or	
BIOL 631	Ecology	3

Approved electives

Physical sciences and mathematics

MATH 150	Plane Trigonometry	3
STAT 340	Biometrics I	3

One of the following:

CHM 190	Elementary Organic Chemistry	3
CHM 191	Elementary Organic Chemistry Lab	2
	or	
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

One of the following:

BIOCH 521	General Biochemistry	3
	and	
BIOCH 522	General Biochemistry Lab	2
	or	
BIOCH 525	Plant Biochemistry Lab	2
	or	
BIOCH 201	Elementary Biochemistry	3
	and	
BIOCH 202	Elementary Biochemistry Lab	2

One of the following:

MATH 220	Analytical Geometry and Calculus I	4
	or	

CMPSC 200	Fundamentals of Computer Programming	2
	and	
CMPSC 201	FORTTRAN Language Laboratory ..	2
One of the following:		
PHYS 113	General Physics I	4
PHYS 114	General Physics II	4
	or	
PHYS 115	Descriptive Physics	4

Graduate study

The M.S. and Ph.D. degrees are offered. For majors, professional courses in entomology and a broad, basic training in agriculture or the biological and physical sciences are needed to provide a satisfactory foundation for graduate work. Facilities for research include field insectaries, greenhouses, programmed environmental chambers, several temperature- and humidity-controlled rooms for rearing insects, laboratories for use of radioisotopes, and a scanning electron microscope.

Major laboratories are provided for study of insect behavior, genetics, host plant resistance to insects, taxonomy, toxicology, physiology, and biochemistry; and for biology, ecology, and control of stored products insects and insects attacking humans and animals. There are isolated laboratories for insecticide testing and for chemical and bioassay determination of insecticide residues. Facilities for the investigation of the biology and control of insects attacking trees, shrubs, ornamental plants, fruits, vegetables, grasslands, and field crops also are provided.

Mutual cooperation with entomologists at the U.S. Grain Marketing Research Center as well as with research faculty in selected on-campus departments further enhances graduate studies.

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-300-1-0421

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, as well as general agriculture. Two hours lecture-demonstration a week. ENTOM-305-0-0421

ENTOM 306. Livestock Entomology Laboratory. (1) I. One two-hour lab a week. ENTOM-306-1-0421

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-312-0-0421

ENTOM 313. General Entomology Laboratory. (1) I, II. Identification, food preferences, and habitat preferences of the common insects. Two hours a week. ENTOM-313-1-0421

ENTOM 314. Insect and Arachnid Identification. (3) I. Offered 1988 and alternate years. Pr.: ENTOM 312 or conc. enrollment. (Not open to entomology science option majors in crop protection curriculum.) Identification of common insects and arachnids. Two three-hour labs a week. ENTOM-314-1-0421

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. ENTOM-320-1-0421

Undergraduate and graduate credit

ENTOM 612. Insect Pest Diagnosis. (2) I. Offered 1989 and alternate 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-612-6-0421

ENTOM 620. Insecticides: Properties and Laws. (2) II. Offered 1988 and alternate years. Study of chemical and biological properties of insecticides. Formulations, use, safety, and environmental impact and laws regulating the use of as related to agriculture. Two hours lec. a week. Pr.: CHM 190. ENTOM-620-0-0421

ENTOM 706. External Insect Morphology. (3) I. Offered 1988 and alternate years or on sufficient demand. 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-706-1-0421

ENTOM 710. Insect Taxonomy. (3) II. 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 660 recommended but not required; insect collection desirable. ENTOM-710-1-0421

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-767-0-0412

ENTOM 799. Problems in Entomology. (Var.) I, II, S. For nonthesis or nondissertation studies. Work in various fields of entomology. Pr.: Consent of instructor. ENTOM-799-3-0421

Graduate credit

ENTOM 805. Insects of Stored Products. (3) II. Offered 1989 and alternate years. Biology, ecology, and behavior of stored-product insects and current practices involved in their control. Two hours lec. and three hours lab a week. Pr.: ENTOM 300, or 312 and 313, or consent of instructor. ENTOM-805-1-0421

ENTOM 820. Biological Control. (3) II. Offered 1989 and alternate years. The theory and practice of biological control, with emphasis on natural enemies of insect pests. Relationship and importance of ecology and integrated pest management to biological control. Experimental approaches, evaluation, recognition, and life histories of beneficial species will be covered. Two hours lec. and two hours lab a week. Pr.: ENTOM 312 and 313 and ENTOM 891 or BIOL 529 or 631 or equiv. ENTOM-820-1-0421

ENTOM 845. Insect Control by Host Plant Resistance. (2) I. Offered 1988 and alternate years. Resistance of varieties of crop plants to insect attack and utilization in insect control; insect habits and physiology in relation to the cause of resistance and methods of breeding resistant varieties of crops. Pr.: ENTOM 300 or 312 and 313 and a course in either plant or animal genetics. ENTOM-845-0-0421

ENTOM 857. Toxicology and Properties of Insecticides. (3) I. Offered 1989 and alternate years. A study of the classification of insecticides, their types of formulations, biological properties, mode of action, and first aid treatment. Synergism, antagonism, and other interactions. Two hours lec. and two hours lab a week. Pr.: CHM 350 or consent of instructor. ENTOM-857-1-0421

ENTOM 865. Internal Insect Morphology. (3) II. Offered 1989 and alternate years. Internal anatomy of representative insects; plan and structure of internal systems. One hour lec. and six hours lab a week. Pr.: ENTOM 660. ENTOM-865-1-0421

ENTOM 875. Insect Physiology. (3) I. Offered 1989 and alternate years. Functions of insect systems for development, metamorphosis, and reproduction. Physiological and biochemical mechanisms

underlying insect activities, behavior, and ecological adaptations. Two hours lec. and three hours lab a week. Pr.: ENTOM 865 or consent of instructor. ENTOM-875-1-0421

ENTOM 892. Insect Ecology. (4) I. Offered 1989 and alternate years. Abiotic and biotic factors underlying the distribution and abundance of insects. How these factors affect insect population processes, life history adaptations, and community structure. Special attention given to current literature and experimental approaches. Three hours lec. and two hours lab a week. Pr.: BIOL 529 or BIOL 631 or equiv. ENTOM-892-0-0421

ENTOM 898. Master's Report in Entomology. (Var.) I, II, S. Work in various fields of entomology. Pr.: Consent of instructor. ENTOM-898-4-0421

ENTOM 899. Master's Research in Entomology. (Var.) I, II, S. For students majoring in entomology. Pr.: Knowledge in special area and consent of instructor. ENTOM-899-4-0421

ENTOM 920. Insect Behavior. (3) II. Offered 1989 and alternate years. The study of the mechanisms, ecology, and evolution of behavior in social and nonsocial insects. Pr. ENTOM 312, 313, and 875. Two hours lec. and two hours lab a week. ENTOM-920-0-0421

ENTOM 930. Topics in Environmental and Physiological Entomology. (Var.) II. Selected topics for advanced study in insect behavior, ecology, genetics, physiology, and related areas. Pr.: Consent of instructor. ENTOM-930-3-0421

ENTOM 932. Topics in General and Systematic Entomology. (Var.) I, II. Offered 1987-88 and alternate years. Principles of taxonomy; advanced taxonomy; taxonomy of immature insects; acarology; and biological literature. Pr.: ENTOM 710 and consent of instructor. ENTOM-932-1-0421

ENTOM 995. Entomology Seminar. (1) I, II, S. Pr.: Consult seminar committee. Pass/fail grade only. ENTOM-995-0-0421

ENTOM 999. Research in Entomology. (Var.) I, II, S. Dissertation credit for students majoring in entomology. Pr.: Knowledge in special area and consent of instructor. ENTOM-999-4-0421

Food Science and Industry

Advisors: Cunningham, Fung, Hunt, Ikins, Jeon, Kastner, Kropf, and Roberts, Animal Sciences and Industry; Hosenev and Seib, Grain Science and Industry; Greig, Horticulture.

Undergraduate study

Bachelor of science in food science and industry—127 semester hours

This curriculum deals with the theoretical and practical aspects of the food industry from production of the raw material through acceptance of the finished product.

The curriculum, designed to educate individuals in the discipline of food science, balances fundamental principles and application of food theory within a flexible program that permits students to tailor education to fit personal career goals. The program is certified by the National Institute of Food Technologists.

Employment opportunities include production management, product and process research and development, public health and regulatory agency service, teaching, merchandising, advertising, technical service and marketing, quality control supervision, and positions in international food agencies.

Students will select one of three options: processing, business, or science.

The processing option emphasizes processing techniques through such courses as baking science, poultry products technology, food engineering, handling and processing fruits and vegetables, meat technology, dairy food processing, processing grains for food, and meat packing plant operations.

In preparing students to manage food industries, the business option emphasizes accounting, business law, marketing, business finance, management, personnel, labor legislation, consumer behavior, and sales. It also incorporates a few processing courses.

The science option prepares students for specializing in research, product development, and quality control. It often leads to graduate work in food science. Courses are selected to give students excellent backgrounds in mathematics, chemistry, microbiology, statistics, and computer science, along with understanding of processing and food characteristics.

Graduate study

All options may lead to graduate study in food science. Both M.S. and Ph.D. programs are offered.

This is an interdepartmental curriculum involving the Colleges of Agriculture and Human Ecology. Students may enroll in either college for the science option of this curriculum, depending upon their interest.

Facilities range from those required for fundamental studies to pilot plant production and utilization of dairy, poultry, red meat, horticultural, and grain-based foods. Students should contact the office of the director of resident instruction, College of Agriculture, or the dean of human ecology for assignment of an advisor.

Scholarships are available through the National Institute of Food Technologists to qualified incoming freshman planning to major in food science and industry. High school seniors interested in applying for a scholarship should contact the director of resident instruction in agriculture or the dean of human ecology by December of their senior year.

Core curriculum—science, processing, and business options

Liberal-general (13–14 hours)

ENGL 100	English Composition I	3
ENGL 120	English Composition II	3
SPCH 105	Public Speaking 1A	2
ECON 110	Economics I	3
PE 101	Concepts in Physical Education	1
GENAG 101	Ag Orientation	1
Social sciences/humanities		9
MATH 100	College Algebra	3
STAT 340	Biometrics I	3
MATH 205	General Calculus and Linear Algebra	3
MATH 210	Technical Calculus I	3
BIOL 198	Principles of Biology	4
BIOL 220	Bacteriology and Man	3
BIOL 555	Microbiology*	5
CHM 210	Chemistry I	4
CHM 230	Chemistry II	4
CHM 190	Elementary Organic Chemistry	3
CHM 350	General Organic Chemistry*	3
CHM 351	General Organic Chemistry Lab	2
BIOCH 201	Elementary Biochemistry**	3
BIOCH 521	General Biochemistry*	3
BIOCH 522	General Biochemistry Lab	2
CHM 271	Chemical Analysis*	4
PHYS 115	Descriptive Physics	4
PHYS 113	General Physics I*	4
PHYS 114	General Physics II	4

*Required for science option.

**If BIOCH 202 is not available, substitute BIOCH 522.

General food science courses (27–28 hours)

ASI 302	Introduction to Food Science	3
ASI 410	Food Analysis	3
ASI 311	Introductory Food Chemistry	3
ET 440	Introduction to Food Engineering Technology	4
BIOL 520	Microbiology of Foods	4
ASI 695	Quality Assurance	3
GRSC 651	Food and Feed Plant Sanitation	4
FN 502	Principles of Nutrition	3
GENAG 500	Food Science Seminar	1
ASI 305 (or GRSC 305)	Fundamentals of Food Processing	3

Options (select one):

Science: two processing courses plus a minimum of 13 hours selected from any of the courses listed below.

Processing: a minimum of 18 hours from the list of processing electives, including courses from at least three commodity areas, plus six hours from business or professional electives listed below.

Business: a minimum of 18 hours from the list of suggested business electives, including ACCTG 211 and ACCTG 221, plus two of the processing electives, plus three hours from the processing or professional electives listed below.

General food science electives:

ASI 630	Egg Science	2
ASI 635	Poultry Meat Technology	2
ASI 694	Food Plant Management	2
HORT 792	Handling and Processing Fruits and Vegetables	3
GRSC 120	Introduction to Bakery Technology	2
GRSC 602	Cereal Science	3
GRSC 661	Qualities of Feed and Food Ingredients	3
CMPSC 110	Introduction to Personal Computing	3
CMPSC 200	Fundamentals of Computer Programming	2
CMPSC 20-	Computer Language Lab	2
FN 301	Trends in Food Products	3
FN 501	Food Science	4
FN 612	Principles of Food Product Development and Control	3
FN 750	Nutrition Aspects of Food Processing and Preparation	3
FN 790	Food Research Techniques	3
GENAG 630	Food Science Problem	var.

Processing electives:

ASI 350	Principles of Meat Science	2
ASI 361	Meat Processing	2
ASI 405	Fundamentals of Milk Processing	3
ASI 430	Food Products Evaluation	3
ASI 502	Principles of Dairy Food Processing	4
ASI 550	Dairy Bacteriology	4
ASI 671	Meat Selection and Utilization	3
ASI 711	Food Fermentation	4
ASI 725	Meat Packing Plant Operations	2-6
ASI 777	Meat Technology	4
GRSC 100	Principles of Milling	3
GRSC 625	Flour and Dough Testing	3
GRSC 635	Baking Science I	2
GRSC 636	Baking Science I Laboratory	2
GRSC 737	Baking Science II	2
GRSC 738	Baking Science II Laboratory	1
ET 640	Food Processing Operations	5
FN 620	Sensory Evaluation of Foods	3

Business electives:

AGEC 511	Consumption Economics in Agriculture	3
AGEC 515	Marketing of Agricultural and Food Products	3
AGEC 518	Economic Principles of Agricultural Business Firms	3
AGEC 520	Grain Marketing	3
AGEC 521	Livestock and Meat Marketing	3
ASI 694	Food Plant Management	2
ECON 120	Economics II	3
ACCTG 211	Financial Accounting	3
ACCTG 221	Managerial Accounting	3
FINAN 450	Business Finance	3
MANGT 202	Small Business Operations	3
MANGT 390	Business Law I	3
MANGT 420	Management Concepts	3
MANGT 421	Production Management	3
MANGT 530	Industrial and Labor Relations	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

Unrestricted electives 7-18

Forestry

Lester R. Pinkerton, Acting State Forester and Department Head

Professors Geyer,* Naughton, Nighswonger, and Strickler; Associate Professors Aslin, Bratton, Gould, Loucks, and Rowland; Assistant Professors Bruckerhoff, Cable, Hildebrandt, Kunkel, Lynch, and Strine.

Undergraduate study

Society faces a future of making potentially infinite demands upon finite natural resources. Good management of America's natural resources will require the best efforts of dedicated, trained professional natural resource managers. A basic objective of natural resource managers is to provide essential goods and services while maintaining the highest environmental standards.

The KSU Department of Forestry offers two career-oriented programs: a two-year pre-forestry curriculum, and a four-year park resource management curriculum that leads to a bachelor of science degree.

Hours earned in the pre-forestry program can be transferred to most other colleges 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. The department does not offer graduate degrees.

Pre-forestry (two-year program)

Freshman

Fall semester	
BIOL 210	General Botany
ENGL 100	English Composition I
SPCH 106	Public Speaking I
MATH 100	College Algebra*
FOR 285	Introduction to Forestry
Electives	.....
1-2	
17-18	

Spring semester

CHM 110	General Chemistry
CHM 210	Chemistry I
ENGL 120	English Composition II
MATH 150	Plane Trigonometry*
GEOL 100	Introduction to Geology
FOR 210	Forestry Graphics
PE 101	Concepts in Physical Education
1	
16-17	

*Students with proper mathematics background are encouraged to substitute calculus for these courses.

Sophomore

Fall semester	
BIOL 305	Soils
FOR 330	Dendrology I
FOR 311	Forestry Instruments
STAT 340	Biometrics I
FOR 321	Forestry Resource Topics
ECON 110	Economics I
Electives	.....
3	
18	

Spring semester

PHYS 115	Descriptive Physics
ECON 120	Economics II
FOR 340	Dendrology II
CE 212	Elementary Surveying
CMPSC 200	Fundamentals of Computer
CMPSC 206	Programming
	BASIC Language Laboratory
2	
16	

Park resource management Bachelor of science in agriculture— 127 semester hours

Freshman

Fall semester	
GENAG 101	Ag Orientation
CHM 110	General Chemistry
ENGL 100	English Composition I
FOR 375	Introduction to Natural Resource
	Management
PE 101	Concepts in Physical Education
MATH 100	College Algebra
3	
16	

Spring semester

ENGL 120	English Composition II
MATH 150	Plane Trigonometry
SPCH 106	Public Speaking I
BIOL 210	General Botany
Electives	.....
3	
16	

Sophomore

Fall Semester	
FOR 285	Introduction to Forestry
ECON 110	Economics I
FOR 330	Dendrology I
	or
HORT 374	Woody Plants
GEOL 100	Introduction to Geology
SOCIO 211	Introduction to Sociology
BIOL 529	Fundamentals of Ecology
3	
17-18	

Spring semester

AGRON 305	Soils
CMPSC 110	Introduction to Personal
	Computing
FOR 340	Dendrology II
	or
HORT 375	Woody Plants
FOR 440	Use of Natural Resources for
	Leisure
Electives	.....
3	
15-16	

Junior

Fall semester	
PHYS 115	Descriptive Physics
POLSC 110	Introduction to Political Science ...
	or
POLSC 520	State and Local Government
STAT 330	Elementary Statistics
	or
STAT 340	Biometrics
AGEC 525	Natural Resource Economics
Electives	.....
3	
16	

Spring semester

BIOL 433	Wildlife Conservation
ENTOM 312	General Entomology
ENTOM 313	General Entomology Laboratory ...
FOR 635	Methods of Environmental
	Interpretation
HORT 200	Plant Sciences
Electives	.....
3	
16	

Senior

Fall semester	
FOR 645	Park Management Seminar
FOR 350	Park Field Studies
FOR 699	Park Administration and
	Management
HORT 612	Turf Management
HORT 585	Arboriculture
Electives	.....
3	
15	

Spring semester

FOR 590	Park Operations
Electives	.....
4	
9-11	
13-15	

At least six hours must be in humanities or social sciences; 12-15 hours of free electives.

Select four courses from:

FOR 510	Urban Forestry
FOR 520	Urban Forestry Administration
FOR 575	Management of Water Resources
	for Leisure
FOR 660	Travel, Tourism, and Park
	Management
AGRON 501	Range Management
GEOG 705	Remote Sensing of the
	Environment
PLPTH 500	Principles of Plant Pathology
JMC 512	Public Relations
3	

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 a week. No prerequisites. FOR-210-1-0114

FOR 275. Farm Forestry. (3) II. Care and management of existing farm woodlots for maximum production of fuel wood and saw timber, livestock and homestead protection, and recreational opportunities. Establishment and care of new forest plantings for timber production, nut production, wildlife habitat improvement, wind protection, and snow management. Land-use decisions related to Kansas conditions will also be covered. FOR-275-1-0114

FOR 285. Introduction to Forestry. (3) I. An introduction to American forestry. Forestry heritage in the U.S., importance of forests, multiple-use concepts, management practices, utilization, protection, policy, and the profession of forestry. FOR-285-0-0114

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. No prerequisites. FOR-311-1-0114

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-321-0-0114

FOR 330. Dendrology I. (2) I. Identification, classification, silvical characteristics, distribution, and economic significance of important North American angiosperm trees. One hour rec. and three hours lab a

week. Pr.: BIOL 210 or equiv. FOR-330-1-0114

FOR 340. Dendrology II. (2) II. Identification, classification, silvical characteristics, distribution, and economic significance of important North American gymnosperm trees. One hour rec. and three hours lab a week. Pr.: BIOL 210 or equiv. FOR-340-1-0114

FOR 350. Park and Recreation Areas Field Studies. (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. FOR-350-3-0115

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-375-0-0115

FOR 440. Use of Natural Resources for Leisure. (3) II. A survey of the concepts, history, present status, and goals of outdoor recreation for leisure, with particular emphasis on the role of using natural resources for leisure. Three hours rec. a week. FOR-440-0-0115

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 in-depth study of the theory and practical application of integrated management of the urban forest resource. The following areas will be emphasized: urban forest environment and the role environment plays in management, practical problems in planning and design, product and wastewood use, integrated pest management, watershed protection, and water conservation and research needs. 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-510-0-0115

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. FOR-520-0-0115

FOR 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. FOR-575-0-0115

FOR 590. Park Operations. (4) II. Planning, execution, and supervision of field maintenance and operations to include: job planning, budgeting, equipment selection and maintenance, and personnel practices. Basic park design considerations will also be covered. Pr.: Junior standing, FOR 375, FOR 440. FOR-590-1-0114

Undergraduate and graduate credit

FOR 635. Methods of Environmental Interpretation. (3) II. Principles and techniques necessary to communicate values of man's total environment to visitors in recreation and park areas. The synthesis and analysis of information necessary in various types of formal and informal presentations. The philosophy, design, and use of interpretive devices to communicate the understanding of man's total environment in recreation and park areas. Two hours rec. and three hours lab a week. Field trips required. Pr.: FOR 375 and 440. FOR-635-1-0115

FOR 641. Forestry Problems. (Var.) I, II, S. Work is offered in various fields of forestry. Pr.: Consent of instructor. FOR-641-3-0114

FOR 642. Parks and Recreation Problems. (Var.) I, II, S. Special problems and individual research in recreation. Designed for investigations and individual study not included in the student's normal course work. Pr.: Advanced undergraduate standing and consent of instructor. FOR-642-3-0115

FOR 645. Park Management Seminar. (1) I. Various exercises designed to offer the student opportunities to articulate and interact in structured small groups discussing park and recreational area management topics. FOR-645-0-0115

FOR 660. Travel, Tourism, and Park Management. (3) I, S. Advanced study of nonbusiness travel and tourism including its origins, present characteristics, economic impact, and leisure implications as they apply to park management and the use of natural resources. Field trips required at the expense of the student. Pr.: FOR 440 and junior standing. FOR-660-0-0115

FOR 699. Park Administration and Management. (3) I. Analysis of park administration and management and the detailed study of the principles of administrative behavior, using problem-solving models and case studies. Three hours rec. a

week. Field trips required. Pr.: FOR 440 and 590. FOR-699-0-0115

General Agriculture

David J. Mugler,* Associate Dean and Director of Resident Instruction
Lawrence H. Erpelding, Associate Director
John B. Riley,* Assistant Director

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-101-0-0101

GENAG 200. Topics in Agriculture. (0-3) On sufficient demand. Selected issues in agriculture. May be repeated with change in topics. GENAG-200-0-0101

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/place-ment services, resume construction, personal interviewing, and job offer evaluation and analysis; and monitoring involved in career planning. GENAG-390-0-0101

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 or JMC 350. GENAG-410-2-0101

Undergraduate and graduate credit

GENAG 500. Food Science Seminar. (1) II. 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-500-0-0101

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-505-0-0101

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-510-2-0101

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-515-0-0101

GENAG 520. Issues in Agriculture. (1-3) On sufficient demand. Selected issues in agriculture. May be repeated with change in topics. GENAG-520-0-0101

GENAG 605. Extension Organization and Programs. (3) I. Development and objectives of cooperative extension and other University adult education programs, with emphasis on programs and procedures. Pr.: Senior standing or consent of instructor. GENAG-605-0-0101

GENAG 606. Principles of Teaching Adults in Extension. (3) II. Methods and principles of adult teaching, with emphasis on Cooperative Extension Service; application to various adult education programs. Pr.: Senior standing, juniors by consent of instructor. GENAG-606-0-0101

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-630-3-0101

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-770-2-0101

Graduate credit

GENAG 988. Scientific Writing. (1) I. Instruction in reporting research results, as in a scientific journal article, thesis, or dissertation. Course shows how to organize and communicate scientific findings logically, clearly, and precisely. Students who use results of their research should benefit most from the course. Pr.: M.S. or equiv. GENAG-988-0-0101

Grain Science and Industry

Charles Deyoe,* Head

Professors Balding,* Deyoe,* Eustace,* Hoseney,* McElhiney,* Ponte,* Schoeff,* Seib,* Walker,* Wetzels,* and Wilcox,* Adjunct Professors Hoover,* Pomeranz,* and Vetter,* Associate Professors Behnke,*

Pedersen,* Posner,* and Wingfield,* Adjunct Associate Professor Chung,* Assistant Professors Faubion* and Klopfenstein,* Adjunct Assistant Professors Bennett and Lookhart,* Instructor Curran; Emeriti: Professors Farrell* and Ward,* Assistant Professor Miller.

Undergraduate study

The Department of Grain Science and Industry offers three curricula. One leads to a bachelor of science in bakery science and management; another to a bachelor of science in feed science and management; and the third to 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—127 semester hours

Freshman

Fall semester	
GENAG 101	Ag Orientation
GRSC 100	Principles of Milling
CHM 210	Chemistry I
ENGL 100	English Composition I
MATH 100	College Algebra
PE 101	Concepts in Physical Education
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Spring semester

CHM 230	Chemistry II
ECON 110	Economics I
ENGL 120	English Composition II
MATH 150	Plane Trigonometry
GRSC 120	Introduction to Bakery Technology
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15	

Sophomore

Fall semester	
SPCH 105	Public Speaking IA
BIOL 198	Principles of Biology
Humanities or social science electives	
Option A, B, or C	
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17	

Spring semester

BIOL 555	Microbiology
Humanities or social science electives	
STAT 320 Elements of Statistics	
Option A, B, or C	
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17	

Junior

Fall semester	
GRSC 635	Baking Science I
GRSC 636	Baking Science I Lab
BIOL 520	Microbiology of Foods
Option A, B, or C	
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16	

Spring semester

GRSC 737	Baking Science II
GRSC 738	Baking Science II Lab
GRSC 602	Cereal Science
Option A, B, or C	
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15	

Senior

Fall semester

GRSC 670	Bakery Layout
ET 440	Introduction to Food Engineering Technology
Option A, B, or C	
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16	

Spring semester

GRSC 625	Flour and Dough Testing
GRSC 651	Food and Feed Plant Sanitation
Option A, B, or C	
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16	

Administration option (A)

GRSC 505	Cereal and Feed Analysis
BIOCH 120	Introduction to Organic and Biological Chemistry
ECON 120	Economics II
MATH 205	General Calculus and Linear Algebra
PHYS 113	General Physics I
PHYS 114	General Physics II
CMPSC 200	Fundamentals of Computer Programming
ACCTG 211	Financial Accounting
ACCTG 221	Managerial Accounting
MANGT 420	Management Concepts
MKTG 400	Marketing
FINAN 450	Business Finance
Electives	
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3	

And six hours from the following:

ECON 530	Money and Banking
ECON 620	Labor Economics
ACCTG 312	Cost Accounting
MANGT 530	Industrial and Labor Relations
MANGT 531	Personnel and Wage Administration
MKTG 450	Consumer Behavior
MKTG 542	Sales Management
MANGT 630	Labor Relations Law
FINAN 650	Capital Budgeting
IE 501	Industrial Management
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3	

Chemistry option (B)

GRSC 505	Cereal and Feed Analysis
BIOCH 521	General Biochemistry
BIOCH 522	General Biochemistry Lab
CHM 271	Chemical Analysis
CHM 500	Descriptive Physical Chemistry
CHM 531	Organic Chemistry I
CHM 532	Organic Chemistry I Lab
CHM 550	Organic Chemistry II
CHM 551	Organic Chemistry II Lab
MATH 220	Analytic Geometry and Calculus I ..
MATH 221	Analytic Geometry and Calculus II
PHYS 213	Engineering Physics I
PHYS 214	Engineering Physics II
Electives	
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6	

Operations option (C)

BIOCH 120	Introduction to Organic and Biological Chemistry
MATH 220	Analytic Geometry and Calculus I ..
MATH 221	Analytic Geometry and Calculus II
MATH 222	Analytic Geometry and Calculus III
AGE 563	Farmstead Utilities
ME 212	Engineering Graphics I
PHYS 213	Engineering Physics I
PHYS 214	Engineering Physics II
CE 231	Statics A
CE 331	Strength of Materials A
IE 501	Industrial Management
ME 513	Thermodynamics I
Electives	
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5	

Feed science and management

Bachelor of science in feed science and management—127 semester hours

Freshman

Fall semester

GENAG 101	Ag Orientation
GRSC 100	Principles of Milling
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3	

CHM 210	Chemistry I	4
ENGL 100	English Composition I	3
MATH 100	College Algebra	3
PE 101	Concepts in Physical Education	1
		15

Spring semester

CHM 230	Chemistry II	4
ENGL 120	English Composition II	3
MATH 150	Plane Trigonometry	3
SPCH 105	Public Speaking IA	2
Required courses*		5
		17

Sophomore**Fall semester**

GRSC 110	Flow Sheets	2
BIOL 198	Principles of Biology	4
ECON 110	Economics I	3
Required courses*		6
		15

Spring semester

ASI 318	Fundamentals of Nutrition	3
Social science electives		6
Required courses*		7
		16

Junior**Fall semester**

GRSC 510	Feed Technology I	4
GRSC 661	Qualities of Feed and Food Ingredients	3
Social science electives		3
Required courses*		6
		16

Spring semester

GRSC 750	Feed Technology II	4
BIOL 220	Bacteriology and Man	3
ENTOM 312	General Entomology	2
ENTOM 313	General Entomology Lab	1
Required courses*		6
		16

Senior**Fall semester**

Required courses*		16
		16

Spring semester

GRSC 651	Food and Feed Plant Sanitation	4
Required courses*		12
		16

*Including specialization electives

Required courses

GRSC 505	Cereal and Feed Analysis	3
GRSC 630	Management Applications	3
GRSC 650	Concepts of Modern Feed Mill Design	3
GRSC 785	Advanced Flour and Feed Technology	3
AGEC 520	Grain Marketing	3
BIOCH 120	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
CMPSC 200	Fundamentals of Computer Programming	4
ACCTG 211	Financial Accounting	3

Specialization electives

GENAG 390	Agricultural Employment	1
GRSC 591	Commercial Feed and Food Manufacturing Internship	2
GRSC 655	Flour and Feed Mill Construction	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 221	Managerial Accounting	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 Wage Administration	3
MANGT 630	Labor Relations Law	3
MKTG 542	Sales Management	3
AMC 363	Farmstead Utilities	3
IE 501	Industrial Management	3
Free electives		6

Milling science and management**Bachelor of science in milling 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	English Composition I	3
MATH 100	College Algebra	3
PE 101	Concepts in Physical Education	1
		15

Spring semester

CHM 230	Chemistry II	4
ENGL 120	English Composition II	3
MATH 150	Plane Trigonometry	3
SPCH 105	Public Speaking IA	2
ME 212	Engineering Graphics I	2
Option A, B, or C		3
		17

Sophomore**Fall semester**

GRSC 110	Flow Sheets	2
BIOL 198	Principles of Biology	4
ECON 110	Economics I	3
Option A, B, or C		7
		16

Spring semester

GRSC 500	Milling Technology I	4
BIOL 220	Bacteriology and Man	3
Social science electives		6
Option A, B, or C		3
		16

Junior**Fall semester**

AGRON 340	Market Grading Cereals	2
Social science electives		3
Option A, B, or C		11
		16

Spring semester

GRSC 602	Cereal Science	3
STAT 320	Elements of Statistics	3
Option A, B, or C		9
		15

Senior**Fall semester**

GRSC 635	Baking Science I	2
GRSC 636	Baking Science I Lab	2
Option A, B, or C		12
		16

Spring semester

GRSC 651	Food and Feed Plant Sanitation	4
Option A, B, or C		12
		16

Administration option (A)

AGEC 520	Grain Marketing	3
GRSC 505	Cereal and Feed Analysis	3
GRSC 640	Advanced Flow Sheets	2
GRSC 655	Flour and Feed Mill Construction	3
GRSC 730	Milling Technology II (Lecture)	2
GRSC 785	Advanced Flour and Feed Technology	3
GRSC 630	Management Applications	3
BIOCH 120	Introduction to Organic and Biological Chemistry	5
ECON 120	Economics II	3

MATH 205	General Calculus and Linear Algebra	3
PHYS 113	General Physics I	4
PHYS 114	General Physics II	4
CMPSC 200	Fundamentals of Computer Programming	4
ACCTG 211	Financial Accounting	3
Electives		6

And six hours from the following:

ACCTG 221	Managerial Accounting	3
ECON 530	Money and Banking	3
ACCTG 312	Cost Accounting	3
MANGT 390	Business Law I	3
MANGT 420	Management Concepts	3
MANGT 530	Industrial and Labor Relations	3
MANGT 531	Personnel and Wage Administration	3
MKTG 450	Consumer Behavior	3
MKTG 542	Sales Management	3
MANGT 630	Labor Relations Law	3
FINAN 450	Business Finance	3
FINAN 650	Capital Budgeting	3
IE 501	Industrial Management	3

Chemistry option (B)

GRSC 505	Cereal and Feed Analysis	3
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		11

Operations option (C)

GRSC 640	Advanced Flow Sheets	2
GRSC 655	Flour and Feed Mill Construction	3
GRSC 730	Milling Technology II	4
GRSC 785	Advanced Flour and Feed Technology	3
BIOCH 120	Introduction to Organic and Biological Chemistry	5
MATH 210	Technical Calculus I	3
MATH 211	Technical Calculus II	3
ET 431	Electrical Circuit Technology	4
ET 550	Industrial Microprocessing	3
GRSC 630	Management Applications in Grain Processing Industries	3
PHYS 213	Engineering Physics I	5
PHYS 214	Engineering Physics II	5
CE 231	Statics A	3
CE 331	Strength of Materials A	3
Electives		8

Graduate study

Major work leading to the degrees master of science and doctor of philosophy is offered in specialized administration, chemical, and engineering fields related to baking, feed, and grain milling. Requirements for entering graduate study in grain science are: mathematics, including college algebra; analytical chemistry; organic chemistry; a course in physics; a course in a biological science. When the committee believes it necessary, students will be required to take additional undergraduate courses to prepare them more completely for their programs.

Modern teaching and research facilities include a pilot bakery, feed mill, and pilot flour mill. Associated laboratories permit

the study of the physical, chemical, and biochemical properties of cereals and related products.

Graduates are prepared for positions of responsibility in the baking, feed, and milling industries.

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-100-1-4-0199

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-110-1-0199

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, donuts, 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-120-1-0197

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 donuts. 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-121-1-0-0197

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. GRSC-305-0-0198

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-500-1-0199

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 250 and BIOCH 120. GRSC-505-1-0198

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-510-1-0198

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 GRSC 500 or GRSC 635. GRSC-591-2-0199

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-602-0-0198

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-625-1-0197

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-630-0-0112

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-635-0-0197

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-636-1-0197

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-640-1-0199

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-650-0-0198

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-651-1-0198

GRSC 655. Flour and Feed Mill Construction. (3) I. Mill engineering practices including sheet metal drafting, design of power transmission drives with belts, chains, and gears, and layout of new installations in existing plants. Design and layout of a grain or feed mill. Nine hours lab a week. Pr.: GRSC 500 or 510. GRSC-655-1-0199

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-661-0-0198

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-670-1-0197

GRSC 705. Nutritional Properties of Cereals and Legumes. (3) II. Special emphasis is given to the nutritional properties of grains and legumes and their processed products. Pr.: BIOCH 521, GRSC 602, or conc. enrollment. GRSC-705-0-0196

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-710-0-0199

GRSC 711. Principles of Food Analysis. (3) II. Principles of instrumentation and analysis, with emphasis on applications to quality control and research in the food

industry. Pr.: CHM 271 or GRSC 300 and BIOCH 120. GRSC-711-0-0198

GRSC 715. Fundamentals of Processing Grains for Food. (3) I. Unit processes in the receiving and storing of grains: grinding, sifting, mixing, conveying, cooling, drying air qualities, air flow, compaction, extrusion, etc. This course is not open to undergraduate majors in the department. Two hours lec. and three hours lab a week. Pr.: A course in physics. GRSC-715-1-0198

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, 150, and ASI 320. GRSC-725-1-0198

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-730-0-0199

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-731-1-0199

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-737-0-0197

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-738-1-0197

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 214, and one course each in statistics and computer programming. GRSC-750-1-0198

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-785-1-0199

GRSC 790. Grain Science Problem. (Var.) I, II, S. Pr.: Consent of staff. GRSC-790-3-0196

Graduate credit

GRSC 801. Enzyme Applications. (2) I. Theories of enzyme action and function; commercial methods of manufacture and industrial uses, with special emphasis on the role of enzymes in the food industries. Two hours lec. a week. Pr.: BIOCH 521 and 522. GRSC-801-0-0196

GRSC 810. Advanced Cereal Chemistry. (3) II. The chemistry of cereal components at the molecular level. The role and interactions of the various constituents, their functionality in producing an end product, and their influence on nutritional properties. Three hours lec. a week. Pr.: BIOCH 521 and GRSC 602. GRSC-810-0-0198

GRSC 899. Research in Grain Science. (Var.) I, II, S. Research may be used as basis for the M.S. thesis. Pr.: Consent of staff. GRSC-899-4-0196

GRSC 900. Graduate Seminar in Grain Science. (1) I, II. Discussion of technical problems in the cereal industry. One hour lec. a week. Attendance required of all graduate students in grain science. GRSC-900-2-0196

GRSC 901. Starch Chemistry and Technology. (2) II. Offered 1987-88 and alternate years. Chemical and physical properties of cereal and legume starches. Isolation, structure, assay methods, and properties in solution. Methods of modifying starches for industrial use, including chemical, physical, and enzymic modifications. Pr.: BIOCH 521, GRSC 602. GRSC-901-0-0196

GRSC 999. Research in Grain Science. (Var.) I, II, S. Research may be used as basis for Ph.D. dissertation. Pr.: Consent of staff. GRSC-999-4-0196

Horticulture

P. H. Jennings, Head

Professors Campbell,* Clayberg,* Greig,* Jennings,* Marr,* Mattson,* Morrison,* Pair,* and van der Hoeven; Associate Professors Albrecht,* Hensley,* Khatamian,* Kimmins, Leuthold, Long,* and Wiest;* Assistant Professors Allison, Hellman,* Nus,* Rajashekar,* and Robbins. Instructor Reid; Emeriti: Professors Abmeyer and Keen.

Undergraduate study

The Department of Horticulture offers two four-year curricula (horticulture and horticultural therapy), and one two-year program (retail floriculture). The department also helps administer and advises students in two interdepartmental programs. These are the crop protection curriculum and the food science and industry curriculum.

Horticulture (four-year curriculum)

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	English Composition I	3
ENGL 120	English Composition II	3
SPCH 105	Public Speaking IA	2
MATH 100	College Algebra*	3
ECON 110	Economics I	3
CHM 210	Chemistry I	4
	or	
CHM 110	General Chemistry	5
BIOL 210	General Botany	4
	or	
BIOL 198	Principles of Biology	4
PE 101	Concepts in Physical Education	1
	Humanities and/or social sciences	9
	Communications electives	3
ACCTG 211	Financial Accounting	3
	Organic chemistry	3-5
	Mathematics/statistics/	
	computer science electives	3-4
	Biology elective	3-4

*Students in the science option take calculus

Horticulture and agriculture requirements for science and industries options

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 undergraduates in horticulture 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 and the 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 525	General Plant Biochemistry Lab ...	2
BIOL 500	Plant Physiology	4
HORT 520	Fruit Production	3
HORT 560	Vegetable Crop Ecology	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 specializations: fruit/vegetable, greenhouse, landscape operations, nursery, turf, and urban. Requirements in addition to general education and agriculture are as follows:

HORT 350	Plant Propagation	3
HORT 520	Fruit Production*	3
HORT 560	Vegetable Crop Ecology*	3
HORT 612	Turf Management	3
Business electives		9
Free electives		8-13

*In turf and landscape operations, students take either HORT 520 or HORT 560.

Other requirements for the different suboptions are:

Fruit/vegetable and urban 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 361	Herbaceous Plant Material	3
HORT 570	Greenhouse Management	3
HORT 575	Nursery Management	3
HORT 580	Foliage Plant Production	3
HORT 582	Pesticide Application Technology ..	3
HORT 625	Floriculture	4
Horticulture specialization electives		10

Landscape operations 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

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 361	Herbaceous Plant Material	3
HORT 374	Woody Plant Material I	3
HORT 582	Pesticide Application Technology ..	3
AGRON 375	Soil Fertility	3
Horticulture specialization electives		20

Horticultural therapy (four-year curriculum)

Bachelor of science in agriculture—127 semester hours

The first horticultural therapy undergraduate training program in the United States was developed in 1971 in a cooperative agreement between Kansas State University and the Menninger Foundation, Topeka, Kansas. 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. The requirements of the curriculum are as follows:

General education requirements

ENGL 100	English Composition I	3
ENGL 120	English Composition II	3
SPCH 105	Public Speaking IA	2
GENAG 101	Ag Orientation	1
or		
HORT 110	Introduction to Horticulture	1
MATH 100	College Algebra	3
ECON 110	Economics I	3
CHM 110	General Chemistry	5
BIOL 210	General Botany	4
PE 101	Concepts in Physical Education	1
PE 375	First Aid-Multi/CPR	1
STAT or CMPSC 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 361	Herbaceous Plant Materials	3
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 Ecology	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
EDAF 215	Educational Psychology I	3
Art electives		2
Specialization electives		15

Internship requirement

HORT 540	Horticultural Therapy Field Experiences	12
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Electives 7-9

Retail floriculture (four semesters)

Associate of agriculture degree

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. In the program 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

BIOL 210	General Botany	4
HORT 110	Introduction to Horticulture	1
HORT 255	Introduction to Horticultural Therapy	1
HORT 325	Indoor Plants and Flowers	2
ENGL 100	English Composition I	3
ART 100	Design I	2
PE 101	Concepts in Physical Education	1
		14

Second semester

HORT 180	Basic Floral Design Concepts	3
HORT 200	Plant Science	4
HORT 299	Flower Judging	1
ART 200	Design II	2
ECON 110	Economics I	3
Communications elective		3
		16

Third semester

HORT 380	Advanced Floral Design	3
ENGL 120	English Composition II	3
PSYCH 110	General Psychology	3
HORT 361	Herbaceous Plant Materials	3
MATH 100	College Algebra	3
or		
CMPSC 200	Fundamentals of Computer Programming	2
and		
CMPSC 20-	Computer Language Lab	2
		15-16
HORT 290	Florist Shop Management Internship	1

Fourth semester

HORT 570	Greenhouse Management	3
ACCTG 211	Financial Accounting	3
Business electives		6
Social science elective		3
		15

Graduate study

Both the master of science and doctor of philosophy degrees are offered in the horticulture department in the fields of fruit and vegetable crops and in ornamental horticulture, including floriculture and turf science. The master of science degree is offered in the field of horticultural therapy. Specialization areas for the master of science and doctor of philosophy degrees include: crop physiology, growth regulators, herbicides/weed management, nutrition/fertility, soil/plant relationships, stress physiology, breeding/genetics, and food science. The last two of these are interdepartmental programs. Specialization areas for the master of science degree in horticultural therapy include: community programs, corrections, developmental disabilities, education, gerontology, and mental health. A B.S. degree from a recognized college or university whose undergraduate program is substantially equivalent to the program at KSU is prerequisite to admittance to graduate work in this department.

The department has a variety of facilities for both undergraduate and graduate study and research. These include the orchards and vegetable plots at the horticultural farm, experimental fields, turf farm, greenhouses, cold storage units, controlled atmosphere chambers, and research laboratories equipped for scientific plant studies. Many horticulture courses require student visitations and work at these facilities.

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-110-0-0108

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-153-0-0109

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-155-1-0109

HORT 180. Basic Floral Design Concepts. (3) I, II. 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-180-1-0109

HORT 190. Horticultural Science. (3) I. An orientation to horticultural practices and concepts which will be used as building blocks toward a major in horticulture. Three hours rec. a week. HORT-190-0-0108

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-200-0-0108

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-255-0-0108

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-290-2-0109

HORT 299. Flower Judging. (1) II. Principles of judging cut flowers, flowering potted plants, and foliage plants for flower shows and judging contests. Pr.: Consent of instructor. HORT-299-1-0109

HORT 305. Plants, Man, and Environment. (2). On sufficient demand. A study of how plants and man interact and how this interaction influences their environmental quality. Recognition of the essential nature of plants and their role in modifying the environment in which we live will be the primary objective. Two hours rec. a week. Nonmajor. No prerequisites. HORT-305-0-0109

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-325-0-0109

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-333-0-0108

HORT 350. Plant Propagation. (3) II. 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 three hours lab a week. Pr.: HORT 200. HORT-350-1-0109

HORT 361. Herbaceous Plant Materials. (3) I. Annual and perennial flowers and ornamental grasses for ornamental planting. Two hours lec., one hour rec., and two hours lab a week. Pr.: HORT 350, BIOL 210 or equiv. HORT-361-0-0109

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-374-0-0109

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-375-0-0109

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-380-1-0109

HORT 390. Horticulture Topics. (Var.) I, II, S. Lectures and discussion of topics of importance to undergraduate majors. Pr.: Consent of instructor. HORT-390-3-0108

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 HORT 375. HORT-450-1-0109

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 HORT 375. HORT-508-0-0109

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 HORT 350. HORT-520-1-0108

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-525-1-0109

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 HORT 525. HORT-530-0-0109

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-535-1-0109

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-540-2-0109

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 HORT 375. HORT-551-1-0109

HORT 560. Vegetable Crop Ecology. (3) II. Study of ecological principles involved in the production of vegetable crops, with emphasis on environmental conditions. Two hours lec. and three hours lab or field trips a week. Pr.: HORT 200. HORT-560-1-0108

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-570-1-0109

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-575-1-0109

HORT 580. Foliage Plant Production. (3) II, in even years. The commercial production techniques of foliage plants and foliage plant utilization. Two hours rec. and two hours lab a week. Pr.: HORT 350 and HORT 570. HORT-580-0-0109

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-582-1-0108

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 HORT 374. HORT-585-0-0109

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. HORT-590-2-0108

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-612-0-0109

HORT 615. Construction of Turf Sites. (1) I, in odd years. Practical aspects of turf management are emphasized including: grass identification, reports and budgets, and construction methods for recreational turf sites. Pr.: HORT 612. HORT-615-1-0109

HORT 616. Turf Water Management. (1) I, in even years. Practical and theoretical aspects of water management for turf areas. Includes irrigation and drainage. Pr.: HORT 612. HORT-616-1-0109

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 HORT 570. HORT-625-0-0109

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-640-3-0109

HORT 700. Vegetable Crop Physiology. (3) I, in even years. Study of applied physiological responses of selected vegetable crops on grade, quality, storage, and marketing of these products. Three hours lec. a week. Field trip required. Pr.: HORT 200. HORT-700-0-0108

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-706-0-0109

HORT 730. Fruit Science. (3) II. Detailed discussion of selected and important pomological topics. Laboratory includes exercises on practical and research topics with emphasis on latter. Two hours rec. and three hours lab a week. Pr.: HORT 520. HORT-730-1-0108

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-740-0-0108

HORT 750. Environmental Plant Stress. (3) II. Physiological, biochemical, and morphological factors involved in stress development and resistance will be discussed. Pr.: BIOL 500. HORT-750-0-0108

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-780-3-0108

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. HORT-792-0-0108

Graduate credit

HORT 846. Plant Research Methods. (3) I. Review of history and forms of plant science literature. Discussion on selecting experimental procedures, interpreting data, and reporting results. Two hours rec. and two hours lab a week. Pr.: One statistics course or consent of instructor. HORT-846-1-0109

HORT 850. 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 846 or EDAF 816. HORT-850-0-0108

HORT 898. Master's Report. (2) I, II, S. Investigations in pomology, olericulture, floriculture, ornamental horticulture, turfgrass, or horticultural therapy for preparation of master's report. Pr.: Consent of instructor. HORT-898-4-0108

HORT 899. Research—M.S. (Var.) I, II, S. Investigations in pomology, olericulture, floriculture, ornamental horticulture, turfgrass, or horticultural therapy for preparation of master's thesis. Pr.: Consent of instructor. HORT-899-4-0108

HORT 910. Topics in Plant Breeding. (Var.) I, II, S. Discussion and lectures on important papers and contributions in this field. Same as AGRON 910. Pr.: Consent of instructor. HORT-910-0-0108

HORT 921. Horticultural Crop Nutrition. (2) I, in odd years. Nutritional requirements of horticultural crops and factors affecting these requirements. Review of current literature on horticultural crop nutrition. Two hours lec. or reports a week. Pr.: HORT 200, AGRON 305, and a plant physiology course. HORT-921-0-0108

HORT 930. Topics in Plant Genetics. (Var.) I, II, S. Discussion and lectures on important papers and contributions in this field. Pr.: Consent of instructor. Same as AGRON 930. HORT-930-0-0108

HORT 940. Plant Regulators in Horticulture. (3) I, in even years. A study of synthetic plant regulators used to initiate, induce, promote, inhibit, or alter characteristics of horticultural plants and crops. Included are kinds and types of exogenous plant regulators used on crops, their activity, plant responses, benefits and problems, and application technology. One hour lec. and two hours rec. a week. Pr.: BIOCH 510 or BIOL 500, and one graduate plant commodity course. HORT-940-0-0108

HORT 951. Horticulture Graduate Seminar. (1) I, II. Student presentations and discussion of investigational works in the various branches of horticulture. HORT-951-0-0108

HORT 999. Research in Horticulture, Ph.D. (Var.) I, II, S. Investigations in pomology, olericulture, floriculture, ornamental horticulture, and turfgrass.

Data collected may form basis for a thesis or dissertation. Pr.: Consent of instructor. HORT-999-4-0108

Plant Pathology

Bachelor of science in agriculture under the crop protection curriculum, which includes a plant pathology science option

Fred W. Schwenk,* Head

Professors Claflin,* Gill,* Johnson,* Schwenk,* Stuteville,* and Willis;* Associate Professors Bockus* and Hetrick;* Assistant Professors Jardine,* Leach,* Leslie,* Lommel,* Pfender,* Tisserat,* and White,* Assistant Instructor Todd; Adjunct Associate Professor Browder;* Adjunct Assistant Professors Eversmeyer,* Sauer,* and Sim; Emeriti: Professors Hansing and King.

Plant pathology is the study of plant diseases, their economic effects, causes, nature, and control. Opportunities for graduates in plant pathology include research and development.

Undergraduate study

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 crop protection curriculum. Students who wish to specialize in the study of plant diseases should consider the plant pathology science option of the crop protection curriculum, discussed below.

Students majoring in the plant pathology science option of the crop protection curriculum take, in addition to the general requirements for the curriculum, the following courses. See also information earlier in this college section.

Major courses		
BIOL 210	General Botany	4
AGRON 305	Soils	4
ENTOM 300	Economic Entomology	3
	or	
ENTOM 312	General Entomology	2
	and	
ENTOM 313	General Entomology Lab	1
ASI 500	Genetics	3
PLPTH 500	Principles of Plant Pathology	3
BIOL 555	Microbiology	5
BIOL 640	Introductory Mycology	4
	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
CMPSC 200	Fundamentals of Computer Programming	2
CMPSC 20-	Computer Language Lab	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

One of the following:

BIOCH 510	General Plant Biochemistry	4
BIOCH 521	General Biochemistry and	3
BIOCH 522	General Biochemistry Laboratory ..	2
BIOCH 655	Biochemistry I and	3
BIOCH 656	Biochemistry Laboratory	2

Free electives 23-24

Graduate study

The graduate program in plant pathology leads to the master of science and doctor of philosophy degrees. Prerequisite to graduate study is possession of a bachelor's degree from an accredited college. Students often enter advanced work in plant pathology following a major in agronomy, biology, botany, horticulture, or similar area as well as from plant pathology. Specialized areas of study include biology, physiology, ecology, and epidemiology of disease development; disease resistance; disease control; host-parasite relationships; host-mycorrhizal interactions; plant molecular genetics; genetics and cytogenetics of disease resistance; and protoplast, cell, and tissue culture and plant regeneration. Research is conducted on diseases of grain and forage crops, fruits, vegetables, ornamentals, turf, and stored grain.

Departmental facilities include experimental field plots, greenhouses, controlled environment growth chambers, incubators, and well-equipped research and teaching laboratories. Students have access to the electron microscope laboratory, scanning electron microscope laboratory, computing center, herbarium, and science libraries. Graduate research assistantships or employment in departmental research projects may be available to outstanding students.

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 PLPTH 520. Pr.: BIOL 198, 210 or equiv., and junior standing. PLPTH-500-1-0404

PLPTH 550. 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 techniques used in their study. Two hours lec., one two-hour lab a week. Pr.: An introductory course in plant pathology. PLPTH-550-1-7-0404

Undergraduate and graduate credit
PLPTH 607. Plant Disease Diagnosis. (2) II. Theory and principles, with laboratory and field practice, in plant disease diagno-

sis. Designed as an introduction to PLPTH 708 and 709. Four hours combined lec. and lab a week. Pr.: An introductory course in plant pathology. PLPTH-607-1-6-0404

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 510 or 520. PLPTH-613-1-5-0404

PLPTH 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 two credits may be applied towards a B.S. in crop protection. Credit is allowed only for approved work-study programs. Pr.: Junior standing in crop protection curriculum; or AGRON 330, ENTOM 312 and 313, and PLPTH 500. PLPTH-651-2-0404

PLPTH 652. Seminar in Crop Protection. (1) II. A discussion of modern developments in the use of integrated pest management. Pr.: An introductory course each in plant pathology, entomology, and weed science. One hour discussion a week. PLPTH-652-0-0404

PLPTH 705. Ecology and Epidemiology of Plant Pathogens. (3) II, in even years. This course deals with the ecological relationships of soilborne and foliar pathogens, as well as the biological and environmental factors which influence the spread of plant diseases. Five hours combined lec./lab a week. Pr.: PLPTH 510 or 520. PLPTH-705-1-4-0404

PLPTH 709. Plant Disease Diagnosis Lab, Fall. (1) I, first half of the semester. Practical experience in diagnosing diseases of field crops and horticultural plants. Six hours lab a week. Diseases studied will be those available that term, emphasizing, but not restricted to, those in the student's area of interest. Overnight field trips may be required. Pr.: PLPTH 607 and BIOL 640. PLPTH-709-1-0404

PLPTH 711. Plant Tissue Culture and Regeneration. (3) II, in odd years. Plant tissue culture principles, techniques, and applications, with emphasis on plant regeneration from protoplasts and the use and potential of this procedure for crop improvement through genetic engineering. Research-level skills in this area will be taught in lab. Two hours lec. and three hours lab a week. Pr.: Biochemistry or Plant Physiology; Genetics; and consent of instructor. Enrollment limited to 10 students. PLPTH-711-1-4-0404

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-735-1-7-0404

PLPTH 740. Plant Bacteriology. (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, or consent of instructor. Enrollment limited to 12 students. PLPTH-740-1-3-0404

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-745-1-0404

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-750-3-0404

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. PLPTH-760-1-0404

Graduate credit

PLPTH 805. Phytopathogenic Bacteria. (3) II, in even years. Taxonomy of phytopathogenic bacteria; molecular aspects of bacterial pathogenicity with emphasis on cell surface components, metabolic patterns, toxins, extracellular enzymes, genetics, and plasmids. Two hours lec., one

three-hour lab a week. Pr.: PLPTH 721 and 722. PLPTH-805-1-4-0404

PLPTH 810. Plant Disease Physiology. (3) I, in odd years. A discussion of changes in the physiology and biochemistry of the host and pathogen, and their interaction during infection and disease development. Examples from fungal, bacterial, and viral diseases will be utilized. Resistant and susceptible interactions will be considered. Current hypotheses to explain the nature of pathogen recognition and disease resistance will be evaluated. Two hour lec., one two-three hour lab a week. Pr.: BIOL 500 and a course in biochemistry. PLPTH-810-1-4-0404

PLPTH 815. Advanced Techniques in Plant Cytogenetics. (3) I, in odd years. An advanced course in research techniques in genome analysis of higher plants emphasizing genetic mapping by use of various cytogenetic stocks. Laboratory, greenhouse, and field experiments involved in chromosomal location of morphological and disease resistance traits are performed. Pr.: AGRON 770 or BIOL 615 or equiv. PLPTH-815-0-0404

PLPTH 860. Host Plant Resistance to Disease. (2) II, in odd years. A consideration of basic and applied aspects of controlling plant disease through host plant resistance. The relationships of disease components are elucidated, and types and characteristics of plant disease resistances are considered. Methods of using disease resistance in crop production are developed. Two hours lec./discussion a week. Pr.: PLPTH 510 or 520 and a basic course in genetics. PLPTH-860-0-0404

PLPTH 870. Seminar in Plant Pathology. (1) I, II. Reports in the field of plant pathology. Pr.: Consent of instructor. PLPTH-870-0-0404

PLPTH 898. Master's Report. (2) I, II, S. Pr.: Background of courses needed for the topic undertaken. PLPTH-898-4-0404

PLPTH 899. Research in Plant Pathology for the M.S. Degree. (Var.) I, II, S. Work is offered in general plant pathology, plant virology, plant nematology, disease physiology, and epidemiology. Pr.: Sufficient background to conduct the line of research undertaken. PLPTH-899-4-0404

PLPTH 920. Topics in Plant Pathology. (Var.) I, II, S. Discussions and lectures on important areas and contributions in the field of phytopathology. Pr.: Graduate standing. PLPTH-920-0-0404

PLPTH 927. Fungal Genetics. (3) I, in even years. A study of the classical, molecular, and population aspects of fungal genetics in both model and commercially important systems. Topics to be discussed include: genetic analysis via mitosis and meiosis, models of recombina-

tion, genetic control of fungal development, basic molecular genetics of fungi, and genetic factors affecting fungal population structure and stability. Three hours lec./discussion a week. Pr.: BIOCH 521, ASI 500; recommended: BIOL 640 and a 600-level or higher course in genetics. PLPTH-927-0-0404

PLPTH 999. Research in Plant Pathology for the Ph.D. Degree. (Var.) I, II, S. Work is offered in general plant pathology, plant virology, plant nematology, disease physiology, and epidemiology. Pr.: Sufficient background to conduct the line of research undertaken. PLPTH-999-4-0404

Faculty

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SCHRUBEN, LEONARD WILLIAM, Prof. Emeritus of Agricultural Economics; Research Agr. Econ. Grain Marketing, Agr. Exp. Sta. (1949). BS 1939, Kansas St. U.; MS 1940, U. of Illinois; MPA 1948, MA 1949, PhD 1949, Harvard U. (*)

SCHURLE, BRYAN W., Assoc. Prof. of Agricultural Economics; Research Agr. Econ., Farm Management Production, Agr. Exp. Sta. (1977). BS 1972, Emporia St. U.; MS 1974, PhD 1977, Ohio St. U. (*)

SCHWAB, ARTHUR P., Asst. Prof. of Agronomy; Research Soil Chemist, Agr. Exp. Sta. (1983). BS 1976, Colorado School of Mines; MS 1978, PhD 1981, Colorado St. U. (*)

SCHWARZENTRAUB, MARK A., Instr.; Area Extension Economist, Farm Management (1980). MS 1980, U. of Missouri.

SCHWENK, FRED W., Prof. and Head of Plant Pathology; Research Soybean Pathologist, Agr. Exp. Sta. (1969). BS 1960, MS 1964, North Dakota St. U.; PhD 1969, U. of California. (*)

SCHWULST, FRANK J., Assoc. Prof.; Sheep Research Scientist, NW Research-Extension Center (1974). BS 1961, Wisconsin St. U.; MS 1966, PhD 1968, U. of Nebraska.

SCOBY, RICHARD K., Research Asst. of Animal Sciences and Industry (1987). BS 1966, Emporia St. Teachers Col.

SCOVILLE, ORLIN J., Prof. Emeritus of Agricultural Economics (1966). BS 1931, MS 1933, Colorado St. U.; PhD 1949, Harvard U.

SEARS, ROLLIN G., Assoc. Prof. of Agronomy; Research Wheat Geneticist, Agr. Exp. Sta. (1980). BS 1972, MS 1974, Montana St. U.; PhD 1979, Oregon St. U. (*)

SEIB, PAUL A., Prof. of Grain Science and Industry; Research Biochemist, Agr. Exp. Sta. (1970). BS 1958, PhD 1965, Purdue U. (*)

SEIFERS, DALLAS L., Asst. Prof. of Plant Pathology; Research Plant Pathologist, Fort Hays Branch Agri. Exp. Sta. (1982). BS 1974, U. of Missouri; MS 1976, PhD 1980, Mississippi St. U.

SEITZ, LARRY M., Assoc. Prof. of Grain Science and Industry; USDA Grain Marketing Research Center (1979). BS 1962, Kansas St. U.; MS 1965, PhD 1966, U. of Illinois. Adjunct appt.

SHARMA, URMILA, Research Asst. of Plant Pathology (1987). BS 1969, MS 1971, Vikram U., India; PhD 1977, Moscow St. U., USSR.

SHELKE, KANTHA, Research Assoc., Grain Science and Industry (1987). PhD 1986, North Dakota St. U.

SHIRLEY, JOHN E., Assoc. Prof. of Animal Sciences and Industry, Dairy Cattle Nutrition and Management (1985). BS 1968, MS 1970, Western Kentucky U.; PhD 1973, Michigan St. U.

SHOGREN, MERLE, Research Assoc. Grain Science and Industry; USDA (1971). BS 1951, Bethany Col.; MS 1954, Kansas St. U. Adjunct appt.

SIEBERT, JAY D., Asst. Prof.; International Agricultural Programs (1982). BA 1969, Tabor Col.; MS 1976, Kansas St. U.; PhD 1982, U. of Georgia.

SIGLER, DENNIS H., Asst. Prof. of Animal Sciences and Industry; Horse Research Scientist, Agr. Exp. Sta. (1980). BS 1975, Abilene Christian U.; MS 1977, Texas Tech. U.; PhD 1979, Texas A & M. (*)

SIM, THOMAS IV, Asst. Prof. of Plant Pathology; Survey Plant Pathologist, Kansas St. Bd. of Agric. (1984). MS 1975, Oklahoma St. U. Adjunct appt.

SISSON, JAMES B., Asst. Prof. of Agronomy; Research Soil Physicist, Agr. Exp. Sta. (1982). BS 1968, MS 1972, Montana St. U.; PhD 1980, New Mexico St. U. (*)

SJO, JOHN B., Prof. of Agricultural Economics; Research Agr. Econ., Regional and Community Dev., Agr. Exp. Sta. (1953). BS 1949, MS 1952, Kansas St. U.; PhD 1960, Michigan St. U. (*)

SKIDMORE, EDWARD L., Prof. of Agronomy; Research Soil Scientist, Wind Erosion Research Unit, USDA ARS (1963). BS 1958, Utah St. U.; PhD 1963, Oklahoma St. U. Adjunct appt. (*)

SMITH, EDGAR FITZHUGH, Prof. Emeritus of Animal Sciences and Industry; Beef Cattle Research Scientist and Range Management Research, Agr. Exp. Sta. (1946). BS 1941, Texas A & M; MS 1947, Kansas St. U.; PhD 1956, Texas A & M. (*)

SMITH, FLOYD W., Prof. Emeritus of Agronomy; Dir., Kansas Water Resources Research Institute; Research Soil Scientist, Agr. Exp. Sta. (1946). BS 1942, Kansas St. U.; MS 1946, PhD 1949, Michigan St. U. (*)

SMITH, WALTER H., Assoc. Prof. of Animal Sciences and Industry; Animal Research Geneticist and Horse Husbandry Research, Agr. Exp. Sta. (1948). BS 1943, MS 1949, Kansas St. U. (*)

SNYDER, EDWARD B., Research Asst. of Plant Pathology (1983). BS 1981, Purdue U.; MA 1983, U. of Wisconsin.

SORENSEN, EDGAR LAVELL, Prof. of Agronomy; Research Alfalfa Geneticist, USDA, SEA-AR (1955). BS 1941, MS 1952, Utah Agricultural Col.; PhD 1955, U. of Wisconsin. Adjunct appt. (*)

SORENSEN, LEONARD ORLO, Prof. of Agricultural Economics; Research Agr. Econ., Transportation and Marketing, Agr. Exp. Sta. (1955). BA 1951, MS 1953, PhD 1963, U. of Minnesota. (*)

SPAETH, CLIFFORD W., Assoc. Prof. of Animal Sciences and Industry; Sheep Research Scientist, Agr. Exp. Sta. (1974). BS 1965, Texas A & M; PhD 1974, Kansas St. U.

SPITZER, PHILLIP, Research Asst. of Plant Pathology (1985). BS 1984, Kansas St. U.

STAHLMAN, PHILLIP W., Asst. Prof.; Research Agronomist, Fort Hays Branch Agr. Exp. Sta. (1975). BS 1970, Panhandle St. Col.; MS 1973, North Dakota St. U.

STEGMEIER, WILLIAM D., Assoc. Prof.; Research Agronomist Forage and Specialty Crops, Fort Hays Branch Agr. Exp. Sta. (1958). BS 1956, MS 1959, Colorado St. U.; PhD 1971, South Dakota St. U.

STEIN, IRA S., Research Asst. of Agronomy (1984). BS 1977, U. of Arizona; MS 1983, Oregon St. U.

STEVENSON, JEFFREY S., Assoc. Prof. of Animal Sciences and Industry; Reproductive Physiologist, Agr. Exp. Sta. (1980). BS 1975, Utah St. U.; MS 1977, Michigan St. U.; PhD 1980, North Carolina St. U. (*)

STONE, LOYD R., Prof. of Agronomy; Research Soil Physicist, Agr. Exp. Sta. (1973). BS 1967, MS 1969, Oklahoma St. U.; PhD 1973, South Dakota St. U. (*)

STUTEVILLE, DONALD L., Prof. of Plant Pathology; Research Forage Pathologist, Agr. Exp. Sta. (1964). BS 1959, MS 1961, Kansas St. U.; PhD 1964, U. of Wisconsin. (*)

SUNDERMAN, HERBERT D., Assoc. Prof.; Soils Research Scientist, NW Research-Extension Center (1975). BS 1965, MS 1967, Kansas St. U.; PhD 1975, Texas A & M.

SWALLOW, CLARENCE W., Assoc. Prof. of Agronomy; Research Agronomist in charge, Agronomy Research Farms, Agr. Exp. Sta. (1954). BS 1951, MS 1955, Kansas St. U.

SWEENEY, DANIEL W., Asst. Prof.; SE Kansas Branch Agr. Exp. Sta. (1983). BS 1974, Kentucky Wesleyan Col.; MS 1978, Purdue U.; PhD 1982, U. of Florida.

TATARKO, JOHN, Research Asst. of Agronomy (1980). BS 1976, Stephen F. Austin St. U.; MS 1980, Texas Tech U.

THIEN, STEPHEN J., Prof. of Agronomy; Research Soil Scientist, Agr. Exp. Sta. (1970). BS 1966, Iowa St. U.; MS 1968, PhD 1971, Purdue U. (*)

THOMAS, MARK, Research Assoc. of Plant Pathology (1986). BS 1981, PhD 1986, New Castle U., Australia.

THOMPSON, CARLYLE A., Asst. Prof.; Soils Research Scientist, Fort Hays Branch Agr. Exp. Sta. (1964). BS 1958, MS 1959, Kansas St. U.

THOMPSON, HUGH E., Prof. Emeritus of Entomology; Research Entomologist, Trees, Turf, Ornamental Shrubs, and Forest Insects, Agr. Exp. Sta. (1956). BS 1947, U. of Rhode Island; PhD 1953, Cornell U. (*)

TISSERAT, NED A., Asst. Prof. of Plant Pathology; Research Horticulture Pathologist, Agr. Exp. Sta. (1984). BS 1976, Colorado St. U.; MS 1978, Texas A & M; PhD 1982, U. Wisconsin-Madison. (*)

TODD, TIMOTHY C., Asst. Instr. of Plant Pathology; Research Plant Nematologist (1982). BS 1980, Northeastern Oklahoma St. U.; MS 1982, Oklahoma St. U.

TOWNE, EARL E., Research Asst. of Agronomy (1977). BS 1976, Kansas St. U.

UNRUH, LARRY, Research Asst. of Agronomy; USDA Grain Marketing Research Lab (1981). BS 1979, MS 1981, Oklahoma St. U.

UNRUH, NATALIE C., Research Asst. of Grain Science and Industry (1983). BS 1980, Oklahoma St. U.

VANDERLIP, RICHARD L., Prof. of Agronomy; Crop Production Research Agronomist, Agr. Exp. Sta. (1964). BS 1960, Kansas St. U.; MS 1962, PhD 1965, Iowa St. U. (*)

VANZANT, ERIC S., Research Asst. of Animal Sciences and Industry (1986). BS 1986, Ohio St. U.

VETTER, JAMES, Prof. of Grain Science and Industry, Amer. Inst. of Baking (1977). AB 1954, Washington U.; MS 1955, PhD 1958, U. of Illinois. Adjunct appt.

VIGIL, MERLE F., Research Asst. of Agronomy (1985). BS 1981, MS 1983, Colorado St. U.

WALKER, C. E. (Chuck), Prof. of Grain Science and Industry (1987). BS 1959, Iowa St. U.; PhD 1966, U. of North Dakota.

WALTER, TED L., Assoc. Prof. of Agronomy; Crop Research Scientist, Crop Performance Testing, Agr. Exp. Sta. (1951). BS 1949, U. of Nebraska; MS 1951, Colorado St. U.

WARD, ARLIN B., Prof. Emeritus of Grain Science and Industry; Milling Technology Research Scientist, Agr. Exp. Sta. (1961). BS 1942, MS 1951, Kansas St. U. (*)

WARD, GEORGE M., Prof. Emeritus of Animal Sciences and Industry; Dairy Cattle Research Nutritionist, Agr. Exp. Sta. (1955). BS 1941, U. of Vermont; MS 1947, Rutgers U.; PhD 1950, Michigan St. U. (*)

WASSOM, CLYDE E., Prof. of Agronomy; Corn Research Geneticist, Agr. Exp. Sta. (1954). BS 1949, MS 1951, PhD 1953, Iowa St. U. (*)

WEIXELMAN, TERESA E., Research Asst. of Agricultural Economics (1970). BS 1970, Kansas St. U.

WETZEL, DAVID L., Prof. of Grain Science and Industry; Research Analytical Chemist, Agr. Exp. Sta. (1973). AB 1956, Augustana Col., Illinois; MS 1962, PhD 1973, Kansas St. U. (*)

WHEAT, JOHN D., Prof. Emeritus of Animal Sciences and Industry; Animal Research Geneticist, Agr. Exp. Sta. (1954). BS 1942, MS 1951, Texas A & M; PhD 1954, Iowa St. U. (*)

WHITE, FRANK F., Asst. Prof. of Plant Pathology; Research Plant Molecular Geneticist, Agr. Exp. Sta. (1985). BS 1974, U. Wisconsin-Madison, MS 1978, PhD 1981, U. of Washington. (*)

WHITE, RICHARD S., Prof. and Head, NW Research-Extension Center (1987). BS 1966, Humboldt St. U.; MS 1968, Texas Tech U.; PhD 1976, Utah St. U.

WIEST, STEVEN C., Assoc. Prof. of Horticulture; Research Horticulturist, Agr. Exp. Sta. (1980). BS 1973, MS 1975, PhD 1979, Cornell U. (*)

WILBUR, DONALD A., Prof. Emeritus of Entomology (1928). BS 1925, Oregon St. Col.; AM 1928, Ohio St. U.

WILDE, GERALD E., Prof. of Entomology; Research Entomologist, Field Crop Insects, Agr. Exp. Sta. (1966). BS 1962, Texas Tech. Col.; PhD 1966, Cornell U. (*)

WILLIAMS, JEFFERY R., Assoc. Prof. of Agricultural Economics; Research Agr. Econ. Farm Management, Resource Econ., Agr. Exp. Sta. (1980). BS 1975, Pennsylvania St. U.; MS 1977, PhD 1980, Michigan St. U.

WILLIS, WILLIAM G., Prof. of Plant Pathology (1967). BS 1951, MS 1964, PhD 1967, Kansas St. U. (*)

WILSON, DUANE L., Research Asst. of Plant Pathology (1984). BS 1976, Kansas St. U.

WILSON, GAIL T., Research Asst. of Plant Pathology (1985). BS 1979, Mercyhurst Col., Pennsylvania; MS 1983, Slippery Rock U., Pennsylvania.

WINGFIELD, JOHN G., Assoc. Prof. of Grain Science and Industry; Milling Technology Research Scientist, Agr. Exp. Sta. (1977). BS 1950, MS 1980, Kansas St. U.

WITHEE, LAURESTON VAN, Prof. of Agronomy (1953). BS 1947, Kansas St. U.; MS 1952, U. of Nebraska; PhD 1963, Kansas St. U. (*)

WITT, MERLE D., Assoc. Prof.; Research Agronomist, SW Kansas Branch Agr. Exp. Sta. (1969). BS 1967, MS 1969, Kansas St. U.; PhD 1981, U. of Nebraska.

WITTORFF, EDWARD K., Research Asst., KABSU (1987). BS 1985, MS 1987, U. of Arkansas.

WOLFFING, RALPH M., Senior Milling Engineer/Instr. of Grain Science and Industry (1985). BS 1949, Kansas St. U.

WOODS, WALTER, Prof.; Dean of Agriculture; Dir. of Agr. Exp. Sta.; Dir. of Extension (1985). BS 1954, Murray St. U.; MS 1955, U. of Kentucky; PhD 1957, Oklahoma St. U.

WORMAN, FREDERICK, Asst. Prof. of Agricultural Economics (1985). MA 1965, Northwestern U.; MS 1970, New Mexico St. U.; PhD 1985, Kansas St. U.

WRIGHT, DANA M., Research Asst. of Entomology (1983). BS 1983, Kansas St. U.

WRIGHT, DAVID L., Research Asst. of Agronomy (1987). BA 1980, Ellsworth Comm. Col.; BS 1982, MS 1986, Iowa St. U.

WRIGHT, VALERIE F., Asst. Prof. of Entomology, Stored Products Insects (1979). BS 1965, Gustavus Adolphus Col.; MS 1973, PhD 1979, U. of Minnesota. (*)

Architecture and Design

Mark B. Lapping,* Dean
Richard H. Forsyth,* Associate Dean
Lynn Ewanow, Assistant Dean
William R. Jahnke,* 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 of Architecture and Design consists of five academic departments: environmental design, 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 within the College of Architecture and Design 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 nonstudio 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, LAAB, or an accredited junior college. Students who have questions concerning the transfer of specific courses should contact the dean's office.

Graduate programs

The College of Architecture and Design offers graduate study leading to the master of architecture, master of landscape architecture, and master of regional and community planning degrees. Students and faculty from each of these degree programs work collaboratively in historic preservation, professional practice, and community/urban design. Additional information on the graduate programs is included under Graduate School in this catalog.

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.

The program is structured to help individual 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.

Students usually live on the University campus while participating in the program and benefit from the opportunity to experience college life and meet others who have similar interests.

Participants in the Design Discovery Program may, if they wish, receive University credit for completing the program.

Honors program

Honors courses in the environmental design department are for students who wish to be challenged beyond the requirements of regular classes. Students in these seminars study selected topics in environmental design.

Summer School

Some University courses may be taken during the summer session. Detailed information on specific courses is contained in the Summer School Bulletin, which may be obtained from the Director of Admissions, 119 Anderson Hall, Manhattan, Kansas 66506. It is available in early spring.

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 a large number of semesters to coordinate courses and to plan enrollments in order to assure completion of all degree requirements for each curriculum in which a degree is sought. Interested students should consult the assistant deans.

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 earlier in this catalog.

Environmental Design

Richard Hoag, Head

Professors Foerster, Hoag,* and Payne;* Associate Professors Chelz, Haycock, Husseini, McDonald, and Wendt; Assistant Professors Bullock, Charney, Clement, McMillan, Owens-Wilson, Pavlides,* Schrader, Siepl-Coates, Sullivan, C. Watts, and Wigfall; Emeriti: Professors Ealy, Fischer, and Krider.

Undergraduate environmental design program

The Department of Environmental Design offers both interdisciplinary graduate and undergraduate course work in the college.

All students are enrolled in the Department of Environmental Design 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 the environmental design course requirements, students undertake the professional curricula in the degree-granting departments.

The professional part of the curricula in architecture, interior architecture, and landscape architecture extends from the third through the fifth year. Students are admitted after successful completion of the environmental design curriculum. Admission to the degree-granting programs is determined by faculty in each department. The admissions process is administered cooperatively by the Departments of Architecture, Environmental Design, Interior Architecture, and Landscape Architecture. In all departments, admission may be affected by availability of teaching faculty, space, and equipment.

Participation in the program, 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 take the accelerated studios in environmental design, which usually enable them to complete the program requirements in one year.

Program of study

The curriculum for the first two years forms the foundation of the five-year accredited professional programs in architecture, interior architecture, and landscape architecture.

Environmental design program—100 ENVD

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	English Composition I	3
ART 195	Survey of Art History I	3
HIST 101	Western Civilization: Rise of Europe	3
MATH 201	Elementary Applied Mathematics ..	3
		<hr/> 15

Second semester

ENVD 206	Graphics II	2
ENVD 231	Environmental Design Studio I	2
ENVD 222	Theory of Environmental Design II	2
ENGL 120	English Composition II	3
ART 196	Survey of Art History II	3
HIST 102	Western Civilization: Modern Era ..	3
PHYS 115	Descriptive Physics	4
SPCH 105	Public Speaking IA	2
		<hr/> 18

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
PE 101	Concepts in Physical Education	1
Limited elective	.....	3
		<hr/> 17

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
		<hr/> 16

Total for ENVD curriculum 66 minimum

*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 KSU, or elsewhere, with the exception of geometry, which is not taught at KSU.

After satisfactory completion of the environmental design curriculum, students are eligible to apply for admission to the Department of Architecture, the Department of Interior Architecture, or the Department of Landscape Architecture.

Courses in environmental design

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. ENVD-205-1-0201

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. ENVD-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 per week.

ENVD 207. Form, Space, and Order I. (3) I. Pr.: ENVD 205, 206. ENVD-207-0-0201

ENVD 208. Form, Space, and Order II. (3) II. Pr.: ENVD 205, 206, 207. ENVD-208-0-0201

ENVD 212. Studio for Environmental Design and Graphics. (3) I, II, S. Introduction to graphic communication skills and problem-solving processes used by environ-

mental designers. For students not enrolled in the College of Architecture and Design. Six hours studio a week. ENVD-212-1-0201

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-220-0-0201

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-221-0-0201

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-222-0-0201

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-223-0-0201

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-224-0-0201

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-225-0-0201

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-226-0-0201

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-227-0-0201

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. ENVD-230-1-0201

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-231-1-0201

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-232-1-0201

ENVD 233. Environmental Design Studio III. (4) II. Pr.: ENVD 232. ENVD-233-1-0201

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-240-0-0201

ENVD 250 and ENVD 251. History of the Designed Environment I and II. A study of the history of the man-made 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-250-0-0201

ENVD 251. History of the Designed Environment II. (3) Pr.: ENVD 250. ENVD-251-0-0201

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-290-0-0201

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-291-0-0201

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-292-0-0201

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-293-0-0201

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-299-4-0201

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 eight or more credit hours in environmental design, graphics, and/or art studio courses. Twelve hours of studio a week.

ENVD 341. Accelerated Environmental Design Studio I. (6) ENVD-341-1-0201

ENVD 342. Accelerated Environmental Design Studio II. (6) Pr.: ENVD 341. ENVD-342-1-0201

ENVD 350. American Architecture and Urbanism, 1800-1970. (3) I. Developments in architectural and urban design which have had a major impact on American culture and the environment from the inception of the Industrial Revolution to the present. Emphasis given to attitudes towards design and to the social and cultural context in which they occurred. Styles and technology will be examined as they related to the aspirations, needs, and resources of each period. Three hours lec. a week. Pr.: ENVD 250 and ENVD 251. ENVD-350-0-0201

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-351-0-0201

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-352-0-0201

ENVD 370. Perspective Methodology for Designers. (2) Intersession. Mechanical and freehand perspective drawing methodology as a systematic approach to three-dimensional design. Projects will be directed towards the individual student's area of interest and need. Pr.: ENVD 208 and two hours drawing credit. ENVD-370-0-0201

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-375-0-0201

ENVD 380. Visual Thinking. (2) Intersession. An analysis of man's recognition, visualization, and recording of environmental experiences. Experimental exercises in sensory stimulation and response recording. ENVD-380-0-0201

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 per week. Pr.: ENVD 292 and junior standing. ENVD-505-3-0201

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-510-0-0201

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 non-majors/architecture and design majors by permission of the department head only. ENVD-520-0-0201

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. ENVD-560-0-0201

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-650-0-0201

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-651-0-0201

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-655-0-0201

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. ENVD-699-4-0201

Architecture

Robert Burnham,* Head

Professors Coates,* DeVilbiss, Ernst,* Jahnke,* Kremer,* Miller, Stotesbury,* and Windley;* Associate Professors Bryant,* Burnham,* Christensen,* Norris-Baker,* Seamon,* D. Watts,* and Wyatt; Assistant Professors Abbott, Faoro, Jones, Seibold,* and Streeter; Emeriti: Professors Chang, Fischer, Heintzelman, Krider, Sanner, and Slack; Adjunct Professor Garvin.

Undergraduate study

The professional program leading to the bachelor of architecture degree consists of a five-year course of study which includes the two-year environmental design program.

The Kansas State University bachelor of architecture degree is accredited by the National Architectural Accrediting Board. This professional degree and three years' practical experience under the supervision of a registered architect qualify one to take the National Council of Architectural Registration Board's Architectural Registration Examination.

One of the few certainties the future holds is change. It is for this reason that the professional program in architecture emphasizes principles and problem-solving processes rather than focusing on mastery of the myriad technical details of the pro-

fession which are rapidly supplanted by new social, political, and technological developments. The design studio experience forms the core of the program: here concepts earlier introduced through courses in human needs, history, theory, construction technology, structures, and environmental control systems are synthesized. An elective, 30-week internship program, which may include work-study experience in professional offices, industry, or governmental agencies, affords advanced students an opportunity to work in a professional context and to apply the problem-solving approaches they have developed.

Graduate study

Emphases in the master of architecture program accommodate students with certain four-year baccalaureate degrees, or graduates of five- or six-year programs in architecture, interior architecture, or landscape architecture. Applicants are considered upon the merits of their academic backgrounds and proposed programs of study.

Architecture program—115 AR

Total hours required for graduation—167

For the curriculum requirements for the first four semesters, see environmental design 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
Electives*		6
		18

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
		17

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
		17

Eighth semester

ARCH 604	Architectural Design Studio IV	5
Electives*		10
		15

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 I	1
ARCH 720	Environment and Behavior	3
ARCH 756	Topics in Professional Practice I	2
Electives*		3
		17

Tenth semester

ARCH 702	Architectural Design Studio VI	5
ARCH 757	Topics in Professional Practice II	2
Electives*		10
		17

*Students must successfully complete at least 13 professional support elective credits and as many as 19 free elective credits.

Courses in architecture

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-301-0-0202

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. Fifteen hours studio a week.

ARCH 401. Architectural Design Studio I. (5) I. Pr.: Admission to the professional program and ENVD 233 or 342. ARCH-401-1-0202

ARCH 402. Architectural Design Studio II. (5) II, S. Pr.: ARCH 401. ARCH-402-1-0202

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-413-0-0202

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, ENVD 291, and admission to a professional program in the college. ARCH-433-1-0202

ARCH 434. Building Construction Systems in Architecture II. (3) I.

Pr.: ARCH 433. ARCH-434-1-0202

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, ENVD 291. ARCH-450-1-0202

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-451-1-0202

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-475-3-0202

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, ARCH 603, not more than one grade of "D" in an architectural design course, and approval of the internship coordinator. ARCH-504-2-0202

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-514-0-0202

ARCH 515. Environmental Systems in Architecture III. (3) I.

Pr.: ARCH 413. ARCH-515-0-0202

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-566-3-0202

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 man-made 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-601-0-0202

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. Fifteen hours studio a week. Pr.: ARCH 402 and not more than one grade of "D" in an architectural design course. ARCH-603-1-0202

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. Fifteen hours studio a week. Pr.: ARCH 603 and not more than one grade of "D" in an architectural design course. ARCH-604-1-0202

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. ARCH-655-2-0202

Undergraduate and graduate credit

ARCH 621. Economics of Preservation.

Detailed examination of economic issues in preservation of the built environment with emphasis on understanding costing techniques, public and private financing methods, and the economic benefits of preservation. Three hours a week. Pr.: ECON 110 and fourth year standing. ARCH-621-0-0202

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-650-3-0202

ARCH 660. Architectural Ornament. (3)

I, II. Design and production of architectural ornamental elements; study of historic elements; study of historic and contemporary examples. One hour lec. and six hours studio a week. May be repeated once for

credit. Pr.: Third year standing in the College of Architecture and Design.

ARCH-660-1-0202

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-680-1-0202

ARCH 700. Architectural Design Programming. (2) I, II.

Independent development of the program for ARCH 702, Architectural Design VI, under the direction of a faculty committee. Must be taken in residence and may be conc. with ARCH 604 or ARCH 701. Pr.: ARCH 603 and approval of the faculty committee. ARCH-700-3-0202

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. Fifteen 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; and ARCH 450. ARCH-701-1-0202

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. Fifteen 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; ARCH 451, or ARCH 450 and conc. enrollment in ARCH 451. ARCH-702-1-0202

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-703-0-0202

ARCH 704. Environmental Seminar. (Var.) I, II. Environmental systems related to human perception, reactions, and behavior. Pr.: Senior standing. ARCH-704-3-0202

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-705-3-0202

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-710-0-0202

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 LAR 641. ARCH-715-0-0202

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 ARCH 402; or graduate standing. ARCH-716-0-0202

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-720-0-0202

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 man-built environment. Three hours lecture/seminar a week. Pr.: Senior standing. ARCH-725-0-0202

ARCH 730. Environmental Design and the Aging Process. (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-730-0-0202

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-735-1-0202

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-752-varies-0202

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-756-0-0202

ARCH 757. Topics II. (2) I, II. Pr.: Fourth-year standing. ARCH-757-0-0202

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. ARCH-765-3-0202

Graduate credit only

ARCH 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 or equiv. and conc. enrollment in PLAN 749. ARCH-746-1-0202

ARCH 830. Advanced Architectural Design. (Var.) I, II, S. Studies related to a comprehensive program in architecture. Pr.: ARCH 702. ARCH-830-3-0202

ARCH 846. Urban Design Studio II. (4) II. Continuation of ARCH 746. Pr.: ARCH 746 and conc. enrollment in PLAN 845. ARCH-846-1-0202

ARCH 847. Urban Design Field Study. (3) I, II, S. A field investigation of varied large scale institutions, C.B.D., and other mixed use developments. Pr.: PLAN 745 and PLAN 746. ARCH-847-1-0202

ARCH 899. Research In Architecture. (Var.) I, II, S. Study in architecture and related fields leading to thesis or nonthesis project. Pr.: Approval of instructor. ARCH-899-4-0202

Interior Architecture

Jack C. Durgan, Head

Professors Durgan* and McGraw;* Associate Professor Murphy; Assistant Professors Dubois, Genov, and Troyer.

Undergraduate study

The bachelor of interior architecture professional program consists of a three-year course of study following the two-year environmental design 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, 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, affords advanced students 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 KSU and Fachhochschule des Landes Rheinland-Pfalz in Trier, West Germany, as an alternative to selecting the internship program. With the German studies option, students 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 earlier in this section.

Fifth semester

IAR 401	Interior Architectural Design Studio I	5
ARCH 413	Environmental Systems in Architecture I	4

IAR 409	Finishing	3
IAR 415	History of Interior Architecture	2
Free electives		3
		17

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
		16

Seventh semester

IAR 601	Interior Architecture Seminar	3
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
		17

Eighth semester

IAR 604	Interior Architectural Design Studio IV	5
Free electives		12
		17
	or	
IAR 444	Interior Architecture Internship	15
Free elective		2
		17

Option A**Ninth semester—A**

IAR 701	Interior Architectural Design Studio V	5
ARCH 434	Building Construction Systems in Architecture II	3
ARCH 720	Environment and Behavior	3
IAR professional elective		3
Marketing elective		3
		17

Tenth semester—A

IAR 702	Interior Architectural Design Studio VI	5
IAR 754	Contract Design Practice	2
CT 260	Textiles	3
Management elective		3
Free elective		4
		17

Option B**Ninth semester—B**

IAR 784	Product Design Workshop I	4
IAR 703	Product Design Studio I	4
IAR 755	Product Design Illustration	2
IAR 756	Theory of Product Design	2
ARCH 434	Building Construction Systems in Architecture II	3
Free elective		2
		17

Tenth semester—B

IAR 785	Product Design Workshop II	4
IAR 704	Product Design Studio II	4
CT 260	Textiles	3
IAR 754	Contract Design Practice	2
Free electives		4
		17

Courses in interior architecture**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-406-0-0203

IAR 409. Finishing. (3) II. Methods of finishing various materials in interiors. Six hours lab a week. Pr.: ENVD 233 or 342. IAR-409-0-0203

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-414-1-0203

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-415-0-0203

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. IAR-420-0-0203

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. **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-401-1-0203

IAR 402. Interior Architectural Design Studio II. (5) II. Pr.: IAR 401. IAR-402-1-0203

IAR 603. Interior Architectural Design Studio III. (5) I. Pr.: IAR 402. IAR-603-1-0203

IAR 604. Interior Architectural Design Studio IV. (5) II. Pr.: IAR 603. IAR-604-1-0203

IAR 701. Interior Architectural Design Studio V. (5) I. Pr.: IAR 604. IAR-701-1-0203

IAR 702. Interior Architectural Design Studio VI. (5) II. Pr.: IAR 701. IAR-702-1-0203

IAR 407 and 408. Design Workshop I through III. 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-407-1-0203

IAR 408. Design Workshop II. (3) II. Pr.: IAR 407. IAR-408-1-0203

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 per week. Pr.: Enrollment in the interior architecture program. IAR-410-1-1-0203

IAR 444. Interior Architecture Internship. (15) II, S. Thirty weeks off-campus work-study in professional offices specializing in interior architecture; field and office experience. Pr.: IAR 603, ARCH 433, and approval by the internship coordinator. IAR-444-1-0203

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-601-0-0203

IAR 703. Product Design Studio I. (4) I. Analysis, synthesis, and design of various types of products associated with the interior environment, integrating such human factor determinants as anthropometrics, ergonomics, and futuribles. Pr.: IAR 604. IAR-703-1-0203

IAR 704. Product Design Studio II. (4) II. Advanced design projects involving products related to the interior environment. Pr.: IAR 703. IAR-704-1-0203

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-720-0-0203

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-740-1-0203

IAR 754. Contract Design Practice. (2) II. Evaluation, selection, and specification of interior architectural materials, surfaces, and finishes. Pr.: IAR 604. IAR-754-0-0203

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-755-1-0203

IAR 756. Theory of Product Design. (2) II. History and design theory related to analysis materials and construction in product design. Pr.: IAR 420. IAR-756-1-0203

IAR 784. Product Design Workshop I. (4) I. Construction and finishing of prototypical products associated with the human environment. Pr.: IAR 408. IAR-784-1-0203

IAR 785. Product Design Workshop II. (4) II. Synthesis of the design, materials, construction, and finishing of prototypical products relevant to human use. Pr.: IAR 784. IAR-785-1-0203

Graduate credit

IAR 821. Advanced Interior Architectural Design. (1-4) I, II. Advanced study of interior space planning and interior component design. Pr.: Professional design degree. IAR-821-0-0203

IAR 830. Problems in Interior Architecture. (Var.) I, II. Study of specific interior architectural problems under direct supervision of the departmental staff. Pr.: Professional design degree. IAR-830-0-0203

Landscape Architecture

Thomas A. Musiak, Head

Professors Barnes,* Day,* Forsyth,* Lapping,* Law,* Lin,* Musiak,* and Page;* Associate Professors Brooks* and Ewanow; Assistant Professors Keane, Rassman, Tautges, and Winslow; Emeriti: Professors Ealy and Quinlan.

Undergraduate study

The bachelor of landscape architecture professional program consists of a three-year course of study following the two-year environmental design program.

The curriculum is designed to prepare students for professional landscape architecture. Special emphasis is placed upon outdoor space organization, land planning, topographical manipulation, landscape planning and construction, and the role of adapted plant materials in the landscape. The study of man's impact upon the environment, both natural and man-made, 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.

Graduate study

Individual graduate programs in the master of landscape architecture curriculum can accommodate students with bachelor's degrees in many fields of study. Applicants are considered on the merits of their academic backgrounds and proposed programs of study. The master of landscape architecture degree is accredited by the Landscape Architectural Accreditation Board of the American Society of Landscape Architects.

Landscape architecture program—180 LAR

Total hours required for graduation—166

For the curriculum requirements for the first four semesters, see environmental design 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
		15

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
		15

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
		17

Eighth semester

LAR 642	Landscape Architectural Design Studio IV	4
LAR 542	Planting Design II	4
GEOG 705	Remote Sensing of Environment ...	2
HORT 508	Landscape Horticulture	3
LAR 501	Landscape Architecture Seminar ...	2
LAR 744	Community Site Planning	3
		18

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
		18

*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.

Tenth semester

LAR 702	Landscape Architectural Design Studio VI	5
LAR 753	Professional Practice	2
Business elective		3
Science elective		4
General elective		3
		17

Courses in landscape architecture 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-431-1-0204

LAR 432. Landscape Architectural Design Studio II. (4) II. Two hours lec. and six hours design studio a week. Pr.: LAR 431. LAR-432-1-0204

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-433-0-0204

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-436-1-0204

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-437-1-0204

LAR 440. Problems in Landscape Design. (Var.) I, II, S. Assigned problems and reports in landscape architecture. Pr.: Junior standing. LAR-440-3-0204

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-450-1-0204

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-460-1-0204

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-501-2-0204

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-510-1-0204

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 hour of studio a week. Pr.: HORT 375; and BIOL 210 or HORT 200. LAR-541-1-5-0204

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-542-1-5-0204

LAR 548. Composite Planting Design I. (1-4) I, II. Preparation of planting plans and specifications designed to fit a variety of sites; emphasis on planting design elements and principles. Two hours lec. a week and six hours studio a week. Pr.: Graduate standing. LAR-548-1-0204

LAR 549. Composite Planting Design II. (1-4) I, II. Plant characteristics and their use in landscape architectural design; ecological consideration of site adaptation; comprehensive in scale and scope of projects. Two hours lec. a week and six hours studio a week. Pr.: Graduate standing and LAR 548. LAR-549-1-0204

LAR 553. Composite Landscape Construction I. (1-4) I. Landscape construction including topography, site planning, site layout, grading, earthwork estimating, lighting, irrigation, construction detailing, cost estimating. Pr.: Graduate standing. LAR-553-1-0204

LAR 554. Composite Landscape Construction II. (1-4) II. A continuation of LAR 553: large area grading, road alignment, storm drainage, utilities layout and specifications, contracts. Pr.: Graduate standing. LAR-554-1-0204

LAR 560. Composite Landscape Design Studio I. (1-4) II. Landscape design including delineation, design process, design elements, small-scale design, urban design. Pr.: Graduate standing. LAR-560-1-0204

LAR 561. Composite Landscape Design Studio II. (1-4) I. Continuation of LAR 560: including topics such as community design, resource analysis, park and recreation design, historic preservation, and a terminal landscape project. Pr.: Graduate standing. LAR-561-1-0204

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 LAR 436. LAR-641-1-0204

LAR 642. Landscape Architectural Design Studio IV. (4) II. Twelve hours design studio a week. Pr.: LAR 641 and LAR 437. LAR-642-1-0204

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, LAR 437. LAR-645-2-0204

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-647-1-0204

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-652-1-0204

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. LAR-660-0-10-0204

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 LAR 647. LAR-701-1-0204

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 LAR 647. LAR-702-1-0204

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-710-1-0204

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-741-3-0204

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-744-1-0204

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-746-1-0204

LAR 747. Urban Design Studio II. (4) II. Continuation of LAR 746. Pr.: LAR 746 and conc. enrollment in PLAN 845. LAR-747-1-0204

LAR 750. Graduate Seminar in Landscape Architecture. (1-3) I, II. Discussion of current issues in the profession of landscape architecture. Pr.: Graduate standing in the department. LAR-750-0-0204

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-753-0-0204

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-756-0-0204

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-757-0-0204

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-758-1-0204

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-759-0-0204

Graduate credit only

LAR 860. Advanced Planting Design. (1-4) I, II, S. Special studies in advanced planting design. Pr.: LAR 549. LAR-860-4-0204

LAR 870. Advanced Landscape Architecture. (1-4) I, II, S. Special studies and designs in advanced landscape architecture. Pr.: LAR 702. LAR-870-4-0204

LAR 880. Advanced Landscape Construction. (1-4) I, II, S. Specialized study of large-scale landscape planning involving landscape construction and grading. Pr.: LAR 647. LAR-880-4-0204

LAR 898. Thesis Proposal Writing. (2) I, II. Exploration of procedures of planning, design, scheduling, organization, and management of a landscape architecture research project. Two hours lec. a week. Pr.: ARCH 725 or EDAF 816. LAR-898-1-0204

LAR 899. Research in Landscape Architecture. (Var.) I, II, S. Investigations in landscape architecture and related areas, of such caliber as to form the basis for a graduate thesis. Pr.: Graduate standing in landscape architecture. LAR-899-4-0204

Regional and Community Planning

C. A. Keithley,* Head

Professors Deines,* Keller,* Lapping,* and Weisenburger;* Associate Professors Daniels,* Keithley,* and Selfridge;* Adjunct Professors Ernst, Foerster, McGraw, Seamon, and Wigfall.

Graduate study

Study leading to the two-year professional graduate degree, master of regional and community planning, requiring a minimum of 48 graduate credit hours, is offered by the department in cooperation with the Departments of Architecture, Civil Engineering, Economics, Geography, Landscape Architecture, Political Science, and Sociology, and the Colleges of Agriculture, Business Administration, and Human Ecology. The program is fully accredited by the American Planning Association and the Association of Collegiate Schools of Planning.

Applicants with undergraduate degrees in administration, agriculture, architecture, business, construction science, economics, ecology, education, engineering, geology, geography, government, human ecology, landscape architecture, pre-law, planning, political science, and sociology, who meet the requirements of the Graduate School for admission, are fully acceptable for graduate study in planning. Applicants with other academic backgrounds may be accepted upon approval of the department and subject to such conditions as it may impose.

Individual programs of study leading to the professional master of regional and community planning degree are comprised of core and specialization course work of 28 and 20 semester credit hours, respectively, and an internship in planning of at least 3 semester credit hours. The core course work consists of:

PLAN 700	Planning Analysis	3*
PLAN 715	Planning Principles	3
PLAN 725	Planning Theory	3
PLAN 735	Community Plan Preparation	3
PLAN 736	Community Plan Implementation	3
PLAN 770	Planning Law	3
PLAN 880	Planning Methods	3*
PLAN 820	Planning Administration	3
PLAN 825	Advanced Planning Theory	3

*Students with limited microcomputer skills may be advised to take one semester credit hour of Computer Applications in Planning and Design (PLAN 630) in conjunction with the methods courses.

During the last semester of core course work, students will be given an opportunity to prepare written planning process responses to professional planning issues posed by the faculty during a prescribed period of time. Students will also have an

opportunity to discuss their written response with selected faculty members. While not intended to be viewed as a traditional "comprehensive" examination, the exercise nonetheless serves the same synthesizing function.

The 21 hours of specialized course work may be in any one of four regular specializations or, in the case of uniquely qualified students, a larger range of independent specializations. The minimum requirements of the regular specializations are:

Rural and small town planning

PLAN 740	Small Community and Rural Area Planning	3
PLAN 755	Regional Planning I	3
PLAN 780	Planning and Developing Areas	3
An approved graduate course in rural sociology		3
An approved graduate course in economics		3
An approved graduate course in physical/biological systems		3
Approved graduate electives (minimum)		3

Resource planning

PLAN 755	Regional Planning I	3
PLAN 855	Regional Planning II	3
LAR 758	Land Resource Information Systems	3
LAR 759	Landscape Resource Evaluation	3
BIOL 529	Ecology	3
or		
BIOL 715	Ecological Impact Assessment	3
or		
GEOG 760	Human Impact on the Environment	3
An approved graduate course in resource economics		3
Approved graduate electives (minimum)		3

Community design and preservation

Required for community design option:

PLAN 710	Urban Visual Analysis ...	3
PLAN 745	Urban Design	3
PLAN 746	Urban Design Studio	4
ENVD 651	Preservation Principles and Methods	3
ARCH 710	Topics in Architecture (Development Project Feasibility) ..	3
Approved graduate electives (minimum)		5

Required for preservation option:

ENVD 650	Preservation Documentation	3
ENVD 651	Preservation Principles and Methods	3
ARCH 621	Economics of Preservation	3
or		
ARCH 710	Topics in Architecture (Development Project Feasibility)	3
PLAN 710	Urban Visual Analysis	3
or		
PLAN 745	Urban Design	3
PLAN 746	Urban Design Studio	4
Approved graduate electives (minimum)		5

Community planning and development

Required of the community planning option:

PLAN 750	Housing Policies and Programs	3
PLAN 755	Regional Planning I	3
PLAN 835	Community Growth Management ..	3
An approved graduate course in sociology		3
An approved graduate course in economics		3
An approved graduate course in political science		3
Approved graduate electives (minimum)		3

Required of the community development option:

PLAN 750	Housing Policies and Programs	3
PLAN 760	Community Development Planning	3
PLAN 761	Community Development Workshop	Var.
SOCIO 532	Community Organization and Leadership	3
	An approved graduate course in economics	3
	An approved graduate course in political science . . .	3
	Approved graduate electives (minimum)	3

Students with programs of study in any of these regular specializations have the option of preparing a thesis in place of unspecified electives, provided that prior faculty approval is given.

Consistent with the interdisciplinary objectives of the faculty, uniquely qualified students are free to create independent specializations. The faculty is careful to limit this option to those students who have demonstrated a professional, career, or academic interest and capacity in the independent specialization they wish to pursue. Independent specializations require formal coordination with one or more programs or colleges outside of the department (indicated in parentheses below) and may include, but are not limited to:

Agricultural land planning (College of Agriculture)

Economic development planning (Department of Economics)

Educational planning (College of Education)

Environmental planning (Division of Biology and/or College of Agriculture)

Forest and range management planning (Departments of Forestry and Agronomy)

Infrastructure planning (Department of Civil Engineering)

Health planning (College of Human Ecology)

Housing planning (College of Architecture, College of Business, and/or College of Human Ecology)

Planning and the aged (secondary major in gerontology program: graduate emphasis in gerontology)

Policy planning (Department of Political Science and/or College of Business Administration)

Recreation planning (Departments of Landscape Architecture, Forestry, and/or Physical Education and Leisure Studies)

Site development planning (Departments of Landscape Architecture and/or Architecture)

Sustainable communities planning (College of Architecture)

Third world rural and regional development planning (Departments of Sociology, Economics, Political Science, and/or Geography)

Transportation planning (Department of Civil Engineering)

Water resources planning (Departments of Biology, Geography, and/or Forestry)

Students whose programs of study include an independent specialization may be advised to enroll for up to three hours of PLAN 880 (Topics in Planning) in order to synthesize the relationship between the specialization and planning in a semester paper.

Based upon case-by-case review of upper-division undergraduate work, prior graduate work, and professional practice, some courses in the core and specialization curricula may be waived by the faculty. Waiver is not a routine occurrence, however, and waiver does not reduce the total amount of course work required for the MRCP degree unless advance standing is also granted. Advance standing will not normally exceed 10 semester credit hours and must be approved by the faculty and the Graduate School.

Courses in regional and community planning

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. PLAN-315-0-0206

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-590-3-0206

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.: CMPSC 100 and junior standing. PLAN-630-0-1-0206

PLAN 700. Planning Analysis. (3) I, II. Introduction to quantitative methods in planning to measure change in the socioeconomic/political/physical environment and to analyze the interrelations that guide formulation of comprehensive planning. Pr.: PLAN 315 and ECON 555. PLAN-700-1-0206

PLAN 705. Planning Communications. (1-4) I. Study and application of communication concepts and media used 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-705-1-0206

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-710-1-0206

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-715-0-0206

PLAN 720. Institutional Planning and Development. (3) II. Examination of institutional functions, administrative structures, resources, and policies in the planning and development of physical facilities. Pr.: PLAN 715 and nine other credit hours in planning and/or administration courses. PLAN-720-0-0206

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-725-0-0206

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-735-0-0206

PLAN 736. Community Plan Implementation. (Var.) I. Introduction to legislation and interpretation of codes related to planning, design, and construction. Pr.: PLAN 715. PLAN-736-0-0206

PLAN 740. Small Community and Rural Area Planning. (3) II. Synthesis of small community and rural area change, including socioeconomic/political determinants as bases for community design and planning. Pr.: PLAN 315 plus nine credit hours in economics, political science, and sociology. PLAN-740-0-0206

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-745-0-0206

PLAN 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 and conc. enrollment in PLAN 745. PLAN-746-1-0206

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-750-0-0206

PLAN 755. Regional Planning I. (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-755-0-0206

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 nine semester hours in the social sciences. PLAN-760-0-0206

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 in one of these. PLAN-761-0-0206

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-770-0-0206

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 nine credit hours from the social sciences. PLAN-780-0-0206

Graduate credit

PLAN 800. Research Methods in Planning. (1-4) II. Considerations in the selection, collection, analysis, and interpretation of regional and community planning data, topics to be selected from: (A) network analysis, (B) computer mapping, (C) statistical analysis programs (SPSS and related), (D) remote sensing, (E) visual analysis, (F) linear programming/modeling, (G) policy and program analysis. Pr.: PLAN 700 and 715, plus one course in statistics. PLAN-800-1-0206

PLAN 805. Internship in Planning. (1-4) I, II, S. Assignment to a planning staff for at least 10 weeks; supervision by a profes-

sional planner with periodic reports of activities to planning faculty. Pr.: Completion of two semesters of graduate study in planning. PLAN-805-2-0206

PLAN 810. Practicum in Planning and Development. (Var.) I, II, S. Supervised experience in professional planning and development, including internships, field research, public service, and professional workshops. Pr.: PLAN 715 and 725; or conc. enrollment in one of these. PLAN-810-2-0206

PLAN 815. Seminar in Planning. (1-3) I, II, S. Discussion of contemporary issues in planning within the framework of professional education as a basis for planning practice. Pr.: Completion of one semester of graduate study. PLAN-815-0-0206

PLAN 820. Planning Administration. (3) I. Considerations for the planning director in the administration and management of planning. Pr.: PLAN 715 and completion of nine credit hours of graduate study in planning. PLAN-820-0-0206

PLAN 825. Advanced Planning Theory. (3) II. Review of empirical and normative theories of regional and community planning; analysis of principles, hypotheses, concepts, and law of planning and synthesis of a theory of planning. Pr.: PLAN 725 and completion of two semesters of graduate study in planning. PLAN-825-0-0206

PLAN 835. Community Growth Management. (3) II. Synthesis of city growth and change in relation to planning theory and socioeconomic/political determinants. Criteria and methodology for growth management are reviewed and applied to the contemporary city. Pr.: PLAN 715 and 755. PLAN-835-0-0206

PLAN 845. Advanced Urban Design. (3) II. Synthesis of urban form and space in relation to aesthetic theories and values and socioeconomic/political determinants. Criteria and methodology for urban design and planning are reviewed and applied to contemporary urban form and space. Pr.: PLAN 745. PLAN-845-0-0206

PLAN 846. Urban Design Studio II. (4) II. Continuation of PLAN 746. Pr.: PLAN 746 and conc. enrollment in PLAN 845. PLAN-846-1-0206

PLAN 847. Urban Design Field Study. (3) I, II, and Intersession. A field investigation of varied large-scale institutions, central business districts, and other mixed-use developments. Pr.: PLAN 745 and PLAN 746. PLAN-847-1-0202

PLAN 855. Regional Planning II. (3) II. Synthesis of regional growth and change in relation to regional landscape, resource, and environmental determinants. Criteria and methodology for regional analysis and

planning are reviewed and applied to the elements of the contemporary region. Pr.: PLAN 715. PLAN-855-0-0206

PLAN 880. Topics in Planning. (Var.) I, II, S. The study of selected concepts and trends in regional and community planning and development. Pr.: PLAN 715 or graduate standing. PLAN-880-0-0206

PLAN 899. Research in Planning. (Var.) I, II, S. Original research and advanced study in regional and community planning, urban design, and related fields for thesis or master's report. Pr.: Registration in Graduate School and completion of two semesters of graduate study in planning. PLAN-899-4-0206

Center for Research and Community Services

Paul Windley,* Director

The Center for Research and Community Services (CRCS) is in the College of Architecture and Design and coordinates the research and service activities of its five departments. The center is associated with the graduate programs within the college in architecture, landscape architecture, and regional and community planning. CRCS has three objectives: 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.

Faculty

ABBOTT, MARTHA, Asst. Prof. of Arch. (1987). BA 1979, Stanford U.; MArch 1986, U. of Minnesota.

BARNES, ALTON A., Prof. of Landscape Arch. and Planning (1967). BLA 1965, U. of Georgia; MLA 1967, U. of Illinois. Registered Landscape Architect. (*)

BROOKS, KENNETH R., Assoc. Prof. of Landscape Arch. (1982). BS 1974, Colorado St. U.; MLA 1977, Utah St. Registered Landscape Architect. (*)

BRYANT, DALE A., Assoc. Prof. of Arch. (1977). BArch 1968, U. of Washington; MArch 1969, U. of Michigan. Registered Architect. (*)

BULLOCK, ROBERT A., Asst. Prof. of Environmental Design (1982). BFA 1970, MFA 1975, Michigan St. U.

BURNHAM, ROBERT, Assoc. Prof. and Head of Arch. (1976). BArch 1966, Carnegie Inst. of Tech.; MArch 1970, U. of California, Berkeley. Registered Architect. (*)

CHANG, AMOS I. T., Prof. Emeritus of Arch. (1966). BS Civil Engg. 1939, National Chung King U.; MFA in Arch. 1949, PhD in Arch. 1951, Princeton U. Registered Architect. (*)

CHARNEY, WAYNE, Asst. Prof. of Environmental Design (1987). BS 1973, MArch 1975, U. of Illinois; PhD 1985, Northwestern U.

CHELZ, ANTHONY W., Assoc. Prof. of Environmental Design (1975). BArch 1966, Sch. Art Inst., Chicago; MFA 1970, Syracuse U.

CHRISTENSEN, KEITH H., Assoc. Prof. of Arch. (1966). BArch 1950, U. of Nebraska; MArch 1957, U. of Michigan. Registered Architect.

CLEMENT, LAURENCE A., Asst. Prof. of Environmental Design (1981). BS 1978, BLA 1980, SUNY, Col. of Environmental Science and Forestry; MLA 1985, Kansas St. U. Registered Landscape Architect.

COATES, GARY J., Prof. of Arch. (1977). BED 1969, MArch 1971, North Carolina St. U. (*)

DANIELS, THOMAS L., Assoc. Prof. of Planning (1987). BA 1976, Harvard U.; MS 1977, U. of Newcastle Upon Tyne, England; PhD 1984, Oregon St. U. (*)

DAY, DENNIS J., Prof. of Landscape Arch. (1966). BSLA 1964, Michigan St. U.; MLA 1966, U. of Michigan. Registered Landscape Architect. (*)

DEINES, VERNON PHILLIP, Prof. of Planning (1957). BS 1952, MRP 1962, Kansas St. U.; PhD 1977, U. of Pittsburgh. Registered Professional Engineer. Certified Planner. (*)

DeVILBISS, EDWARD A., Prof. of Arch. (1975). BArch Eng 1953, U. of Colorado. Registered Architect.

DUBOIS, JAMES H., Asst. Prof. of Interior Arch. (1983). BArch 1978, MArch 1985, Kansas St. U.

DURGAN, JACK CLYDE, Prof. and Head of Interior Arch. (1954). BArch 1951, Oklahoma St. U.; MS 1957, Kansas St. U. Registered Architect. (*)

EALY, ROBERT P., Prof. Emeritus of Landscape Arch. (1969). BS 1941, Oklahoma St. U.; MS 1946, Kansas St. U.; PhD 1955, Louisiana St. U. Registered Landscape Architect. (*)

ERNST, F. GENE, Prof. of Arch. and Planning (1967). BArch 1953, Kansas St. U.; MArch (Urban Design) 1971, U. of Washington. Registered Architect. (*)

EWANOW, LYNN, Assoc. Prof. of Landscape Arch. and Environmental Design; Asst. Dean (1979). BA (psych.), BA (art) 1975, Keuka Col.; MLA 1979, SUNY, Col. of Environmental Science and Forestry.

FAORO, DANIEL L., Asst. Prof. of Arch. (1987). BArch 1981, U. of Illinois-Chicago; MArch 1983, Harvard U. Registered Architect.

FISCHER, EMIL C., Prof. and Dean Emeritus (1955). AB 1929, Columbia Col.; BS in Arch. 1932, MS in Arch. 1933, Columbia U. Registered Architect. (*)

FOERSTER, BERND, Prof. of Environmental Design and Planning (1971). BS in Arch. 1954, U. of Cincinnati; MArch 1957, Rensselaer Polytechnic Inst. (*)

FORSYTH, RICHARD H., Prof. of Landscape Arch.; Assoc. Dean (1979). BSLA 1967, Michigan St. U.; MLA 1969, Harvard U. Registered Landscape Architect. (*)

GARVIN, WILLIAM L., Adjunct Prof. of Arch. (1987). BS 1948, Washington and Lee U.; BArch 1952, Ohio St. U.; MArch 1958, Massachusetts Inst. of Tech. Registered Architect.

GENOV, VELIZAR, Asst. Prof. of Interior Arch. (1984). BArch 1977, MA in Urban Design 1978, U. of Arch., Sophia, Bulgaria.

HAYCOCK, GARY E., Assoc. Prof. of Environmental Design (1976). BFA 1970, Pratt Inst.; MArch 1972, U. of Oregon.

HEINTZELMAN, JOHN CRANSTON, Prof. Emeritus of Arch.; Assoc., Inst. for Environmental Research (1947). BArch 1938, Massachusetts Inst. of Tech.; MArch 1941, Columbia U. Registered Architect. (*)

HOAG, RICHARD, Prof. and Head of Environmental Design (1985). BA 1969, MArch 1977, U. of Washington. (*)

HUSSEINI, FAYEZ, Assoc. Prof. of Environmental Design (1980). BArch 1971, Beirut Arab U.; MArch 1979, MFA 1980, Kansas St. U.

JAHNKE, WILLIAM R., Prof. of Arch.; Asst. Dean (1968). BSME 1948, Duke U. Registered Professional Engineer. (*)

JONES, JAMES S., Asst. Prof. of Arch. (1982). BBAdm 1965, U. of Puget Sound; MArch 1971, U. of Washington. Registered Architect.

KEANE, TIMOTHY D., Asst. Prof. of Landscape Arch. (1984). BSLA 1981, Iowa St. U.; MLA 1983, U. of Michigan.

KEITHLEY, CLAUDE A., Assoc. Prof. of Planning; Head, Dept. of Regional and Community Planning (1970). BArch 1965, MRCP 1973, MArch 1973, Kansas St. U. Certified Planner. (*)

KELLER, JOHN W., Prof. of Planning (1972). BA 1966, St. Benedict's; MA 1967, Kansas St. U.; MS 1971, PhD 1973, Rutgers U. Certified Planner. (*)

KREMER, EUGENE R., Prof. of Arch. and Dir. of Program Development (1973). BArch 1960, Rensselaer Polytechnic Inst.; MArch 1967, U. of California at Berkeley. Registered Architect. (*)

KRIDER, ALDEN, Prof. Emeritus of Environmental Design (1949). BS in Arch. 1933, MS 1955, Kansas St. U. Registered Architect. (*)

LAPPING, MARK B., Prof. of Planning, Landscape Arch., and Environmental Design; Dean (1984). BS 1967, SUNY; PhD 1972, Emory U. (*)

LAW, DENNIS L., Prof. of Landscape Arch. (1974). BS 1967, Texas Tech U.; MLA 1976, Kansas St. U. Registered Landscape Architect. (*)

LIN, MIKE W., Prof. of Landscape Arch. (1975). BS in Arch. 1965, Taipei Inst. of Tech.; MSLA 1972, U. of Wisconsin. Registered Landscape Architect. (*)

McDONALD, C. RICHARD, Assoc. Prof. of Environmental Design (1974). BS 1960, MArch 1979, Kansas St. U. Registered Professional Engineer.

McGRAW, EUGENE THOMAS, Prof. of Interior Arch. and Planning (1958). BArch 1957, Oklahoma St. U.; MRP 1963, Kansas St. U. (*)

McMILLAN, BRUCE E., Asst. Prof. of Environmental Design (1981). BArch 1973, MArch 1981, Kansas St. U. Registered Architect.

MILLER, WILLIAM C., Prof. of Arch. (1977). BArch 1968, U. of Oregon; MArch 1970, U. of Illinois. Registered Architect. (*)

MURPHY, STEPHEN M., Assoc. Prof. of Interior Arch. (1968). BS 1968, Kansas St. U.; MEd 1974, U. of Missouri.

MUSIAK, THOMAS A., Prof. and Head of Landscape Arch. (1979). BS 1961, BLA 1965, MLA 1968, U. of Massachusetts. Registered Landscape Architect. (*)

NORRIS-BAKER, CAROLYN, Assoc. Prof. of Arch. (1982). BA 1971, BArch 1972, Rice U.; MA 1978, PhD 1980, U. of Houston. (*)

OWENS-WILSON, GWEN, Asst. Prof. of Environmental Design (1982). BA 1959, U. of Oklahoma; BArch 1972, Howard U.; MS 1980, PhD 1982, U. of Tennessee. Registered Architect.

PAGE, ROBERT L., Prof. of Landscape Arch. (1971). BSLA 1963, Kansas St. U.; MLA 1965, Harvard U. Registered Landscape Architect. (*)

PAVLIDES, ELEFThERIOS, Asst. Prof. of Environmental Design (1982). BA 1971, Brandeis U.; MArch 1974, Yale U.; PhD 1985, U. of Pennsylvania. Registered Architect. (*)

PAYNE, IFAN, Prof. of Environmental Design (1976). BArch 1966, U. of Wales; PhD 1969, U. of London. (*)

PRETZER, CAROLYN A., Dir. of Audio-Visual Aids, Slide Collection (1983). BA 1954, Kansas St. U.

RASSMAN, NEAL, Asst. Prof. of Landscape Arch. (1982). BA 1971, Washington and Lee; MLA 1977, Texas A & M. Registered Landscape Architect.

QUINLAN, LEON REED, Prof. Emeritus of Landscape Arch.; Ornamental Horticulturist and Landscape Architect, Agr. Exp. Sta. (1927). BS 1921, Colorado St. U.; MLA 1925, Harvard U. (*)

SANNER, ALBERT E., Assoc. Prof. Emeritus of Arch. (1963). BS Arch 1948, BS Arch Engg. 1950, U. of Illinois; MArch 1966, U. of Nebraska. Registered Architect. (*)

SCHRADER, CHARLES, Asst. Prof. of Environmental Design (1987). BS 1973, MLA 1987, Kansas St. U.

SEAMON, DAVID R., Assoc. Prof. of Arch. and Planning (1983). BA 1970, SUNY; MA 1974, PhD 1977, Clark U. (*)

SEIBOLD, LLEWELLYN D., Asst. Prof. of Arch. (1983). BS 1977, U. of Nebraska; MArch 1981, U. of Oregon. Registered Architect. (*)

SELFIDGE, O. JOHN, Assoc. Prof. of Planning and Environmental Design (1969). BA 1959, U. of Kansas; MCP 1964, Yale U. (*)

SIEPL-COATES, SUSANNE, Asst. Prof. of Environmental Design (1984). Dipl. 1979, U. of Hannover, West Germany; MArch 1982, U. of California at Berkeley.

SLACK, EARL REX, Assoc. Prof. Emeritus of Arch. (1965). BArch 1952, U. of Oklahoma. Registered Architect.

STOTESBURY, SIDNEY D., Prof. of Arch. (1972). BS 1957, Florida St. U.; MArch 1970, PhD 1975, U. of California at Berkeley. (*)

STREETER, RAYMOND, Asst. Prof. of Arch. (1984). BArch 1979, Kansas St. U.; MArch 1984, Harvard U. Registered Architect.

SULLIVAN, WILLIAM, Asst. Prof. of Environmental Design (1984). BS 1980, MS 1982, U. of Illinois; MLA 1985, Kansas St. U.

TAUTGES, ALAN R., Asst. Prof. of Landscape Arch. (1986). BSLA 1975, U. of Wisconsin; MLA 1979, U. of Oregon. Registered Landscape Architect.

THOMPSON, GEORGE H., Adjunct Asst. Prof. of Environmental Design and Dir., Regents' Center for Architectural Studies/Kansas City (1980). BS 1964, Ohio St. U.; MA 1971, MFA 1980, Kansas St. U.

TROYER, RODNEY, Asst. Prof. of Interior Arch. (1985). BArch 1971, Kansas St. U.; MIntArch 1985, Oregon.

WATTS, CAROL, Asst. Prof. of Environmental Design (1983). BA 1971, Mount Holyoke; MArch 1975, U. of Washington; PhD 1987, U. of Texas-Austin.

WATTS, DONALD, Assoc. Prof. of Arch. (1983). BArch 1970, U. of Nebraska; MArch 1971, U. of California at Berkeley. Registered Architect. (*)

WEISENBURGER, RAY B., Prof. of Planning (1964). BArch 1959, U. of Illinois; MRP 1971, Cornell U. Registered Architect. Registered Landscape Architect. (*)

WENDT, EUGENE G., Assoc. Prof. of Environmental Design (1962). BArch 1959, MArch 1970, Kansas St. U. Registered Architect.

WIGFALL, La BARBARA, Asst. Prof. of Environmental Design and Planning (1987). BArch 1975, Howard U.; MRCP 1977, Harvard U.

WINDLEY, PAUL G., Prof. of Arch. and Environmental Design; Dir. of Center for Research and Community Services, and Graduate Studies (1972). BS 1967, Idaho St. Univ; BArch 1969, U. of Colorado; MArch 1970, DArch 1972, U. of Michigan. (*)

WINSLOW, WILLIAM P. III, Asst. Prof. of Landscape Arch. (1982). BLA 1980, Kansas St. U.; MLA 1982, U. of Michigan. Registered Landscape Architect.

WYATT, STANFORD, Assoc. Prof. of Arch. (1987). BArch, 1967, MArch 1969, U. of Pennsylvania. Registered Architect.

Arts and Sciences

Thomas L. Isenhour, Dean
William E. Carpenter, Associate Dean
William R. Feyerharm, Associate Dean
Marjorie Cleland, Assistant to the 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 Kansas State University. 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 those 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 to these degrees, 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.	Sociology, anthropology, and social work	Political science, B.A. or B.S.	Political science
Art, B.A. or B.F.A.	Art	General	General
Biochemistry, B.A. or B.S.	Biochemistry	Public administration	Public administration
Biology, B.A. or B.S.	Biology	Pre-dentistry, B.A. or B.S.	Dean's office
Chemical science, B.A. or B.S.	Chemistry	Pre-law (advising program)	Dean's office
Chemistry, B.A. or B.S.	Chemistry	Pre-medicine, B.A. or B.S.	Dean's office
General textile		Pre-nursing (advising program)	Dean's office
Computer science, B.A. or B.S.	Computing and Information Sciences	Pre-optometry (advising program)	Dean's office
Economics, B.A. or B.S.	Economics	Pre-pharmacy (advising program)	Dean's office
English, B.A.	English	Dean's office	Pre-physical therapy
Creative writing		Pre-veterinary medicine* (advising program)	Dean's office
Literature		Psychology, B.A. or B.S.	Psychology
Teaching certification		Radio—television, B.A. or B.S.	Journalism and mass communications
Fisheries and wildlife biology, B.A. or B.S.	Biology	Social work, B.A. or B.S.	Sociology, anthropology, and social work
Fisheries biology		Sociology, B.A. or B.S.	Sociology, anthropology, and social work
Wildlife biology		General	
General		Society and criminal justice	
General (advising program)	Dean's office	Speech, B.A. or B.S.	Speech
Geography, B.A. or B.S.	Geography	General	
General		Linguistics	
Pre-planning		Speech Pathology, B.A. or B.S.	Speech
Geology, B.A. or B.S.	Geology	Statistics, B.A. or B.S.	Statistics
Geophysics, B.A. or B.S.	Geology	Theatre, B.A. or B.S.	Speech
History, B.A. or B.S.	History	Dance	
Information systems, B.A. or B.S.	Computing and Information Sciences		
Interdisciplinary	Dean's office		
Humanities, B.A.			
Life science, B.A. or B.S.			
Physical science, B.A. or B.S.			
Social science, B.A. or B.S.			
Journalism and mass communications, B.A. or B.S.	Journalism and mass communications		
Advertising			
General			
Journalism			
Public relations			
Leisure studies, B.A. or B.S.	Physical education and leisure studies		
Recreation and park management			
Therapeutic recreation			
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	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.			
Physical education, B.A. or B.S.	Physical education and leisure studies		
Elementary			
Exercise science			
Human movement			
K-12			
Secondary			
Physics, B.A. or B.S.	Physics		

Secondary majors

Secondary majors are those majors which 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 Asia 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 one hundred (100) may not be applied toward a degree.*

General education requirements

Bachelor of arts, bachelor of science degrees

Requirements common to the B.A. and B.S. degrees

120 credit hours required for graduation

Physical education

Purpose: to give a foundation in the principles of physical exercise and fitness.

PE 101 Concepts in Physical Education 1

Basic rhetoric

(three courses, eight credit hours minimum)

Purpose: to give students practice in writing and analyzing expository and argumentative prose and in oral presentation.

ENGL 100 English Composition I 3
 ENGL 120 English Composition II 3
 SPCH 105 Public Speaking IA 2
 or**
 SPCH 325 Argumentation and Debate 3
 or**
 SPCH 321 Public Speaking II 3

**as recommended by Department of Speech

A major

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.

Purpose: to ensure some depth and detail in at least one field of knowledge.

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 two or more credit hours satisfy these requirements; courses in excess of five credit hours count as two courses.

Humanities (four courses, one course each section, 11 credit hours minimum):

Fine arts (one course)

Purpose: to ensure some interpretive or expressive competence in a traditional nonliterary mode of artistic expression.

Choose from the following:

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, 202, 250, 310, 385, 420, 422, 424, 555, 570, or 571

Music studio performance—MUSIC 252 to 799

Theatre—THTRE 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, 310, 492, 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

Constitutional law—POLSC 613, 614, 615, 616, or 799

Women's studies—Women's Studies xxx 105 or 405

Political thought—POLSC 301, 661, 663, 667, 671, or 675

Western humanities—ENGL 230, 231, 233, or 234

Foreign civilizations—FREN 514, GRMN 530, SPAN 565, or SPAN 566

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 301, 400, 401, 405, 415, 416, 492, 499, 520, 530, or 796

Modern languages—literature courses including literature in translation

Theatre—THTRE 562, 764, 770, 771, 772, 773, 774, or 776

History of rhetoric—SPCH 330, 332, 725, 730, 731, 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):

One course must be at 500 level or above, or carry a prerequisite in the same department.

Purpose: to acquaint the student with the adaptation of scientific method to the analysis of human social systems.

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 or 405

Gerontology—DAS 315 or 415

Linguistics—except LG 601

Speech—SPCH 323, 520, 620, 721, or 726

Journalism and mass communications—JMC 235, 612, 645, 660, 665, or 685, or RTV 660 or 675

Physical education—PE 320 or 340

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 which 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).

Note: 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, 260, 505, 506, 507, 508, 511, 512, 536, 545, 550, 604, 618, 630, 634, 673, 676

Economics—ECON 505, 506, 636, 681, or 682

Geography—GEOG 100, 200, 620, 640, 650, 710, or 715

History—HIST 250, 350, 504, 505, 506, 514, 543, 544, 545, 561, 562, 564, 576, 577, 591, 592, 593, or 598

Journalism and mass communications—JMC 670

Management—MANGT 690

Marketing—MKTG 544

Modern languages—RUSSN 250, 504, 508, or 552

Philosophy—PHILO 310

Political science—POLSC 333, 505, 506, 511, 522, 526, 541, 543, 545, 623, 624, 625, 627, 628, 629, 642, 645, 647, 649, 651, 652, or 653

Sociology—SOCIO 505, 506, or 742

Note: 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 three-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.

Note: 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, three 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:

Physical education—PE 330 or 335

Psychology—PSYCH 470, 480, or 616

Quantitative and abstract formal reasoning

Purpose: to give the student 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, nine credit hours minimum, selected from:
Computer science—100 level or above
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
Leisure studies—LS 520
Physical education—PE 710
Physics—PHYS 113
Sociology—SOCIO 520 or 725
3. Equivalent competency:
Competency may be demonstrated by taking two Level II courses or a Level III course from:

Level II courses:

Computer science—CMPSC 200 and one of the labs CMPSC 201, 202, 206, 207, or 211

Mathematics—MATH 150, 201, or 205

Philosophy—PHILO 510

Statistics—STAT 320, 330, 340, 350, 702, or 703

Level III courses:

Computer science—CMPSC 300 or 305

Mathematics—MATH 210, 220, or 225

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

Physical education—PE 101, Concepts of Physical Education

Art courses (75 credit hours):

Core—39 hours

Major—20 hours

Art electives and related courses—16 hours

Bachelor of music

126 credit hours required for graduation

Areas of concentration offered in this curriculum are: all instruments, voice, theory, and composition. A secondary performance area also is required.

General requirements (42 hours)

ENGL 100	English Composition I	3
ENGL 120	English Composition II	3
SPCH 106	Public Speaking I	3
PE 101	Concepts in Physical Education	1
PHYS 125	Physics for Musicians	3
PSYCH 110	General Psychology	3
Nonmusic electives		minimum of 9
Modern language		two courses minimum

The remaining hours to be taken in the area of concentration. For specific music requirements, see catalog statement for the Department of Music.

Bachelor of music education

134–135 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	English Composition I and	3
ENGL 120	English Composition II	3
or		
ENGL 110	English Honors Composition I and	3
ENGL 125	English Honors Composition II	3
SPCH 106	Public Speaking I	3
Literature elective		3
PSYCH 110	General Psychology	3
Social science electives (may not include other psychology courses)		9
PHYS 125	Physics for Musicians	3
Natural science electives*		9
PE 101	Concepts in Physical Education	1
Humanities electives**		

*Must include one biological science and one course in mathematics.

**Number of hours should complete the total 50 hours required in general education; modern language courses are strongly recommended.

The remaining hours to be taken in the area of concentration. For specific music requirements, see catalog statement for the Department of Music.

Associate of arts at Fort Riley

Sixty 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 which has a prerequisite in the same department: biochemistry, biology, chemistry, computer science, geography, (GEOG 220 and 221 only), geology, mathematics, physics, or statistics

Physical education—PE 101, Concepts in Physical Education

Associate of science at Fort Riley

Sixty 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 which has a prerequisite in the same department: biology, biochemistry, chemistry, computer science, geography (GEOG 220 and 221 only), geology, mathematics, physics, or statistics

Physical education—PE 101, Concepts in Physical Education

Program Options

Honors program

The honors program offers intellectually able and motivated students experiences in the humanities and in the social-behavior and natural sciences that are challenging and unusual in breadth and focus. By stressing liberal studies in the 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 may be admitted to the honors program during the freshman year. Admission requires completion of a noncredit seminar, Introduction to the Honors Program in Arts and Sciences, and achievement of a grade point average of 3.5 in course work completed as a full-time student during one semester of the freshman year. A student who satisfies those requirements may meet with the director of the honors program and petition to join. Once admitted, a student must maintain an overall grade point average of 3.3.

Students accepted into the honors program are expected to enroll in an honors section of ENGL 125, English Composition II. Students must complete: two seminars, one in social sciences or humanities and one in the natural sciences or mathematics, during the sophomore year; an interdisciplinary colloquium, incorporating perspectives of both the humanities and the sciences, during the junior year; and an independent study, under the supervision of a faculty member of the student's choice, during the senior year. The senior study is conducted at a beginning professional level and 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 germ 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 writing, 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 which 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 3.5 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. Persons who wish to be considered for late admission should contact the director.

For more information, please contact the Director of the Honors Program, College of Arts and Sciences, Eisenhower Hall, Manhattan, Kansas 66506.

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-010-0-4900

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-388-2-4900

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. DAS-399-0-4900

Office of Study Abroad

Dr. Walter F. Kolonosky, Director
14A Eisenhower Hall
(913) 532-6900

The Office of Study Abroad should be the first stop for students who are looking for opportunities to study or work outside the U.S. In addition to summer programs in Paris, Mexico City, and Eutin, a semester or academic year of study is available to K-State students at the Universidad de Sevilla and the Université de Haute Bretagne through our membership with CIEE. According to the terms of institutional agreements, K-State students may also study for an academic year at the

Universities of Reading, Essex, Exeter, St. Andrews, and Stirling. The International Student Exchange Program (ISEP) allows K-Staters to study at one of many institutions of higher education all over the world for little more than the cost of tuition, room, and board at Kansas State University. Besides our scholarship exchange with Justus Liebig University in Giessen, Germany, new exchanges are under negotiation with universities in Great Britain.

Application for admission to all programs may be obtained from the Office of Study Abroad, 14A Eisenhower Hall. The application deadline for financial aid for international programs is February 15.

Summer independent reading program

Each summer the College of Arts and Sciences offers an opportunity for students to read six books independently during their summer holidays for two hours of academic credit. Each year two books are chosen in the humanities, two in the social sciences, and two in the natural sciences; the books chosen are all intelligible to the nonspecialist, are usually current paperbacks, and are frequently controversial.

In the fall, students meet in three small two-hour seminars moderated by a faculty member. A written examination is given for each pair of books and the course appears on the student's transcript of courses for the fall term. The course may be taken on the A/Pass/F basis.

Students wishing to take the course should enroll in arts and sciences course DAS 199 during the spring preenrollment period preceding the summer they wish to do the reading. If the decision to take the course is made at a later time a student should see an advisor in the dean's office.

DAS 199. Summer Independent Reading Program. (2) DAS-199-3-4901

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 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.

Liberal arts with 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, the student can complete the 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, a student who chooses to combine these two programs is 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, a student can be assured of varied choices after graduation. The liberal arts degree will equip a student to pursue graduate or professional study or to apply the education to a career. 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 a graduate to teach in a public secondary school. For specific certification requirements in secondary education, please see the College of Education section of this catalog.

Liberal arts with business preparation

Many of the nation's top business leaders agree that the best preparation for a successful career in business is a bachelor of arts degree (B.A.) in a liberal arts discipline plus a master's degree in business administration (M.B.A.) from a nationally-ranked graduate school of business. Liberal arts study has long been recognized as the best way to equip students with the communication, analytic, problem-solving, and interpersonal skills required of young executives. Such skills are developed and refined through rigorous course work in the humanities, social sciences, natural sciences, and quantitative sciences. Proficiency with a foreign language (a requirement for the B.A.) is also highly desirable.

A student interested in pursuing this route to a career in business may, with careful planning and in consultation with a Dean's Office advisor, construct a degree program based on an arts and sciences major, supplemented by a concentration of business-related courses. While majors in economics, English, history, modern languages, political science, psychology, or sociology might be among the most obvious choices for pre-business preparation, many other arts and sciences majors are equally appropriate. Most liberal arts majors require only 30-36 credit hours in the major field, approximately one-fourth of the total 120 hours required for a B.A. Most of the courses M.B.A. programs expect entering

students to have completed are basic liberal arts courses: economics, calculus, computer science, statistics, etc. Some of these can apply toward the general distribution requirements, which total approximately 60 hours. That leaves approximately 30 hours of free electives which may be used to create a pre-business area of concentration drawing from courses offered by both the College of Business and the College of Arts and Sciences. Such a degree would also qualify a student for certain entry-level positions in business if he or she did not wish to go directly to graduate school.

The College of Arts and Sciences Dean's Office maintains a lending library of information, catalogs, and application materials for M.B.A. programs. Interested students are invited to use these materials and to consult with an advisor in the Advising Center, 112 Eisenhower Hall, 532-6904.

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.	30
Physical science	B.S. or B.A.	34
Social science	B.S. or B.A.	30

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. For more information about these majors, students may call 532-6900 or stop by 113 Eisenhower Hall.

Humanities

Humanities disciplines are those which deal with various aspects of culture. They include art, dance, theatre, history, languages, literature, music, philosophy, and speech. The humanities major leads to a bachelor of arts, the traditional liberal arts degree. The intellectual training and cultural appreciation students acquire through humanistic study enable them to apply humanistic values and perspectives

toward solutions to the problems of today and tomorrow.

Humanities majors take 15 hours in each of two humanities fields, including at least one upper-level course in each field.

Life science

Life science is a multidisciplinary major which deals with studies of living organisms and life processes.

BIOL 198	Principles of Biology	4
BIOL 201	Organismic Biology	5
BIOL 220	Bacteriology and Man	3
ANTH 280,	Introduction to Physical	
281	Anthropology and Lab	4
PSYCH 110	General Psychology	3

The remaining 11 semester hours must include appropriate courses selected from two or more of the following fields: biochemistry, biology, microbiology, physical anthropology, and psychology. At least two of these courses must be above the introductory level.

Physical science

Physical science is a multidisciplinary major which deals primarily with nonliving matter. It concerns itself with the theoretical and observable natural phenomena of our world and universe. The physical science disciplines include chemistry, geology, mathematics, and physics.

MATH 150	Plane Trigonometry	3
CHM 210	Chemistry I	4
CHM 230	Chemistry II	4
GEOL 130	Elementary Geology Laboratory	1
PHYS 113	General Physics I	4
PHYS 114	General Physics II	4
GEOL 100	Introductory Geology	3
	or	
GEOL 105	Oceanography	3

In addition, at least three courses must be taken from two or more of these fields: chemistry, geology, mathematics, and physics. At least two of these courses must be above the introductory level.

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. Majors are required to choose a total of ten courses from at least four of these fields, with at least four courses being above the introductory level.

Pre-professional programs

Medical technology

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. DAS-015-0-1201

The medical technology curriculum requires 90 semester hours of preclinical courses and 12 months of work at one of the affiliated clinical programs. The latter are located in Kansas City at Providence-St. Margaret Health Center, Research Hospital, and Medical Center, North Kansas City Memorial Hospital, or in Topeka at the Topeka School of Medical Technology. Admission into that portion of the training is by application; students are expected to have a minimum GPA of 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

STAT 320	Elements of Statistics	3
	or	
STAT 330	Elementary Statistics for the Social Sciences	3
	or	
STAT 340	Biometrics I	3
	One math course*	
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	2-4
	or	
CHM 271	Chemical Analysis	4
BIOL 198	Principles of Biology	4
BIOL 555	Microbiology	5
BIOL 670	Immunology	4
	Two of the following courses:	
BIOL 240	Human Body	6
BIOL 610	Bacteriology of Human Diseases	5
BIOL 545	Parasitology and	4
BIOL 546	Parasitology Laboratory	1
		46-50

B.S. general education requirement 39
TOTAL 85-89

Highly recommended courses:

BIOL 400	Human Genetics	3
BIOL 671	Immunology Laboratory	2
CMPSC 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

*MATH 110 does not fulfill this requirement.

Clinical courses

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-401-2-1223

DAS 402. Clinical Chemistry. (6-8) I. Theory and laboratory study of analytical biochemistry, incorporating both routine and special chemical procedures. DAS-402-2-1223

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-403-2-1223

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-404-2-1223

DAS 405. Topics in Medical Technology. (3-6) II. Basic principles and practices of the medical laboratory, techniques and special projects. DAS-405-2-1223

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 predental 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 and	3
CHM 351	General Organic Chemistry Laboratory	2
	or	
CHM 531	Organic Chemistry I and	3
CHM 532	Organic Chemistry Laboratory and	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

Additional information may be obtained in the office of the dean of arts and sciences.

*Students who enter dental school after completing only 90 credit hours, which includes the courses listed in the predental 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. DAS-240-2-1205

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

Additional information may be obtained in the office of the dean of arts and sciences.

**Applicants for whom the degree requirement is waived, and who enter medical school before completing the bachelor's degree and who have completed all the general education requirements and the major for the B.A. or B.S. degree, may complete degree requirements by transferring 30 semester hours from an accredited medical school.

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.

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 555	Microbiology	5
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
Social sciences		6
Psychology elective		3

These courses also fulfill most of the requirements for the other schools of optometry. The list does not constitute a major toward an undergraduate degree.

Pre-veterinary

Seventy-one semester hours are required for students applying for admission to the freshmen class entering the College of Veterinary Medicine.

ENGL 100	English Composition I	3
ENGL 120	English Composition 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 555	Microbiology (with lab)	5
ASI 102	Principles of Animal Science	3
ASI 103	Dairy Science	1
ASI 104	Poultry Science	1
ASI 105	Animal Sciences and Industry	1
ASI 318	Fundamentals of Nutrition	3
ASI 500	Animal Genetics	3
Social sciences and/or humanities electives		12
		71

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 office of the dean of arts and sciences.

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	English Composition I	3
ENGL 120	English Composition 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 100	College Algebra	3
MATH 150	Plane Trigonometry	3
MATH 220	Analytic Geometry and Calculus I	4
or		
MATH 205	General Calculus and Linear Algebra	3
BIOL 198	Principles of Biology	4
BIOL 201	Organismic Biology	5
BIOL 240	Structure and Function of the Human Body*	6

BIOL 555	Microbiology	5
PHYS 115	Descriptive Physics**	4
or		
PHYS 101	The Physical World I and	3
PHYS 103	The Physical World I Laboratory	1
SPCH 106	Public Speaking I	3
Humanities and social sciences electives		6

*BIOCH 521 and 522, General Biochemistry and Laboratory, may be substituted for BIOL 240, Structure and Function of the Human Body.

**Students who have completed high school physics with a grade of B or better may be exempt.

Additional information may be obtained in the office of the dean of the College of Arts and Sciences.

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 office of the dean of arts and sciences 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. The pre-nursing advisor in the office of the dean of arts and sciences will assist students in selecting appropriate courses, advising them regarding the different kinds of nursing education and in processing applications.

ENGL 100	English Composition I	3
ENGL 120	English Composition 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
PE 101	Concepts of Physical Education	1
BIOL 220	Bacteriology and Man (Lab)	3
BIOL 240	Structure and Function of the Human Body	6
PSYCH 520	Life Span Personality Development	3
FN 132	Basic Nutrition	3
ANTH 200	Cultural Anthropology	3
STAT 330	Elementary Statistics for the Social Sciences	3
Philosophy or ethics		3
Humanities electives		6

For the licensed practical nurses and registered nurses special advising is available to the individual in selecting

appropriate classes. This assistance is provided by the pre-nursing advisor in the dean's office of the College of Arts and Sciences.

Pre-physical therapy

To be eligible for the two physical therapy degree programs in Kansas, students should complete an undergraduate degree including the following classes. There are additional requirements for Wichita State University starting in 1990. Both programs will be granting a master's degree in physical therapy.

ENGL 100	English Composition I	3
ENGL 120	English Composition II	3
Literature course		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
Humanities (history, art history, music literature, philosophy)		6
MATH 100	College Algebra and	3
MATH 150	Plane Trigonometry	3
Statistics		3
BIOL 198	Principles of Biology	4
BIOL 240	Structure and Function of the Human Body	6
BIOL 220	Bacteriology and Man	3
CHM 210	Chemistry I	4
CHM 230	Chemistry II	4
PHYS 113	General Physics I	4
PHYS 114	General Physics II	4
PE 376	Standard First Aid	1

Any student interested in this program should consult with the pre-physical therapy advisor in the dean's office of the College of Arts and Sciences for details.

Pre-dental hygiene

Students interested in dental hygiene careers can gain the knowledge and competence needed for clinical study in a two-year course of study. Most students who do their first two years at KSU attend programs at either the University of Missouri-Kansas City School of Dentistry or Wichita State University. The following courses are required of students applying for admission to these programs.

ENGL 100	English Composition I	3
ENGL 120	English Composition II	3
SPCH 105	Public Speaking IA	3
Humanities electives		9
PSYCH 110	General Psychology	3
SOCIO 211	Introduction to Sociology	3
Behavioral or social science elective		3
MATH 100	College Algebra	3
BIOL 220	Bacteriology and Man	3
BIOL 240	Structure and Function of the Human Body	6
CHM 110	General Chemistry	5
Electives		

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	English Composition I	3
ENGL 120	English Composition II	3
Literature		3
SPCH 106	Public Speaking I	3

SOCIO 211	Introduction to Sociology	3
PSYCH 110	General Psychology	3
PSYCH 520	Life Span and Personality Development	3
BIOL 198	Principles of Biology	4
BIOL 240	Structure and Function of the Human Body	6
Basic media courses*		3
Social science—humanities elective		3
General electives		8
Total		45

*Must include a tangible art/craft (wood, metal, jewelry, weaving, ceramics, painting, etc.) for at least 2 of the credits. One credit of aerobic dancing, music, etc. is acceptable.

Any student interested in this program should consult with the pre-occupational therapy advisor in the dean's office in the College of Arts and Sciences for details.

Pre-respiratory therapy

Advising is available also for two years of preparatory work for application to respiratory therapy programs.

For more specific information about any of these health care professions, designate which profession(s) interest(s) you have and address your questions to:

Office of the Dean
College of Arts and Sciences
113 Eisenhower
Kansas State University
Manhattan, Kansas 66506

Anthropology

Marvin A. Kaiser,* Head

Professors Finnegan,* O'Brien,* H. Ottenheimer,* and M. Ottenheimer;* Associate Professors Benson* and Taylor;* Adjunct Professors Hay, Hesser, and Michie.

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.

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

Four advanced electives distributed among at least two of the subfields: 12 hours at or above the 500 level.

ANTH 602	Anthropological Theory	3
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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.

Courses in anthropology Undergraduate credit

ANTH 200. Introduction to Cultural Anthropology. (3) I, II S. Introduction to basic anthropological concepts; technological, social, and religious characteristics of nonliterate cultures. ANTH-200-0-2202

ANTH 201. Introduction to Cultural Anthropology, Honors. (4) On sufficient demand. Introduction to basic anthropological concepts; technological, social, and religious characteristics of nonliterate cultures; discussion and independent study. ANTH-201-0-2202

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-202-0-2202

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-220-0-2202

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-260-0-2202

ANTH 280. Introduction to Physical Anthropology. (3) I, II, S. History of research; principles of evolution and human genetics; man's primate relations; fossil evidence of the evolution of hominids; the study of modern race; culture and evolution. ANTH-280-0-2202

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-281-1-2202

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-399-3-4900

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-420-0-2202

ANTH 499. Senior Honors Thesis. (2) On sufficient demand. Open only to seniors in the arts and sciences honors program. ANTH-499-4-2202

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-501-0-2202

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-505-0-2202

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-506-0-2202

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-507-0-2202

ANTH 508. Male and Female: Cross-Cultural Perspectives. (3) I or II. Sex roles and male-female relationships, particularly in non-Western cultures. Stresses sex-role complementarity within the anthropological framework of cultural relativism. Pr.: Sophomore standing. ANTH-508-0-2202

ANTH 510. Kinship and Marriage in Cross-Cultural Perspective. (3) I or II. Systems of family, marriage, descent, and sex tabus in cross-cultural perspective. Pr.: ANTH 200 or SOCIO 211. ANTH-510-0-2202

ANTH 511. Cultural Ecology and Economy. (3) I or II. Cultural ecology and organization in non-Western 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-511-0-2202

ANTH 512. Political Organization in Folk and Nonliterate Cultures. (3) I or II. Anthropological approaches to politics in non-Western societies. Structural-functional, evolutionary, and conflict theories. A comparison of the political systems of small-scale and complex societies: political modernization. Pr.: Sophomore standing. ANTH-512-0-2202

ANTH 515. Creativity and Culture. (3) I or II. How anthropologists view the expressive and creative aspects of culture. A cross-cultural survey of the verbal, visual, and performing arts. Pr.: Sophomore standing. ANTH-515-0-2202

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-519-0-2202

ANTH 520. Senior Seminar. (3) On sufficient demand. Intensive exploration of anthropological problems for both majors and non-majors of sufficient background. High levels of individual participation. Pr.: Senior standing and nine hours of anthropology, or consent of instructor. ANTH-520-0-2202

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-522-3-2202

ANTH 532. Mexican and Central American Indians. (3) I or II. Description and comparison of Tarahumara, Aztec, Maya, Cuna, and other civilizations and nonliterate cultures of Mexico, Central America, and the Caribbean ring. Culture contact and change in surviving tribes. ANTH-532-0-2202

ANTH 533. Indians of Kansas. (3) I, in even years. Description and comparison of aboriginal and post-contact tribes of the prairies and plains of Kansas. Culture contact and change in surviving tribes. Pr.: Sophomore standing. ANTH-533-0-2202

ANTH 536. Black Cultures of the Americas. (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-536-0-2202

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-545-0-2202

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-550-0-2202

ANTH 555. Black Music of the Americas. (3) I or II. Black American music from its roots in Africa to the current styles, emphasizing the cultural contexts in which it developed into such styles as vodun, shango, arhoolies, work songs, shouts, spirituals, blues, jazz, soul, and reggae. Pr.: Junior standing. Same as MUSIC 555. ANTH-555-0-2202

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. ANTH-570-0-2202

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-600-0-2202

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-602-0-2202

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 nonliterate and folk cultures; cultural change and personality. Pr.: Three hours of anthropology or consent of instructor. ANTH-604-0-2202

ANTH 616. Music and Culture. (3) I or II. Music as an aspect of human behavior. Exploration of structural and functional relationships between music and other aspects of culture. Style area survey. Pr.: ANTH 200 or consent of instructor. ANTH-616-0-2202

ANTH 618. Religion in Culture. (3) II. The nature of religion in different cultural systems. Pr.: ANTH 200 or SOCIO 211 or consent of instructor. Same as SOCIO 618. ANTH-618-0-2202

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-625-3-2202

ANTH 630. Indians of North America. (3) I, in odd years. Aboriginal cultures of Canada and the United States; culture contact and change among surviving groups. ANTH-630-0-2202

ANTH 633. Gender, Power, and International Development. (3) II, in odd 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 three additional hours in sociology or cultural anthropology. Same as SOCIO 633. ANTH-633-0-2202

ANTH 634. Indian Cultures of South America. (3) On sufficient demand. A survey of the nature and variability of the aboriginal cultures of South America. Analysis of sample cultures, stressing economic, social, political, and religious structures. ANTH-634-0-2202

ANTH 673. Precolumbian Civilizations of Mexico and Guatemala. (3) I or II. Early man, the beginnings of agriculture; the rise of civilization; the classic empires of the Maya, Aztec, Tarascans, and their neighbors; relationships with the southeastern and southwestern United States. Pr.: ANTH 200 or 260, or consent of instructor. ANTH-673-0-2202

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 Mediter-

ranean civilizations. Pr.: ANTH 200, 260, or consent of instructor. ANTH-676-0-2202

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, 8:00-5:00, while weather permits, laboratory work thereafter. Pr.: Consent of instructor. ANTH-679-1-2202

ANTH 685. Race and Culture. (3) I, in odd years. 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-685-0-2202

ANTH 688. Fossil Man and Human Evolution. (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-688-0-2202

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 man in the context of the primate order. Pr.: ANTH 280 or consent of instructor. ANTH-691-0-2202

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-694-0-2202

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-695-1-2202

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-730-1-2202

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-736-0-2202

ANTH 792. Field Methods in Linguistics. (3) On sufficient demand. An introduction to techniques of collecting and analyzing linguistic data in the field. Work with non-Western informants in class. Pr.: Consent of instructor. Same as SPCH 792 and MLANG 792. ANTH-792-0-2202

Art

Charles Stroh,* Head

Professors Garzio,* Larmer,* Pujol,* and Stroh;* Associate Professors Culley,* Ikeda,* Munce,* Rex Replogle,* Sturr,* Woodward,* and Vogt;* Assistant Professors Clore, Dollar, Harmes, Kren,* Love,* Noblett,* O'Shea,* Routson,* Schmidt,* Swiler,* and Winegardner; Instructors Hagan, Ogg, and Renata Replogle; Emeriti: Associate Professor Hill; Assistant Professor Geiger.

Undergraduate study

Bachelor of arts. The B.A. degree in art consists of three parts: the general education as 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 which 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, and 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
*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 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-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
Total		75

*Courses with asterisk are to be completed before declaration of a major area of concentration.

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 completion of specified courses in the College of Education. Art students may enroll in Introduction to Civilization of South Asia as a humanities requirement. See the Academic Programs section for 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. Preparation for graduate work leading to certification as an art therapist may be done as one concentration

in the regular B.F.A. program. The pre-art therapy concentration is the B.F.A. degree with the major concentration (20 credit hours) and the art electives (16 credit hours) selected from a group of specific courses in psychology and art rather than a particular study concentration.

Transfer students

Art hours transferred to KSU 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.

Graduate study

Work leading to the master of fine arts is offered in the Department of Art in drawing, painting, printmaking, sculpture, ceramics, and metalsmithing and jewelry.

Candidates for graduate work should have completed an undergraduate curriculum with a broad background in art. Students lacking preparation in certain areas may be asked to do additional work. Other requirements for the master of fine arts degree include a minimum of 60 semester hours, approximately two-thirds of which will be in the field of concentration. The candidate is also required to complete two graduate seminars and supporting courses in the study of art history.

The candidate will take an oral examination based in part on the academic thesis submitted. The studio project for the thesis will consist of a significant creative effort in the candidate's chosen major medium, which must be publicly exhibited, and a written document providing an analysis of that work.

Courses in art

ART 095. Art Assembly. (0) I, II.

Recommended for all art and art education majors each semester. By appt. ART-095-2-0831

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-100-1-1002

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-190-1-0-1002

ART 195. Survey of Art History I. (3) I, S. Historical development of art from pre-history through the Middle Ages. ART-195-0-1003

ART 196. Survey of Art History II. (3) II, S. Historical development of art from the Renaissance to the nineteenth century. ART-196-0-1003

ART 200. Design II. (2) I, II, S. Further work in the principles and elements of design, with emphasis on color, texture, and pictorial composition. Four hours lab. Pr.: ART 100. ART-200-1-0-1002

ART 205. Graphic Design Techniques. (2) I, II, S. 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-205-1-0-1002

ART 210. Drawing II. (2) I, II, S. Continuation of Drawing I, with strong emphasis on creative expression. Four hours lab. Pr.: ART 100, 190. ART-210-1-0-1002

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-215-1-0-1002

ART 220. Water Color I. (2) I, II, S. 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-220-1-0-1002

ART 225. Figure Drawing I. (2) I, II, S. 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-225-1-0-1002

ART 230. Sculpture I. (2) I, II, S. 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-230-1-0-1002

ART 235. Printmaking I. (2) I, II, S. 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-235-1-0-1002

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-240-1-0-1002

ART 245. Painting I. (2) I, II, S. Introduction to painting through a variety of media and techniques. Four hours lab. Pr.: ART 100, 190. ART-245-1-0-1002

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-250-1-0-1002

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-255-1-0-1002

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-260-1-0-1002

ART 265. Ceramics I. (2) I, II, S. 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-265-1-0-1002

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. ART-270-1-0-1002

ART 275. Weaving I. (2) I, II, S. 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-275-1-0-1002

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-280-2-0831

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-290-1-0-1002

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-295-1-0-1002

ART 300. Special Studies in Art. (1, 2) I, II, S. Specialized workshops or seminars conducted in studio, art therapy, art education, or art history. ART-300-2-1001

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-305-0-1003

ART 310. Sophomore Honors Seminar in Art. (3) Selected topics in art. Pr.: For students in the honors program only. ART-310-0-1002

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-410-1-0-1002

ART 420. History of South Asian Art. (3) I, II. A survey of the history of art in the South Asian subcontinent from its prehistoric origins to the height of the Mughal period in the eighteenth century A.D. Mythological, symbolic, tantric, and religious dimensions of South Asian art are studied as well as regionally important technical and aesthetic aspects. Includes the art of India, Pakistan, Bangladesh, Nepal, Sri Lanka, Afghanistan, Indonesia, and Indochina. ART-420-0-1003

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-425-1-0-0831

ART 430. Independent Study—Ceramics. (1-5) I, II, S. Work in ceramics after competency has been achieved. Personal development is emphasized. ART-430-3-1002

ART 435. Independent Study—Crafts. (1-5) I, II, S. Work in crafts after competency has been achieved. Personal development is emphasized. ART-435-3-1002

ART 440. Independent Study—Drawing. (1-5) I, II, S. Work in drawing after competency has been achieved. Personal development is emphasized. ART-440-3-1002

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-445-3-1002

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-450-3-1002

ART 455. Independent Study—Painting. (1-5) I, II, S. Work in painting after competency has been achieved. Personal development is emphasized. ART-455-3-1002

ART 460. Independent Study—Printmaking. (1-5) I, II, S. Work in printmaking after competency has been achieved. Personal development is emphasized. ART-460-3-1002

ART 465. Independent Study—Sculpture. (1-5) I, II, S. Work in sculpture after competency has been achieved. Personal development is emphasized. ART-465-3-1002

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-470-3-1002

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 ART 196. ART-545-0-1003

ART 550. Twentieth Century Art History II. (3) II. Origins and development of twentieth century art from 1914 to 1950. Pr.: ART 195 or ART 196. ART-550-0-1003

ART 560. Art for Exceptional Children. (3) I, II, S. Using art concepts 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 EDCI 560. ART-560-0-0831

ART 565. Ceramics II. (3) I, II, S. 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-565-1-0-1002

ART 570. Painting II. (3) I, II, S. 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-570-1-0-1002

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-575-1-0-1002

ART 585. Crafts for Children. (3) II. Studio experiences in crafts for elementary school age children. Emphasis will be on creative development with craft materials and processes. Pr.: ART 170 and consent of instructor. ART-585-1-0-1002

ART 602. Art since 1950. (3) I, II, S. 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 ART 196. ART-602-0-1003

ART 604. Greek Art History. (3) I, II, S. The art of classical Greece, from its Aegean origins through the Hellenistic period. Pr.: ART 195 or ART 196. ART-604-0-1003

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-612-0-1003

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 ART 196. ART-622-0-1003

ART 632. The Development of American Art. (3) I, II, S. 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 ART 196. ART-632-0-1003

ART 634. History of Modern Sculpture. (3) I, II, S. Directions in sculpture since the time of Rodin. Pr.: ART 195 or ART 196. ART-634-0-1003

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 ART 196. ART-642-0-1003

ART 654. Women in Art. (3) I, II, S. The work of women artists from early Middle Ages to the twentieth century, with emphasis on the contemporary period. Pr.: ART 195 or ART 196. ART-654-0-1003

ART 662. Southwestern Indian Arts and Culture. (3) I, II, S. The development of southwestern Indian silversmithing, weaving, pottery, basketry, and painting from the prehistoric period through the twentieth century. Pr.: ART 195 or ART 196. ART-662-0-1003

Undergraduate and graduate credit

ART 600. Advanced Drawing. (3-5. Credits over three hours must be approved by the instructor.) I, II, S. Upper-level drawing course with increased demands placed on the individual's manual abilities, conceptual 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-600-1-0-1002

ART 605. Ceramic Kilns (2) On sufficient demand. Principles in design, construction, and the use of various fuels in the operation of up-draft, down-draft, and cross-draft kilns with single and multiple chambers. Pr.: ART 265. ART-605-1-0-1002

ART 610. Figure Drawing II. (3) I, II, S. Continuation of Figure Drawing I, with emphasis on individual expression. Six hours lab. May be taken for four semesters. Pr.: ART 225. ART-610-1-0-1002

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-615-1-0-1002

ART 620. Water Color II. (3) I, II, S. 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-620-1-0-1002

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-625-3-1002

ART 630. Lithography. (3) I, II, S. Advanced work in lithography. Six hours lab. May be taken for four semesters. Pr.: ART 235 (emphasis on lithography). ART-630-1-0-1002

ART 635. Printmaking II. (3) I, II, S. Advanced work in blockprints, serigraphy, lithography, and intaglio. Six hours lab. May be taken for four semesters. Pr.: ART 235. ART-635-1-0-1002

ART 645. Sculpture II. (3) I, II, S. 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-645-1-0-1002

ART 650. Painting III. (3-5) I, II, S. 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-650-1-0-1002

ART 655. Metalsmithing Techniques. (3) I, II, S. 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-655-1-0-1002

ART 660. Sculpture III. (3-5) I, II, S. 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 580. ART-660-1-0-1002

ART 665. Ceramics III. (3) 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-665-1-0-1002

ART 670. Ceramics IV. (2) I, II. Clay and glaze analysis and calculations. Study of raw materials and their characteristics as used in clay and glaze formulations. One hour lec. and two hours lab. Pr.: ART 665. ART-670-1-0-1002

ART 675. History of Ceramics. (3) 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-675-0-1003

ART 680. Metals Workshop. (3-5) I, II, S. 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-680-1-0-1002

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-685-3-1002

ART 690. Techniques in Teaching Art. (Var.) I, S. 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-690-0-0831

ART 695. Topics in Art History. (Var.) I, II, S. Independent exploration in selected problems in art history. Pr.: Twelve hours art history. ART-695-3-1003

Graduate credit

ART 825. Seminar in Art. (2) Selected topics dealing with historical, conceptual, or philosophical issues in the visual arts. May be repeated. Pr.: Graduate standing. ART-825-4-1002

ART 830. Graduate Sculpture Studies. (Var.) I, II, S. Advanced creative work with emphasis on technical and visual research. ART-830-3-1002

ART 835. Graduate Drawing Studies. (Var.) I, II, S. Advanced creative work with emphasis on technical and visual research. ART-835-3-1002

ART 845. Graduate Painting Studies. (Var.) I, II, S. Advanced creative work with emphasis on technical and visual research. ART-845-3-1002

ART 855. Graduate Printmaking Studies. (Var.) I, II. Advanced creative work with emphasis on technical and visual research. ART-855-3-1002

ART 865. Graduate Ceramics Studies. (Var.) I, II. Advanced creative work with emphasis on technical and visual research. ART-865-3-1002

ART 875. Graduate Metalsmithing and Jewelry Studies. (Var.) I, II, S. Advanced creative work with emphasis on technical and visual research. ART-875-3-1002

ART 885. Graduate Independent Study. (1-5) I, II, S. Advanced individual work offered in studio areas of ceramics, graphic design, drawing, painting, printmaking, sculpture, and metalsmithing and jewelry. ART-885-3-1002

ART 899. Research in Art. (Var.) I, II, S. Research which may form the basis for the master's of fine art thesis or report. ART-899-4-1002

Biochemistry

David J. Cox,* Head

Professors Burkhard,* Cox,* Davis,* Hedgcoth,* Klopfenstein,* Koepp,* Kramer,* Reeck,* and Roche,* Associate Professors Cunningham,* Mueller,* and Muthukrishnan,* Assistant Professors Krishnamoorthi,* Ochs,* and D. Takemoto,* Emeriti: Professors Clegg, Mitchell, Nordin, Parrish, and Ruliffson.

Biochemistry bridges the disciplines of biology and chemistry. A sound foundation in both disciplines as well as appropriate courses in calculus and physics are required. The aims of biochemistry are to provide an understanding of the structural and functional relationships of chemical constituents of cells and the role that they play in the processes of life.

Undergraduate study

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 in graduate biochemistry training programs.

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 and	5
CHM 250	Chemical Principles II	5
	or	
CHM 210	Chemistry I and	4
CHM 230	Chemistry II and	4
CHM 271	Chemical Analysis	4
CHM 531	Organic Chemistry I	3
CHM 532	Organic Chemistry Laboratory	2
CHM 550	Organic Chemistry II	3
BIOCH 755	Biochemistry I	3
BIOCH 765	Biochemistry II	3
BIOCH 522	General Biochemistry Laboratory ..	2
MATH 220	Analytic Geometry and Calculus I ..	4
MATH 221	Analytic Geometry and Calculus II	4
	General Physics I	4
PHYS 113	General Physics II	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.

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 and	5
CHM 250	Chemical Principles II	5
	or	
CHM 210	Chemistry I and	4
CHM 230	Chemistry II and	4
CHM 271	Chemical Analysis	4
CHM 531	Organic Chemistry I	3
CHM 532	Organic Chemistry Laboratory	2
CHM 550	Organic Chemistry II	3
BIOCH 755	Biochemistry I	3
BIOCH 765	Biochemistry II	3
BIOCH 756	Biochemistry I Laboratory	2
BIOCH 766	Biochemistry II Laboratory	2
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 and	5
PHYS 214	Engineering Physics II	5
	or	
PHYS 113	General Physics I and	4
PHYS 114	General Physics II	4
BIOL 198	Principles of Biology	4
	Biological science electives	8
	Biology, statistics, or computer science elective	3-4
	One year of modern language. French, German, or Russian is recommended for those interested in graduate studies.	

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.

Graduate study

The Department of Biochemistry, as a participant in the interdepartmental Graduate Biochemistry Group, offers work leading to the master of science and doctor of philosophy degrees with majors in biochemistry. See the Graduate School section for further details.

The Department of Biochemistry also participates in interdepartmental programs in food science leading to the master of science and doctor of philosophy degrees with majors in food science. See the Graduate School section for further details.

Courses in biochemistry

Undergraduate credit

BIOCH 100. Biochemistry Orientation. (1) I. Discussion of biochemistry as a discipline in the life sciences. BIOCH-100-0-0414

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-101-0-0414

BIOCH 110. Biochemistry and Society. (3) II. 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-110-0-0414

BIOCH 120. Introductory Organic and Biological Chemistry. (5) I, II, S. 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-120-1-0414

BIOCH 201. Elementary Biochemistry. (3) I, II. An elementary treatment of the chemistry and metabolism of carbohydrates, lipids, proteins, and nucleic acids. Pr.: CHM 190. BIOCH-201-0-0414

BIOCH 202. Elementary Biochemistry Laboratory. (2) I, II. A laboratory course to accompany BIOCH 201. Six hours lab a week. Pr.: BIOCH 201 or conc. enrollment. BIOCH-202-1-0414

BIOCH 290. Biochemistry Seminar. (0-3) I, II. Lectures, discussions, and activities of biochemical interest. BIOCH-290-0-0414

BIOCH 300. Sophomore Honors Seminar in Biochemistry. (3) II. 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-300-0-4900

BIOCH 499. Senior Honors Thesis. (2) I, II, 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. BIOCH-499-4-0414

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-521-0-0414

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. BIOCH-522-1-0414

BIOCH 525. General Plant Biochemistry Laboratory. (2) I. A general one-semester laboratory course with experiments relating to carbohydrates, lipids, pigments, proteins, and enzymes found in plant systems, with a strong emphasis on metabolic pathways and processes unique to plants. One hour rec. and five hours lab a week. Pr.: BIOCH 521 or conc. enrollment. BIOCH-525-1-0414

Undergraduate and graduate credit

BIOCH 700. Advanced Topics in Plant Biochemistry. (3) I; 1988-89 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-700-0-0414

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-755-0-0414

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-756-1-0414

BIOCH 765. Biochemistry II. (3) II. 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-765-0-0414

BIOCH 766. Biochemistry II Laboratory. (2) II. A continuation of CHM 756. Six hours lab a week. Pr.: *BIOCH 756 and 765 or conc. enrollment. BIOCH-766-1-0414

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-790-1-0414

BIOCH 799. Problems in Biochemistry. (Var.) I, II, S. Problem may include laboratory and/or library work in various phases of biochemistry, agricultural chemistry, or nutrition. Pr.: *Background adequate for problem undertaken. BIOCH-799-3-0414

Graduate credit

BIOCH 806. Biochemistry Seminar. (0-1) I, II. Seminar for graduate students in biochemistry. BIOCH-806-0-0414

BIOCH 840. Intermediary Metabolism. (3) II, S. On sufficient demand. Metabolic role of carbohydrates, lipids, proteins and amino acids, purines, pyrimidines, vitamins, minerals, and hormones; biological oxidations: mechanisms of

energy production and utilization. Pr.: *BIOCH 755 and 765. BIOCH-840-0-0414

BIOCH 845. Hormones. (3) I; 1988-89 and alternate years or on sufficient demand. The structure, biosynthesis, biochemical role, metabolism, and interrelations of hormones in vertebrates and invertebrates. Pr.: BIOCH 765. BIOCH-845-0-0414

BIOCH 899. Research in Biochemistry I. (Var.) I, II, S. Research in biochemistry which may be used for preparation of the M.S. thesis. Pr.: Sufficient training for research undertaken. BIOCH-899-4-0414

BIOCH 910. Lipids. (2) II; 1989-90 and alternate years. Chemistry of plant and animal lipids, their occurrence, metabolism, and industrial uses. Pr.: *BIOCH 765. BIOCH-910-0-0414

BIOCH 920. Nucleic Acids. (2) II; 1989-90 and alternate years. Structure and function of nucleic acids: structures and properties of DNA, RNA, and chromatin; recombinant DNA techniques; mutagenesis and carcinogenesis; protein-nucleic acid interactions; structural influences on replication, transcription, translation, and regulation. Pr.: BIOCH 765. BIOCH-920-0-0414

BIOCH 930. Proteins. (2) I; 1989-90 and alternate years. Lectures and readings on the chemical nature of proteins; fractionation; purification, structure, chemical and physical properties of proteins and amino acids. Pr.: *BIOCH 756 and 765. BIOCH-930-0-0414

BIOCH 940. Chemistry of Carbohydrates. (2) I; 1988-89 and alternate years. Lectures and readings on structural chemistry of carbohydrates, their general properties, biological and chemical reactions, and the methods of characterization. Pr.: *BIOCH 756 and 765. BIOCH-940-0-0414

BIOCH 950. Enzyme Chemistry. (3) II; 1988-89 and alternate years. The following properties of enzymes are considered: structure, specificity, catalytic power, mechanism of action, multienzyme complexes, kinetics, regulation and pacemaker properties in multienzyme systems. Pr.: *BIOCH 765. BIOCH-950-0-0414

BIOCH 999. Research in Biochemistry II. (Var.) I, II, S. Research in biochemistry which may be used for preparation of the Ph.D. thesis. Pr.: Sufficient training for research undertaken. BIOCH-999-4-0414

*Nonmajors lacking these prerequisites should obtain consent of instructor before enrollment.

Division of Biology

T. C. Johnson, Director

Professors Barkley,* Bode,* Conrad,* Consigli,* Denell,* Fina,* Iandolo,* T. Johnson,* Kramer,* Robel,* Roufa,* C. Smith,* Spooner,* Sutton, Wong,* and Zimmerman,* Associate Professors Center,* Guikema,* Kaufman,* Klaassen,* Marchin,* Reichman,* Rintoul,* Takemoto,* Tomb,* Urban,* Weis,* Williams,* and Wilson,* Assistant Professors Chapes,* Fortner,* Hartnett,* Knapp, Perchellet,* Seastedt,* A. Smith, Upton,* and Welti,* Instructors Hook and Paulsen; Emeriti: Professors Goodrich,* Hansen,* Pady,* and Pittenger,* Associate Professors Lockhart* and McCracken,* Instructor Kundiger.

Undergraduate study

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 may select a program leading to a B.A. or B.S. degree.

In addition to the general requirements of the College of Arts and Sciences, courses required for a bachelor's degree in biology are:

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

Plus 15 hours of elective credits taken in the Division of Biology (number 400 or higher) which must include two courses providing a laboratory experience.

The following courses given by other departments also are required:

PHYS 113	General Physics I and	4
PHYS 114	General Physics II	4
	or	
PHYS 213	Engineering Physics I and	5

PHYS 214	Engineering Physics II	5
MATH 220	Analytic Geometry and Calculus I	4

Note: MATH 100, 150, or two years of high school algebra and one semester of trigonometry are prerequisite to MATH 220, Analytic Geometry and Calculus I.

CHM 210	Chemistry I	4
CHM 230	Chemistry II	4
CHM 350	General Organic Chemistry and	3
CHM 351	General Organic Chemistry Laboratory	2
	or	
CHM 531	Organic Chemistry I and	3
CHM 532	Organic Chemistry I Laboratory	2
BIOCH 521	General Biochemistry	3
	or	
BIOCH 655	Biochemistry I	3
BIOCH 665	Biochemistry II	3

Students contemplating graduate school are encouraged to take additional work in mathematics, computer science, statistics, and a modern foreign language.

Microbiology degree

The degree may be either a B.A. or a B.S. depending upon which electives are chosen by the student and advisor. The major in microbiology consists of the general requirements of the College of Arts and Sciences, plus the following courses in the Division of Biology:

BIOL 198	Principles of Biology	4
BIOL 555	Microbiology	5
BIOL 610	Bacteriology of Human Diseases	5
BIOL 670	Immunology	4
BIOL 675	Genetics of Microorganisms	3
BIOL 690	Microbial Physiology Lecture	3
BIOL 691	Microbial Physiology Laboratory	2
BIOL 730	General Virology	3

Plus eight additional hours of microbiology of the student's choice. Only one hour of practicum credit may be counted as elective biology hours toward the microbiology degree.

The following courses given by other departments also are required:

MATH 220	Analytic Geometry and Calculus I	4
CHM 210	Chemistry I	4
CHM 230	Chemistry II	4
CHM 271	Chemical Analysis	4
CHM 350	General Organic Chemistry and	3
CHM 351	General Organic Chemistry Lab	2
	or	
CHM 531	Organic Chemistry I and	3
CHM 532	Organic Chemistry I Lab	2
CHM 550	Organic Chemistry II	3
BIOCH 521	General Biochemistry Lecture	3
	or	
BIOCH 655	Biochemistry I	3
BIOCH 665	Biochemistry II	3
PHYS 113	General Physics I	4
PHYS 114	General Physics II	4

Students contemplating graduate school should also consider taking a modern foreign language.

Fisheries and wildlife biology

This curriculum has three options: fisheries biology, wildlife biology, and general. In addition to (or in place of Public Speaking only) the requirements of the College of Arts and Sciences, these courses are required in each of the options.

From the Division of Biology:

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
BIOL 555	Microbiology	5

These courses from other departments also are required for each option:

PHYS 113	General Physics I	4
PHYS 114	General Physics II	4
STAT 340	Biometrics I	3
MATH 220	Analytic Geometry and Calculus I	4

Note: MATH 100, 150, or two years of high school algebra and one semester of trigonometry are prerequisite to MATH 220, Analytic Geometry and Calculus I.

CHM 210	Chemistry I	4
CHM 230	Chemistry II	4
CHM 350	General Organic Chemistry	3
CHM 351	General Organic Chemistry Laboratory	2
SPCH 106	Public Speaking I	3
AGRON 305	Soils	4

Additional requirements for the fisheries biology option:

STAT 341	Biometrics II	3
BIOL 550	Lower Plants	3
BIOL 542	Ichthyology	3
BIOL 696	Fisheries Management	4
BIOL 680	Aquaculture	3
BIOL 470	Introductory Limnology	4
BIOL 513	Physiological Adaptations Animals	3
BIOL 514	Physiological Adaptations Animals Lab	1

Additional requirements for the wildlife biology option:

STAT 341	Biometrics II	3
BIOL 551	Taxonomy of Flowering Plants	4
BIOL 543	Ornithology	3
BIOL 544	Mammalogy	3
BIOL 684	Wildlife Management	3
BIOL 685	Wildlife Management Techniques	3
ENTOM 312	Entomology	2
ENTOM 313	Entomology Laboratory	1
BIOL 513	Physiological Adaptations Animals	3
BIOL 514	Physiological Adaptations Animals Lab	1
Plant science electives 300 or above level		3

Additional requirements for the general option:

BIOL 684	Wildlife Management	3
BIOL 500	Plant Physiology	4
	or	
BIOL 513	Physiological Adaptations Animals and	3
BIOL 514	Physiological Adaptations of Animals Laboratory	1
Plant science electives 300 or above level		3
Fisheries electives		3
BIOL 542	Ichthyology	3
BIOL 543	Ornithology	3
BIOL 544	Mammalogy	3

The minimum requirements for graduation under the general option do not qualify the student for certification as either a wildlife biologist or fisheries biologist for federal employment nor do they qualify the student for professional certification by The Wildlife Society or the American Fisheries Society. Students electing this option who wish to qualify for one or more of these certification programs should consult their

academic advisors about the additional courses needed for such certification.

Professional and pre-professional curricula

Students preparing to seek admission to medical, dental, veterinary, or similar professional schools may major in biology (or other academic discipline) provided the specific pre-professional requirements are met. Such students are encouraged to contact the appropriate pre-professional advisor in the dean's office as early in their academic careers as possible. This will permit the planning of a proper academic program for the students' professional goals.

The Division of Biology is intimately associated with several professional programs which are officially organized by the office of the dean of the College of Arts and Sciences. These programs are physical therapy, medical technology, pre-nursing, and a degree program in medical technology. Students with professional interests in these fields should contact either the Division of Biology office or the dean's office.

Special advisement is offered in connection with the College of Education for students preparing to be biology teachers in the secondary schools. For specific certification requirements in secondary education, please see the education section of this catalog.

Graduate study

The division offers both the M.S. and the Ph.D. in numerous areas of biology. Degrees are specifically offered in biology and microbiology and through interdepartmental programs in animal breeding, biochemistry, and genetics. Graduate programs in the division generally relate to one of the five sections into which the division faculty is divided according to research interests and teaching interactions. These are: molecular biology and genetics, microbiology and immunology, developmental biology and physiology, systematics and ecology, and virology and oncology.

Graduate students may establish research advisory committees with faculty members from several of these sections as well as from appropriate departments outside of biology, thereby gaining a considerable latitude of expertise in developing the program of study. It should be noted that a graduate student's education is self-determined in consultation with the major professor and advisory committee; therefore the program of study is always designed to fit the student's particular interests and needs.

Courses in biology

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-101-1-0401

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-107-0-0401

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-198-1-0401

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-201-1-0401

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-210-1-0402

BIOL 220. Bacteriology and Man. (3) I, II. Fundamental concepts of microbial activities, the techniques for studying them, modes of action, role in natural and man-made ecosystem, with special emphasis on relationships to man. Not for biology or microbiology majors. Two hours lec. and three hours lab a week. Pr.: One course in biology, one course in chemistry. BIOL-220-0-0403

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-222-1-0499

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 nonbiology majors. Four hours lec. and two three-hour lab sessions a week. Pr.: BIOL 198. BIOL-240-1-0410

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-303-0-0420

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-310-0-0401

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-320-0-0402

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-365-2-0401

BIOL 397. Topics in Biology. (1-6) I, II, S. Pr.: Consent of instructor. BIOL-397-2-0401

BIOL 399. Honors Seminar in Biology. (1-3) II. Selected topics. Open to nonmajors in the honors program. BIOL-399-0-4900

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-400-0-0422

BIOL 405. Developmental Biology of Animals and Plants. (3) I. Developmental biology and embryology of lower vertebrates, invertebrates, and representative plants. Consideration and comparison of the basic events in their embryogenesis, together with discussion of some mechanisms. A basic course in developmental biology, emphasizing different organisms than those discussed in Embryology (BIOL 510). Does not fulfill pre-vet requirements for higher vertebrate embryology. Pr.: BIOL 198. BIOL-405-0-0427

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-410-0-0417

BIOL 415. Genetic Engineering. (2) I. An introduction to the molecular basis of genetic engineering and a broad coverage of recombinant DNA techniques. Emphasis on the contribution of genetic engineering to agriculture and health related programs. Pr.: Two courses in biology and two courses in chemistry. BIOL-415-0-0416

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-430-0-0420

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-433-0-0107

BIOL 470. 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 198. BIOL-470-1-0420

BIOL 495. Topics in Biology. (1-6) I, II, S. Pr.: Consent of instructor. BIOL-495-2-0401

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 three hours credit. Pr.: Sophomore standing, membership in the honors program of the College of Arts and Sciences, and permission of instructor. BIOL-496-3-4900

BIOL 497. Senior Honor Thesis. (2) I, II, S. Open only to seniors in the arts and sciences honors program. BIOL-497-3-4900

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 BIOL 210; and a course in organic chemistry. BIOL-500-1-5-0406

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-505-1-0412

BIOL 510. Embryology. (3) II. Developmental anatomy and physiology of reproduction of birds and mammals. Three hours lec. a week. Pr.: BIOL 198. BIOL-510-1-0427

BIOL 511. Embryology Laboratory. (1) II. One three-hour lab a week. Pr.: BIOL 510 or conc. enrollment. BIOL-511-1-0427

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-513-0-0410

BIOL 514. Physiological Adaptations of Animals Laboratory. (1) I. One three-hour lab a week. Pr.: Conc. enrollment in BIOL 513. BIOL-514-1-0-0410

BIOL 520. Microbiology of Foods. (4) I. Microbial phenomena involved in the bacteriology and sanitation of foods. Two hours rec. and four hours lab a week. Pr.: BIOL 555 or equiv. BIOL-520-1-0411

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-526-1-5-0410

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-529-0-0420

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-540-0-0416

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-541-0-0417

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-542-1-0407

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-543-1-0407

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-544-1-0407

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-545-0-0411

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-546-1-0411

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-547-1-3-0407

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-550-1-0402

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. BIOL-551-1-0402

BIOL 555. Microbiology. (5) I, II. Microorganisms; their morphology, physiology, classification, and importance. Three hours lec. and four hours lab a week. Pr.: One course in biology and a course in organic chemistry. BIOL-555-1-0411

Undergraduate and graduate credit

BIOL 610. Bacteriology of Human Diseases. (5) I. Three hours lec. and six hours lab a week. Pr.: BIOL 555 or equiv. BIOL-610-1-0411

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-615-1-3-0422

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-620-0-0422

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-625-1-0411

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-631-0-0420

BIOL 632. Ecology Laboratory. (1) II. Laboratory and field experiences with ecological problems. Pr.: STAT 340 or equiv., BIOL 631 or conc. enrollment. BIOL-632-1-0420

BIOL 634. Soil Microbiology. (3) I. Microbial population of the soil and its role in soil fertility. Pr.: BIOL 555 or equiv.; CHM 351 or equiv. BIOL-634-1-0411

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-645-2-0401

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-655-1-3-0422

BIOL 667. Neurobiology. (4) I. Neuronal mechanisms of coordination in animals, with emphasis on neuronal mechanisms underlying behavior in simple systems. Two hours lec. and two three-hour labs a week. Pr.: BIOL 541. BIOL-667-1-0425

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-670-0-0411

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-671-1-0411

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 555. BIOL-675-0-0422

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-680-1-0107

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-684-0-0107

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-685-1-0107

BIOL 690. Microbial Physiology. (3) II. The study of bacteria as an integrated biochemical system emphasizing how the biochemical aspects serve the functional properties of cells. Pr.: BIOL 555; and BIOCH 521 or 755. BIOL-690-0-0411

BIOL 691. Microbial Physiology Laboratory. (2) II. Examination of microbial processes by biological and biochemical methods. Six hours a week. Pr.: Conc. enrollment in BIOL 690. Enrollment of students in curricula other than microbiology is by permission of instructor. BIOL-691-1-0411

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-696-1-0107

BIOL 697. Topics in Biology. (1-6) I, II, S. Pr.: Consent of instructor. BIOL-697-2-0401

BIOL 698. Problems in Biology. (1-8) I, II, S. Pr.: Consent of instructor. BIOL-698-3-0401

BIOL 699. Undergraduate Seminar in Biology. (1) I, II. Pr.: Consent of instructor. BIOL-699-2-0401

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-702-1-0423

BIOL 704. Introductory Mycology. (4) I. Comparative morphology, classification, and life cycles of the fungi. Two hours lec. and six hours lab a week. Pr.: BIOL 201 or 210. BIOL-704-1-0411

BIOL 710. Endocrinology. (3) II. 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-710-0-0410

BIOL 715. Ecological Impact Assessment. (3) I, in even years. Solving problems involving the effect of human activity on the biological environment. Students will identify factors of biological concern and make impact predictions. Pr.: Two 400-level courses in two of the following fields: biological, physical, agricultural, geological, or geographical sciences or equiv. BIOL-715-0-0420

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 555 or equiv.; and BIOCH 521 or equiv.; consent of instructor. BIOL-730-1-0411

BIOL 735. Human Oncology. (3) II. 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-735-0-0408

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-740-1-0402

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-755-1-0417

Graduate credit

BIOL 800. Advanced Plant Physiology I. (3) II, in even years. Modern concepts and research in plant physiology. Respiration, photosynthesis, and water relations of plants. Pr.: An introductory plant physiology course or general biochemistry. BIOL-800-0-0406

BIOL 801. Advanced Plant Physiology II. (3) II, in odd years. Modern concepts and research in plant physiology. Mineral nutrition, translocation, growth, and development of plants. Pr.: An introductory plant physiology course or general biochemistry. Previous enrollment in BIOL 800 is not required. BIOL-801-0-0406

BIOL 805. Advanced Mycology. (3) II, in even years. Study of fungi, with emphasis on structure, identification, classification, phylogeny, and economic importance. One hour lec. and six hours lab a week. Pr.: BIOL 704. BIOL-805-1-0411

BIOL 810. Growth Regulation in Prokaryotes. (2) I, in even years. The nature, dynamics, and regulation of cell growth and the cell cycle in prokaryotes. Pr.: BIOL 555; and BIOCH 755 or equiv. BIOL-810-0-0411

BIOL 815. Plasmid Biology. (2) II, in odd years. The current status of extrachromosomal inheritance in prokaryotic cells. Pr.: BIOL 555; and BIOCH 755 or equiv. BIOL-815-0-0411

BIOL 820. The Lytic Bacteriophages. (2) II, in even years. The regulation of gene expression as revealed through genetic and biochemical methods. Emphasis will be upon phages T4, T7, T5, and N4 of *Escherichia coli* and SP01 and PBS2 of *Bacillus subtilis*. Pr.: BIOL 555; and BIOCH 755 or equiv. BIOL-820-0-0411

BIOL 825. Evolution of Animal Behavior. (4) II, in even years. The study of mechanisms, ontogeny, and evolution of behavior stressing the adaptive nature of behavior. Two hours lec., one hour of discussion on assigned readings, and two to three hours lab a week. Lab format will be individual research projects requiring independent research skills. Pr.: BIOL 430 or equiv. BIOL-825-1-5-0420

BIOL 826. Nutrient Dynamics. (3) II, in odd years. The cycling of elements in ecosystems with emphasis on macronutrients such as nitrogen, phosphorous, and major cations, and the influence of variables such as acid rain on nutrient dynamics. Two hours lec. and two hours lab a week. Pr.: BIOL 529 and CHEM 210. BIOL-826-1-5-0424

BIOL 830. Advanced Virology. (4) I. Application of current biochemical, biophysical, and biological techniques to the study of viruses, including bacterial viruses (bacteriophage), animal viruses, and plant viruses. Pr.: BIOL 730 and consent of instructor. BIOL-830-1-0411

BIOL 840. Molecular Immunology. (3) I, in even years. Lectures and readings covering the chemical and physical properties of antibodies. Pr.: BIOL 670 or equiv.; and consent of instructor. BIOL-840-0-0411

BIOL 850. Advanced Topics in Immunology. (1-2) I, II. Current research in immunology. Pr.: BIOL 670 and consent of instructor. BIOL-850-3-0411

BIOL 855. Molecular Biology of Cellular Membranes. (3) I. A general coverage of membranes with respect to theories of structure, chemical and physical methods

of study, methods of isolation, transport mechanisms, assembly and function of components, and receptors. Some specific membrane systems will be covered in detail including a review of recent references. Pr.: BIOL 541 and BIOCH 521. BIOL-855-0-0417

BIOL 858. Regulation of Gene Expression. (3) II. An analysis of the mechanisms controlling the expression of genetic information in biological systems of varying complexity. Emphasizes the biochemical, genetic, and physical basis of regulation and development. Pr.: BIOCH 755 or equiv.; a basic knowledge of molecular biology and consent of instructor. BIOL-858-0-0422

BIOL 860. Molecular and Cellular Biology. (3) I, in odd years. A study of the molecular biology of the cell. Regulation, organization, and synthesis of cellular constituents in both prokaryotic and eukaryotic cells will be studied in a comparative manner. Pr.: BIOCH 765 or equiv.; and consent of instructor. BIOL-860-0-0417

BIOL 865. Advanced Plant Ecology. (4) I, in even years. Advanced study of vegetation change and of the relationships of plants and environment at various developmental stages. Eight hours combined rec. and lab a week. Pr.: BIOL 500 and 529. BIOL-865-1-0420

BIOL 868. Advanced Cellular and Developmental Biology. (3) II. Chemistry, structure, and function of cellular systems in growth, development, and reproduction. Pr.: BIOCH 755 or equiv. BIOL-868-0-0417

BIOL 870. Advanced Systematic Botany. (4) I, in odd years. Classification, nomenclature, and taxonomic theory of vascular plants. Two hours rec. and six hours lab a week. Pr.: BIOL 551. BIOL-870-1-0402

BIOL 875. Evolutionary Ecology. (3) I, in even years. A study of the evolution of population, community, and ecosystem structure. Two hours lec. and one hour rec. a week. Pr.: BIOL 529. BIOL-875-0-0420

BIOL 880. Population Ecology. (3) II. Growth and regulation of populations, cycles, competition theory, seasonal effects, predator-prey, and community relationships, biogeography, and social regulation. Intensive consideration of current theoretical developments, and recent field population studies. Pr.: BIOL 529, a course in calculus, and a course in statistics. BIOL-880-0-0420

BIOL 882. Reservoir Limnology. (3) II, in odd years. Current investigations in aquatic ecology and limnology as they pertain to reservoirs. Great Plains reservoirs will be viewed as systems for investigation of

ecological phenomena. Pr.: BIOL 470. BIOL-882-0-0420

BIOL 885. Modeling in Biology. (3) II, in even years. Conceptualization, construction, and interpretation of descriptive and predictive mathematical models used in biology, especially ecology. Pr.: A calculus (MATH 220) and statistics (STAT 702) course. BIOL-885-0-0419

BIOL 888. Electron Microscopy Techniques. (3) II. Theory and techniques involved in using the transmission electron microscope for the study of biological materials. Includes individualized instruction on the operation of the Philips 201 electron microscope and techniques for processing biological samples. Pr.: Consent of instructor. BIOL-888-1-0413

BIOL 890. Advanced Topics in Biology. (1-6) I, II, S. Pr.: Consent of instructor. BIOL-890-2-0401

BIOL 891. Advanced Problems in Biology. (1-8) I, II, S. Pr.: Consent of instructor. BIOL-891-3-0401

BIOL 895. Graduate Seminar in Biology. (1) I, II. Pr.: Consent of instructor. BIOL-895-0-0401

BIOL 898. Master's Research in Biology. (1-9) I, II, S. BIOL-898-4-0401

BIOL 899. Master's Research in Microbiology. (1-9) I, II, S. BIOL-899-4-0411

BIOL 998. Research in Biology. (Var.) I, II, S. BIOL-998-4-0402

BIOL 999. Research in Microbiology. (Var.) I, II, S. BIOL-999-4-0411

Chemistry

Kenneth J. Klabunde, Head

Professors Copeland,* Fateley,* Hammaker,* Hawley,* Isenhour,* Kay,* Klabunde,* Kruh,* McDonald,* Meloan,* Moser,* Paukstelis,* Purcell,* and Setser,* Associate Professors Fry,* Maatta,* and Sherwood,* Assistant Professors Hua,* Lenhert,* Macomber,* and Rajca,* Emeriti: Professors Lambert,* Lash, and Schrenk,* Associate Professors Johnson* and Lanning.*

The Department of Chemistry occupies a new chemistry 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 and, in addition, instruction is provided in introductory and advanced chemistry to undergraduate and graduate students in numerous other curricula.

Instruction and research in chemistry are conducted in laboratories well-equipped with modern facilities and instruments.

Undergraduate study

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 KSU.

Independent study and research

Many chemistry students at Kansas State University are engaged in independent study and research, some as early as the 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 which 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 especially 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, please see the College of Education section of this catalog.

Graduate study

Programs leading to the M.S. and Ph.D. degrees are offered. Research and graduate-level courses are conducted in analytical, inorganic, organic, and physical chemistry.

In order to be admitted to the graduate program leading to the M.S. or Ph.D. degree, a student must have completed undergraduate courses in chemistry, mathematics, and physics equivalent to those in the undergraduate chemistry

curriculum. Prospective graduate students whose undergraduate training does not meet these requirements may be admitted on a provisional basis but, depending on placement exam results, may be required to take undergraduate courses, which may not be applied for graduate credit, to make up their deficiencies.

There are no formal foreign language requirements for advanced degrees in this department.

The Department of Chemistry requires all graduate students majoring in chemistry to teach at least one semester as part of their training for an advanced degree.

Information and a brochure describing fields of research, supporting facilities, financial support, and other aspects of graduate study may be obtained on request from the Chairman, Graduate Assistantship Committee, Department of Chemistry, Manhattan, Kansas 66506.

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*

The following is the preferred curriculum for those preparing for employment as chemists or those preparing for graduate study in chemistry.

120 credit hours required for graduation

Chemistry (40-42 hours)	
CHM 220	Chemical Principles I and 5
CHM 250	Chemical Principles II 5
or	
CHM 210	Chemistry I and 4
CHM 230	Chemistry II and 4
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
or	
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*

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.

120 credit hours required for graduation

Chemistry (27-30 hours)	
CHM 220	Chemical Principles I and 5
CHM 250	Chemical Principles II 5
or	
CHM 210	Chemistry I and 4
CHM 230	Chemistry II and 4
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
CHM 500	General Physical Chemistry 3
or	
CHM 585	Physical Chemistry I 3
One additional course in chemistry or biochemistry	
Mathematics (8-14 hours)	
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

Requirements for College Algebra and Plane Trigonometry waived for those with credit in Analytic Geometry and Calculus I.

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 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-100-0-1905

CHM 101. Chemical Science Colloquium. (2) I, II. TELENET only. Current topics in chemistry presented by a distinguished international authority and moderated by a KSU faculty member. Syllabus provided and final original paper required. May be repeated once. Not open to chemistry majors. CHM-101-0-1905

CHM 110. General Chemistry. (5) I, II. Principles, laws, and theories of chemistry; important metallic and nonmetallic substances. Three hours lec., one hour rec., and three hours lab a week. CHM-110-1-8-1905

CHM 195. Approved Techniques in Criminalistics. (3) Intercession 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-195-1-0-1909

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.). CHM-210-1-7-1905

*In the fall semester, the chemistry department conducts an accelerated program which 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 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-220-1-6-1905

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-230-1-7-1905

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-250-1-6-1905

CHM 399. Sophomore Honors Seminar. (3) Open to students in the arts and sciences honors program. CHM-399-0-4900

CHM 498. Senior Honors Thesis. (2) I, II, S. Open only to seniors in the arts and sciences honors program. CHM-498-4-0401

CHM 499. Problems in Undergraduate Chemistry. (Var.) I, II, S. Problems may include classroom and/or lab work. Pr.: Consent of instructor. CHM-499-3-1905

Undergraduate and graduate credit in minor field

CHM 599. Undergraduate Research. (1, 2, 3) I, II, S. Analytical, inorganic, organic, or physical chemistry. CHM-599-4-1905

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) I, II. The basic techniques of bending, sealing, and blowing glass used to fabricate scientific glassware. Three hours of laboratory including one lecture-demonstration per week. Pr.: Senior or graduate standing in physical sciences. CHM-600-1-2-1905

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-700-2-1905

CHM 799. Problems in Chemistry. (Var.) I, II, S. Problems may include classroom or laboratory work. Not for thesis research. Pr.: Consent of instructor. CHM-799-3-1905

Graduate credit

CHM 899. Research in Chemistry. (Var.) I, II, S. Research in analytical chemistry, inorganic chemistry, organic chemistry, and physical chemistry for the M.S. degree. CHM-899-4-1905

CHM 999. Research in Chemistry. (Var.) I, II, S. Research in analytical chemistry, inorganic chemistry, organic chemistry, and physical chemistry for the Ph.D. degree. CHM-999-4-1905

Analytical chemistry**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-240-1-0-1909

CHM 271. Chemical Analysis. (4) I, II, S. Principles of chemical equilibria and qualitative, gravimetric, and titrimetric analyses. Two hours lec. and six hours lab a week. Pr. or conc.: CHM 230. CHM-271-1-5-1909

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 CHM 271. CHM-545-1-5-1909

Undergraduate and graduate credit

CHM 666. Instrumental Analysis. (3) I. Three hours lec. a week. CHM-666-0-1909

CHM 667. Instrumental Analysis Laboratory. (1) I. Three hours lab a week. CHM-667-1-0-1909

CHM 668. Chemical Equilibria. (1) I. One hour lec. a week. CHM-668-0-1909

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. CHM-725-1-1909

CHM 728. Chemistry of Analytical Reactions. (2) II. A study of the inorganic and organic reagents of importance in analytical chemistry and their reactions in sensitive and selective methods of analysis. Pr.: CHM 550, 697, 666, or equiv. courses. CHM-728-1-1909

Graduate credit

CHM 901. Graduate Seminar in Analytical Chemistry. (0-1) I, II, S. CHM-901-0-1909

CHM 921. Advanced Separations. (2) I, in even years. Two hours lec. a week. CHM-921-0-1909

CHM 922. Advanced Separations Laboratory. (1) I, in even years. Three hours lab a week. CHM-922-1-0-1909

CHM 942. Advanced Analytical Chemistry. (3) I, in odd years. Elemental and functional group analyses, nonaqueous solvent systems, gas analysis, kinetics, and thermal methods of analysis. CHM-942-0-1909

CHM 944. Electroanalytical Chemistry. (2-3) II, in even years. Theory and applications of electrochemical methods; chronoamperometry, chronopotentiometry, cyclic voltammetry, coulometry, polarography, potentiometry, and instrumentation. CHM-944-1-1909

CHM 945. Selected Topics in Analytical Chemistry. (1-3) On sufficient demand. A lecture course in analytical chemistry in areas of specialization of the faculty, with emphasis on current developments. Specific topics will be changed from semester to semester, so a student may take the course for credit more than once. CHM-945-0-1909

CHM 946. Principles and Techniques of Analytical Chemistry I. (1-5) II, in odd-numbered years. A lecture and laboratory course on emission spectroscopy, flame photometry, atomic absorption, and x-ray methods. CHM-946-1-1909

CHM 947. Principles and Techniques of Analytical Chemistry II. (1-4) II, in even-numbered years. A lecture and laboratory course on ultraviolet and visible absorption, infrared and Raman methods, fluorescence, phosphorescence, polarimetry, and refractometry. CHM-947-1-1909

CHM 948. Computer Control of Chemical Instruments. (3) The technique and use of a minicomputer in the laboratory, including interface hardware and software for digital and analog data acquisition and display and instrument control. Two hours lec. and three hours lab a week. Pr.: CHM 725. CHM-948-1-1909

Inorganic chemistry

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-650-0-1905

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-657-1-0-1906

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-697-0-1906

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-698-0-1906

CHM 710. Chemical Applications of Group Theory. (1) I. Applications of group theory to molecular structure, bonding, and spectra. One hour lec. a week. CHM-710-0-1906

Graduate credit

CHM 800. Chemistry in Outer Space and in the Laboratory. (2) II, in odd years. The generation of reactive atoms and molecules in outer space and in the laboratory is covered, as well as their chemical reactions and spectroscopy. Extreme conditions of high and low temperatures, synthesis using atoms, and matrix isolation are discussed. Pr.: CHM 698. CHM-800-0-1905

CHM 902. Graduate Seminar in Inorganic Chemistry. (0-1) I, II, S. CHM-902-0-1906

CHM 929. Physical Methods in Inorganic Chemistry. (3) II. Theory and application of infrared, Raman, visible, ultraviolet, NMR, ESR, NQR, Mossbauer, and mass spectrometry to inorganic chemistry. Three hours lec. a week. Pr.: CHM 697, 710. CHM-929-0-1906

CHM 930. Homogeneous Catalysis. (2) II, in even years. The study of industrially important and synthetically useful catalysis of organic reactions by soluble metal complexes. Two hours lec. a week. Pr.: CHM 698 or consent of instructor. CHM-930-0-1906

CHM 935. Selected Topics in Inorganic Chemistry. (1-3) I, II. A lecture course in inorganic chemistry in areas of specialization of the faculty, with emphasis on current developments. Specific topics will be changed from semester to semester, so a student may take the course for credit more than once. Pr.: Consent of instructor. CHM-935-0-1906

CHM 936. Electronic Structure of Molecules and Solids. (2) I, in even years. Electronic structure calculations and interpretations of results using the instructor's software. Pr.: CHM 697 and CHM 710. CHM-936-0-1906

CHM 937. Applications of Surface Science to Chemistry. (2) I, in odd years. Chemical bonding in the solid state. Surface science and related techniques as applied to chemical problems. Special topics including data analysis and corrosion studies. Pr.: CHM 697 and 710. CHM-937-0-1906

Organic chemistry

Undergraduate credit

CHM 190. Elementary Organic Chemistry. (3) I, II, S. A brief introduction to the principles of organic chemistry for students in certain agriculture and home economics curriculums. Conc. enrollment in CHM 191 is recommended. Three hours lec. a week. Pr.: CHM 110. CHM-190-0-1907

CHM 191. Elementary Organic Chemistry Laboratory. (2) I, II, S. One five-hour lab and one hour of lec. a week. Pr. or conc.: CHM 190. CHM-191-1-1907

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-350-0-1907

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. CHM-351-1-1907

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-531-0-1907

CHM 532. Organic Chemistry Laboratory. (2) I, II. One five-hour lab and one hour of lec. a week. Pr.: CHM 531. CHM-532-1-1907

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-550-0-1907

CHM 551. Advanced Organic Laboratory. (2) I, II. One five-hour lab and one hour of lec. a week. Pr.: CHM 550 and CHM 532. CHM-551-1-1907

Graduate credit

CHM 852. Advanced Organic Chemistry. (3) I. Advanced study of organic compounds and fundamental types of reactions. Three hours lec. a week. CHM-852-0-1907

CHM 860. Synthetic Organic Chemistry. (4) II. Conditions, scope, and applications of reactions useful in synthetic organic chemistry. Four hours lec. a week. CHM-860-0-1907

CHM 862. Organic Spectroscopy. (3) II. The principles of IR, UV-VIS, mass, and NMR spectroscopies applied to the problem of structure determination. Three hours lec. a week. CHM-862-0-1907

CHM 903. Graduate Seminar in Organic Chemistry. (0-1) I, II, S. CHM-903-0-1907

CHM 965. Physical Organic Chemistry I. (3) I. Principles of orbital symmetry, thermochemistry, kinetics, and other topics applied to the understanding of reaction mechanisms. Three hours lec. a week. CHM-965-0-1907

CHM 967. Physical Organic Chemistry II. (3) II. The principal types of intermediates and mechanisms of organic reactions and the various types of evidence for them. Recent developments are followed in the current literature. Three hours lec. a week. Pr.: CHM 965. CHM-967-0-1907

CHM 970. Selected Topics in Organic Chemistry. (1-3) On sufficient demand. A lecture course in organic chemistry in areas of specialization of the faculty, with emphasis on current developments. Specific topics will be changed from semester to

semester, so a student may take the course for credit more than once. CHM-970-0-1907

Physical chemistry

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-500-0-1908

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-585-0-1908

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-586-1-1908

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-595-0-1908

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. CHM-598-1-1908

Graduate credit

CHM 801. Chemical Thermodynamics. (3)

II, in alternate years. The laws, principles, and methods of thermodynamics and their applications to chemical systems. Statistical-molecular approach emphasized. Three hours lec. a week. CHM-801-0-1908

CHM 854. Theoretical Chemistry I. (3) I.

Introduction to quantum mechanics and atomic and molecular spectroscopy. Three hours lec. a week. CHM-854-0-1908

CHM 856. Chemical Kinetics. (3) I, in

alternate years. Survey of experimental and/or theoretical aspects of dynamics of chemical reactions. Three hours lec. a week. Pr.: CHM 801 or CHM 854. CHM-856-0-1908

CHM 904. Graduate Seminar in Physical

Chemistry. (0-1) I, II, S. Presentation of topics from literature in physical chemistry. CHM-904-0-1908

CHM 950. Chemical Statistical Methods.

(3) I, in alternate years. Application of classical and quantum statistical mechanics to chemical phenomena. Three hours lec. a week. Pr.: CHM 801, 854. CHM-950-0-1908

CHM 954. Theoretical Chemistry II. (3)

II. Quantum theory of atomic and molecular structure. Three hours lec. a week. Pr.: CHM 854. CHM-954-0-1908

CHM 955. Selected Topics in Physical

Chemistry. (1-3) On sufficient demand. A lecture course in physical chemistry in areas of specialization of the faculty, with emphasis on current developments. Specific topics will be changed from semester to semester, so a student may take the course for credit more than once. Pr.: CHM 854. CHM-955-0-1908

Computing and Information Sciences

Virgil E. Wallentine, Head

Professors Hankley,* Unger,* and

Wallentine;* Associate Professors

Calhoun,* Gustafson,* and VanSwaay;

Assistant Professors Bleyberg, McBride,*

Melton,* Mizuno, Pittman, and Schmidt*;

Instructors Campbell and Townsend.

Undergraduate study

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 increasingly 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 increasingly common.

The department maintains laboratories with extensive mini- and microcomputers. Large computer facilities are provided by KSU Computing and Telecommunications Activities. 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 and software and mathematics, together with electives which focus on some aspect or application of computers. These technical electives consist of a set of computer science courses which permit the student 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; scientific and engineering applications programming; business applications programming; 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 Modelling ...	3
EECE 241	Introduction to Computer Engineering	3
CMPSC 200	Fundamentals of Computer Programming	2
CMPSC 207	PASCAL Language Laboratory	2
CMPSC 300	Algorithms and Data Structures ...	3
CMPSC 305	Computer Organization and Programming IA	3
	or	
CMPSC 307	Computer Organization and Programming IB	3
CMPSC 370	Theoretical Foundations of Computer Science	3
CMPSC 500	Analysis of Algorithms and Data Structures	3
CMPSC 505	Introduction to Programming Languages	3
CMPSC 520	Operating Systems I	3
CMPSC 540	Software Engineering Project I	3
CMPSC 541	Software Engineering Project II	3
CMPSC 560	Introduction to Data Management Systems	3

With B.A. degree:

Technical electives (with advisor's approval)

With a B.S. degree:

ENGL 516 Written Communication for the Sciences

MATH 551 Applied Matrix Theory

or

MATH 555 Elementary Numerical Analysis

or

CMPSC 580 Numerical Computing

Technical electives (with advisor's approval)

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 follows closely programs designed by the Association for Computing Machinery and the Data Processing Management. 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 (MIS) 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 informa-

tion 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
CMPSC 200	Fundamentals of Computer Programming	2
CMPSC 207	PASCAL Language Laboratory	2
CMPSC 300	Algorithms and Data Structures ...	3
CMPSC 305	Computer Organization and Programming IA	3
	or	
CMPSC 307	Computer Organization and Programming IB	3
CMPSC 362	Introduction to Business Programming	3
CMPSC 500	Analysis of Algorithms and Data Structures	3
CMPSC 505	Introduction to Programming Languages	3
CMPSC 520	Operating Systems I	3
CMPSC 540	Software Engineering Project I	3
CMPSC 541	Software Engineering Project II	3
CMPSC 560	Introduction to Data Management Systems	3
CMPSC 562	Business Data Processing	3
CMPSC 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.

Graduate study

The Department of Computing and Information Sciences offers graduate studies leading to master of science and doctor of philosophy degrees. A minimum of 30 semester hours of graduate course work is required for the master's degree, including: CMPSC 671, Programming Science; CMPSC 700, Translator Design I; CMPSC 720, Operating Systems II; CMPSC 740, Software Engineering; CMPSC 761, Data Base Management Systems; CMPSC 897, Seminar in Computer Science; and one course with a prerequisite at the 700 level or above. Either a scholarly and creative work such as a software system or publishable paper, a research thesis, or a directed project and report is required.

The doctor of philosophy in Computer Science is offered jointly by Kansas State University and the University of Kansas. Students apply to one of the schools, but are formally admitted to both universities. Students working at KSU may take some courses at KU and are required to have a representative of KU as a member of their supervisory committee.

Admission to candidacy for the doctoral degree requires selection of a research supervisory committee; completion of written preliminary examinations in the areas of software systems, knowledge and information systems, and theory of

computing; and completion of an oral exam. Completion of the doctoral degree requires 24 semester hours of course work beyond the master's degree at KSU or KU, a minimum of 30 hours of research, and presentation and defense of the dissertation. Courses at the 900 level are offered on a two-year rotation schedule.

Central areas of research emphasis at KSU include: programming languages and language processors; data management systems; operating systems; and software engineering.

Areas of current research include: mini-computer networks; data base systems; theory of concurrency; programming language semantics; software measures; distributed systems; and knowledge-based systems.

Suggested course schedule for computer science majors

Freshmen year

Fall semester		
ENGL 100	English Composition I	3
SPCH 105 or 106	Public Speaking IA or I	2-3
MATH 220	Analytic Geometry and Calculus I ..	4
CMPSC 200	Fundamentals of Computer Programming	2
CMPSC 207	PASCAL Language Laboratory	2
PE 101	Concepts in Physical Education	1
		14-15

Spring semester

ENGL 120	English Composition II	3
CMPSC 370	Theoretical Foundations of Computer Science	3
CMPSC 300	Algorithms and Data Structures ...	3
MATH 221	Analytic Geometry and Calculus II	4
	Social science elective (first of four)	3
		16

Sophomore year

Fall semester		
EECE 241	Introduction to Computer Engineering	3
CMPSC 500	Analysis of Algorithms and Data Structures	3
	Natural science elective with laboratory (first of four)	4
MATH 510	Discrete Mathematics	3
	Social science elective (second of four)	3
		16

Spring semester

CMPSC 305	Computer Organization and Programming IA	3
	or	
CMPSC 307	Computer Organization and Programming IB	3
CMPSC 505	Introduction to Programming Languages	3
	Humanities elective (first of four)	3
	Technical elective	3
	Natural science elective with laboratory (second of four)	4-5
		16-17

Junior year

Fall semester		
CMPSC 520	Operating Systems I	3
PHILO 220	Symbolic Logic I	3
MATH 551	Applied Matrix Theory	3
	or	
MATH 655	Elementary Numerical Analysis	3
	or	
CMPSC 580	Numerical Computing	3

ENGL 516	Written Communication for the Sciences	3
	Natural science elective (third of four)	3
		15

Spring semester

CMPSC 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
		15-16

Senior year

Fall semester

CMPSC 540	Software Engineering Project I	3
	Technical elective	3
	Natural science elective (fourth of four)	3
	Humanities elective (second of four)	3
	Elective	3-4
		15-16

Spring semester

CMPSC 541	Software Engineering Project II	3
	Humanities elective (third of four)	3
	Humanities elective (fourth of four)	3
	Social science elective (fourth of four)	3
	Elective	3
		15

Suggested course schedule for information systems majors

Freshmen year

Fall semester

ENGL 100	English Composition I	3
SPCH 105 or 106	Public Speaking IA or I	2-3
MATH 205	General Calculus and Linear Algebra	3
CMPSC 200	Fundamentals of Computer Programming	2
CMPSC 207	PASCAL Language Laboratory	2
	Humanities elective (first of four)	3
		15-16

Spring semester

ENGL 120	English Composition II	3
CMPSC 300	Algorithms and Data Structures ...	3
PE 101	Concepts in Physical Education	1
	Humanities elective (second of four)	3
	Social science elective (first of four)	3
	Elective	3
		16

Sophomore year

Fall semester

EECE 241	Introduction to Computer Engineering	3
CMPSC 500	Analysis of Algorithms and Data Structures	3
CMPSC 362	Introduction to Business Programming	3
	Social science elective (second of four)	3
	Natural science elective with laboratory (first of four)	4
		16

Spring semester

CMPSC 505	Introduction to Programming Languages	3
CMPSC 307	Computer Organization and Programming IB	3
	Natural science elective with laboratory (second of four)	4
	Technical elective	3
MATH 312	Finite Applications of Mathematics	3
		16

Junior year

Fall semester

CMPSC 520	Operating Systems I	3
	Technical elective	3
	Natural science elective (third of four)	3

ENGL 516	Written Communication for the Sciences	3
Elective		3
		15

Spring semester

CMPSC 560	Introduction to Data Management Systems	3
STAT 320	Elements of Statistics	3
Humanities elective (third of four)		3
Technical elective		3
Elective		3
		15

Senior year**Fall semester**

CMPSC 540	Software Engineering Project I	3
CMPSC 562	Business Data Processing	3
Social science elective (third of four)		3
Natural science elective (fourth of four)		3
Technical elective		3
		15

Spring semester

CMPSC 541	Software Engineering Project II	3
CMPSC 567	Systems Analysis for Business	3
Humanities elective (fourth of four)		3
Social science elective (fourth of four)		3
Elective		3
		15

Courses in computer science**Undergraduate credit**

CMPSC 110. Introduction to Personal Computing. (3) I, II, S. Introduction to the use of computers including history, programming, and problem solving; applications to various software packages such as text processing, spreadsheets, and data base. Two hours lec. and three hours lab a week. Pr.: MATH 100. CMPSC-110-0-0701

CMPSC 190. Undergraduate Seminar in Computing and Information Sciences. (1) Topics of special interest in computing and information sciences. CMPSC-190-0-0701

CMPSC 200. Fundamentals of Computer Programming. (2) I, II, S. Abstraction and problem solving, properties of algorithms, control structures, procedures, arrays and array processing, and algorithm efficiency. Pr.: College Algebra, plus conc. enrollment in one CMPSC language lab. CMPSC-200-0-0704

CMPSC 201. FORTRAN Language Laboratory. (2) I, II, S. Fundamentals of programming in FORTRAN; applications. Six hours lab a week. Pr. or conc.: CMPSC 200. CMPSC-201-1-0-0704

CMPSC 202. PL/1 Language Laboratory. (2) I, II, S. Fundamentals of programming in PL/1; applications. Six hours lab a week. Pr. or conc.: CMPSC 200. CMPSC-202-1-0-0704

CMPSC 206. BASIC Language Laboratory. (2) I, II, S. Fundamentals of programming in BASIC; applications. Six hours lab a week. Pr. or conc.: CMPSC 200. CMPSC-206-1-0-0704

CMPSC 207. PASCAL Language Laboratory. (2) I, II, S. Description and terminology of digital computing systems, program development environments, and program-

ming applications in PASCAL. Six hours lab a week. Pr. or conc.: CMPSC 200. CMPSC-207-1-0-0704

CMPSC 211. FORTRAN Laboratory for Engineering Majors. (1) I, II. Fundamentals of programming engineering applications in FORTRAN. Pr. or conc.: CMPSC 200. CMPSC-211-1-0-0704

CMPSC 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. CMPSC-300-1-0-0704

CMPSC 305. Computer Organization and Programming IA. (3) I, II. Introduction to computer architecture as the interface between hardware and software. Structure of a register-transfer CPU, memory bus structure, input/output structure, input/output hardware, and service code. Assembler language, instruction, sequencing, addressing mechanisms, procedure calls, and command languages for "small" computers. Pr.: EECE 241 and CMPSC 300. CMPSC-305-0-0704

CMPSC 306. Operating Systems Laboratory. (3) Advanced programming laboratory for experience in O/S 360/370, job control language, utilities, and access methods. Pr.: CMPSC 305 or 307. CMPSC-306-0-0704

CMPSC 307. Computer Organization and Programming IB. (3) II. Introduction of a computer architecture as the interface between hardware and software. Structure of a register-transfer CPU, memory bus structure, access to system input/output service. Assembler language, instructions, sequencing, addressing mechanisms, procedure call, and command languages for "large" computers. Pr.: EECE 241 and CMPSC 300. CMPSC-307-0-0704

CMPSC 362. Introduction to Business Programming. (3) I, II. An introduction to basic business programming techniques including file manipulation operations and sorting. The COBOL language will be used as an implementation tool. Pr.: One CMPSC language lab. CMPSC-362-1-6-0723

CMPSC 370. Theoretical Foundations of Computer Science. (3) I, II. Sets, functions, relations; automata theory and formal language theory, including regular and context-free grammars; introduction to computability. Pr.: CMPSC 207. CMPSC-370-0-0702

CMPSC 397. Honors Seminar in Computer Science. (1-3) CMPSC-397-3-0701

CMPSC 490. Special Topics in Computer Science. (2-4) Current topics in computer science. Pr.: Prerequisite varies with the announced topic. CMPSC-490-0-0701

CMPSC 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; CMPSC 520. CMPSC-492-0-0701

CMPSC 499. Senior Honors Thesis. (2) I, II, S. Open only to seniors in the arts and sciences honors program. CMPSC-499-0-0701

Undergraduate and graduate credit in minor field

CMPSC 500. Analysis of Algorithms and Data Structure. (3) I. Analysis of data structures and computer algorithms for trees, lists, graphs, sets. Measures of performance and complexity of algorithms and structures. Pr.: CMPSC 300. CMPSC-500-0-0701

CMPSC 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.: CMPSC 300. CMPSC-505-0-0701

CMPSC 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.: CMPSC 305 or 307 or EECE 631; and CMPSC 300. CMPSC-520-0-0701

CMPSC 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.: One programming course and senior status. CMPSC-535-0-0701

CMPSC 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.: CMPSC 500. CMPSC-540-0-0704

CMPSC 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.: CMPSC 500; CMPSC 540 (which must be taken in the preceding semester). CMPSC-541-0-0704

CMPSC 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.: CMPSC 500. CMPSC-560-0-0701

CMPSC 562. Business Data Processing. (3) I. Advanced topics in COBOL with application to typical business data processing systems such as payrolls, file systems, inventories, and management information systems. Pr.: CMPSC 362. CMPSC-562-0-0703

CMPSC 567. Systems Analysis for Business. (3) II. Manual, semiautomatic, and automatic data processing systems; accounting concepts, data processing implications; organization of sequential and direct-access files; checking and control techniques. Students will study business applications and recommend data processing systems. Pr.: CMPSC 500. CMPSC-567-0-0703

CMPSC 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.: CMPSC 300 and MATH 221 and 551. CMPSC-580-0-0701

CMPSC 591. Computer Science Applications. (3) I, II, S. Programming, JCL, program libraries, and design of algorithms. For students with minimal background in computer science. Not for credit by CMPSC majors. Pr.: Graduate standing in student's own area and knowledge of at least one procedural programming language. CMPSC-591-0-0704

Undergraduate and graduate credit
CMPSC 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.: CMPSC 300. CMPSC-600-0-0701

CMPSC 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.: CMPSC 500 and 520. CMPSC-620-0-0704

CMPSC 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.: CMPSC 505. CMPSC-630-0-0701

CMPSC 636. Introduction to Computer Graphics. (3) I, II. An introduction to the hardware and software aspects of graphics generation. The laboratory will provide practical experience in implementing software drivers and simple graphics routines. Cross-listed with EECE 636. Pr.: CMPSC 500. CMPSC-636-0-0909

CMPSC 642. Human Factors in Software. (3) User interface to software systems; robust software, interaction and response devices, interactive systems; graphics; screen-oriented display, control, and data input; friendly systems; software project. Pr.: CMPSC 300. CMPSC-642-0-0701

CMPSC 671. 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.: CMPSC 505, and either CMPSC 370 or PHILO 220. CMPSC-671-0-0702

CMPSC 675. 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.: CMPSC 500 and MATH 220. CMPSC-675-0-0701

CMPSC 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. CMPSC-690-3-0799

CMPSC 697. Seminar in Computer Science. (1-3) Pr.: Junior standing. CMPSC-697-3-0701

CMPSC 700. Transiator 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.: CMPSC 300, 500, 505. CMPSC-700-1-0-0701

CMPSC 705. Programming Languages II. (3) Advanced concepts and facilities of programming languages; compilation/in-

terpretation structures to handle advanced programming features; programming and language facilities in special-purpose software and application packages; topics in formal models of language. Pr.: CMPSC 505. CMPSC-705-0-0701

CMPSC 710. Computer Simulation Experiments. (3) Principles of digital computer simulations; discrete and continuous simulation method, statistics of simulations; implementations. Pr.: CMPSC 300. CMPSC-710-0-0701

CMPSC 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.: CMPSC 520 and 500. CMPSC-720-0-0701

CMPSC 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.: CMPSC 520. CMPSC-725-0-0701

CMPSC 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.: CMPSC 630, 671. CMPSC-730-0-0701

CMPSC 736. Computer Graphics. (3) Topics in computer representation and display of images and graphic interaction. Pr.: CMPSC 636 or EECE 636. CMPSC-736-0-0702

CMPSC 740. Software Engineering. (3) Software life cycle, requirements, specifications, design, validation, measures, and maintenance. Pr.: CMPSC 540. CMPSC-740-0-0701

CMPSC 745. Software Development Management. (3) Development models, cost estimation, management of programmer teams, acceptance criteria, reliability estimation, development standards. Pr.: CMPSC 541. CMPSC-745-0-0701

CMPSC 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.: CMPSC 305 or 307 and EECE 641. CMPSC-750-0-0701

CMPSC 755. Advanced Computer Architecture. (3) Critique of von Neumann architecture, the semantic gap, requisites for improved architectures. Language-

directed, high-level-language, multiple-language-directed, and software-reliability-directed architectures. Pr.: EECE 649 and CMPSC 520 and 720. CMPSC-755-0-0701

CMPSC 761. Data Base Management Systems. (3) Data models and languages, heirarchical, network, relational systems; implementation and operational requirements; programming projects using data base management systems. Pr.: CMPSC 560. CMPSC-761-0-0702

CMPSC 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.: CMPSC 560. CMPSC-762-0-0702

CMPSC 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.: CMPSC 505, 671. CMPSC-770-0-0701

CMPSC 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 CMPSC language lab and MATH 555 or CMPSC 580 and MATH 240 plus conc. enrollment in MATH 780. CMPSC-780-0-0701

CMPSC 785. Numerical Solution of Partial Differential Equations. (2) Computer algorithms and techniques for solving partial differential equations; programming exercises on the digital computer. Pr.: CMPSC 780 and MATH 780 plus conc. enrollment in MATH 785. CMPSC-785-0-0701

CMPSC 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.: CMPSC 300. CMPSC-791-0-0704

CMPSC 798. Topics in Computer Science. (Var.) I, II, S. Pr.: Prerequisite varies with the announced topic. CMPSC-798-3-0701

Graduate credit

CMPSC 801. Transiator Design II. (3) LR parsing, storage allocation, code generation, data flow optimization, compiler generators. Pr.: CMPSC 700. CMPSC-801-0-0701

CMPSC 806. Semantics of Programming Languages. (3) Introduction to formal semantics description methods for programming languages; comparison of

operational, denotational, algebraic, and axiomatic methods; analysis of relationship of formal semantics definitions to computer implementations. Pr.: CMPSC 671, 705. CMPSC-806-0-0701

CMPSC 807. Algebraic Semantics. (3) Fundamentals of algebraic specification techniques for abstract data types and software systems. Equational specifications, algebras, initial algebra semantics, characterization of equational classes, the equational calculus, term rewriting, correctness and extension of specifications. Pr.: CMPSC 671, CMPSC 705 or 740. CMPSC-807-0-0701

CMPSC 820. Introduction to Operating Systems Theory. (3) Theoretical treatment of process synchronization, multiprocessors, resource allocation, scheduling theory, evaluation techniques for hierarchial memory and machines. Pr.: CMPSC 720. CMPSC-820-0-0705

CMPSC 825. Concurrent and Distributed Computing Systems. (3) The architecture, object access, process synchronization, protection and security, operating system, and language issues in concurrent and distributed computing systems. Design and implementation of both concurrent and distributed computing systems. Pr.: CMPSC 720 and 725. CMPSC-825-0-0705

CMPSC 830. Current Topics in Artificial Intelligence. (3) Advanced techniques and new ideas in artificial intelligence. Includes applications and case studies of artificial intelligence in action. Pr.: CMPSC 730. CMPSC-830-0-0701

CMPSC 840. Advanced Topics in Software Engineering. (3) Studies of one or more of the following topics: AI techniques in software engineering, formal specification methods and systems, software measures, software testing, programming environments. Topics will be announced. May be repeated for credit. Pr.: CMPSC 671 and 740. CMPSC-840-0-0704

CMPSC 860. Distributed Data Bases. (3) Investigation of topics such as backend machines, redundancy, security, concurrency control, recovery, performance models, data distribution models, managerial considerations, and implementation issues. Pr.: CMPSC 761. CMPSC-860-0-0702

CMPSC 870. Theory of Computability. (3) Formal models for computability; universal programs; Church's thesis; unsolvable problems and reducibilities; partial recursive functions; recursive and recursively enumerable sets; s-m-n theorem and the recursion theorem. Pr.: CMPSC 770. CMPSC-870-0-0701

CMPSC 890. Special Topics in Computer Science. (2-4) Topics of the current state-of-the-art of computer science. Pr.: Prerequisite varies with the announced topic. CMPSC-890-0-0701

CMPSC 897. Seminar in Computer Science. (1-3) I, II, S. Required for graduate students in computer science. Pr.: Full graduate standing in CMPSC. CMPSC-897-3-0701

CMPSC 898. Master's Report in CMPSC. (1-2) I, II, S. Pr.: CMPSC 897. CMPSC-898-3-0701

CMPSC 899. Research in Computer Science. (1-6) I, II, S. Pr.: CMPSC 897. CMPSC-899-4-0701

CMPSC 901. Topics in Translator Design. (3) On sufficient demand, in alternate years. Topics involving incremental, extensible, conversational compilers; program development systems, portability and validation of compilers; compiler generators. Pr.: CMPSC 700. CMPSC-901-0-0701

CMPSC 905. Theory of Programming Languages. (3) In alternate years. Formal definition languages; operational and formal semantic models; equivalence of semantic models; formal properties of programming languages. Pr.: CMPSC 740 or CMPSC 671; and CMPSC 806. CMPSC-905-0-0701

CMPSC 920. Contemporary Concepts in Programming Systems. (3) Theoretical analysis of deadlock in multiprocess systems, detection and prevention; theoretical properties of virtual memory, the working set model; theory of resource allocation, scheduling theory. Pr.: CMPSC 720 and 806 and STAT 510. CMPSC-920-0-0701

CMPSC 926. Computation Structures. (3) In alternate years. Petri nets, flowgraph schemata, dataflow models; relationships between abstract computational models and hardware models and programming languages. Pr.: CMPSC 671 and CMPSC 750 and CMPSC 820. CMPSC-926-0-0701

CMPSC 930. Expert Systems. (3) Advanced theory and techniques in the development of expert systems. Focuses on knowledge acquisition and knowledge organization used in expert systems. Includes design, implementation, and evaluation of an expert system. Pr.: CMPSC 830. CMPSC-930-0-0701

CMPSC 940. Research Topics in Software Engineering. (3) Research on one of the topics in CMPSC 840. May be repeated for credit. Pr.: CMPSC 840. CMPSC-940-0-0701

CMPSC 960. Theory of Data Base Systems. (3) In alternate years. Advanced topics in data base systems including

distributed data bases, integrity, security, normalization, data base machines performance models, query languages. Pr.: CMPSC 840. CMPSC-960-0-0702

CMPSC 990. Research Topics. (2-3) Study of current topics in computer science. Pr.: Consent of instructor. CMPSC-990-0-0701

CMPSC 999. Research in Computer Science. (Var.) I, II, S. Pr.: CMPSC 897. CMPSC-999-4-0701

Economics

M. Jarvin Emerson,* Head

Professors Babcock,* Emerson,* Nafziger,* Ragan,* and Thomas;* Associate Professors Akkina,* Gormely,* Koch,* Oldfather, and Olson;* Assistant Professors Chang,* Megna, Rhodes,* and Tremblay;* Instructors Higham, Hula, and Trenary; Emeriti: Professors Bagley,* Chalmers,* and Nordin;* Associate Professor Decou.*

Economics is concerned with the principles governing the production and distribution of goods and services, the principles guiding the best use of resources—land, labor, and capital—and factors causing business prosperity and depression, economic growth, inflation, and deflation. Students may pursue specialized study in economic theory, history of economic thought, money and banking, public finance, labor relations, international trade, economic development, business fluctuations, transportation, econometrics, regional economics, and economic systems.

A student majoring in economics may be enrolled for either the bachelor of arts or the bachelor of science degree.

Students who transfer two years of work to Kansas State University from a community college and who plan to major in economics should have completed ECON 110, Economics I, and ECON 120, Economics II, or equivalent courses, and MATH 100, College Algebra.

Undergraduate study

Requirements for an economics major for either the B.A. or B.S. degree are:

ECON 110	Economics I	3
ECON 120	Economics II	3
ECON 510	Intermediate Macroeconomics	3
ECON 520	Intermediate Microeconomics	3
ECON 580	Senior Seminar in Economics	3

Five additional economics department courses, 500 level or above, in at least four branches of economics (except ECON 505 and 506).

Any introductory statistics course: STAT 320, 330, 340, 350, 702, 703.

Mathematics: either MATH 205, General Calculus and Linear Algebra, or MATH 220, Analytic Geometry and Calculus I.

Courses taken Credit/No Credit may not be used to fulfill these requirements.

Secondary education certification. A student 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 the student's advisors in both economics and education so that the requirements of secondary education are met.

Industrial relations and labor studies.

Students planning to work in the industrial relations or manpower development utilization field should become acquainted with the economic, political, and social aspects of labor-management relations and manpower studies by taking the following courses as part of either a terminal university program or a foundation for graduate study:

ECON 620	Labor Economics	3
ECON 627	Contemporary Labor Problems	3
SOCIO 747	Sociology of Work	3
POLSC 608	Public Personnel Administration	3
MANGT 530	Industrial and Labor Relations	3
MANGT 531	Personnel and Wage Administration	3
MANGT 630	Labor Relations Law	3
MANGT 631	Collective Bargaining	3
MANGT 632	Industrial Dispute Settlement	3

Accelerated undergraduate and graduate programs

A student who begins graduate work after completing the B.A. or B.S. degree generally requires 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 the 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 which meets requirements for the B.A. or B.S. and the M.A. 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.

Graduate study

Graduate study leading to the degrees master of arts and doctor of philosophy is offered in economics. Fields of study are economic theory, history of economic thought, econometrics, regional economics, labor economics, monetary and fiscal policy, economic development, international trade, welfare economics, economic fluctuations, public finance, and transportation.

Graduate degrees are essential for careers as professional economists in higher education, business, or government. Graduate study also is valuable training for certain executive and research positions in business and government and for teaching social science in secondary schools.

Prerequisite to major graduate study in economics is completion of an undergraduate curriculum equivalent to that required of undergraduate majors in economics at Kansas State University. Students must demonstrate reasonable proficiency in mathematics and statistics.

Opportunities for advanced study are enhanced by close contacts with the agricultural economics department, with the College of Business Administration, with the agricultural and engineering experiment stations, and with the various state agencies.

Courses in economics

Undergraduate credit

ECON 110. Economics I. (3) I, II, S. Basic facts, principles, and problems of economics; introductory principles of resource allocation; determination of the level of employment, output, price level; the monetary and banking system; institutions of the American economy; problems of labor, economic instability, depressions, inflation, economic growth; principles of economic development; other economic systems. ECON-110-0-2204

ECON 111. Economics I Honors. (3) I. Course description same as ECON 110. (3) I, II, S. Pr.: Open to students in honors program. ECON-111-0-2204

ECON 120. Economics II. (3) I, II, S. Continuation of Economics I. Basic facts, principles, and problems of economics including study of the determination of prices by supply and demand, the determination of wages, rent, interest, and profit; theory of the firm; problems of monopoly, agriculture, taxation; international economic relations. ECON-120-0-2204

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-399-0-2204

ECON 499. Seniors Honors Thesis. (2) I, II, S. Open only to seniors in the arts and sciences honors program. ECON-499-0-2204

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 demo-

graphic 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-505-0-2204

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-506-0-2204

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 AGECE 100. ECON-510-0-2204

ECON 520. Intermediate Microeconomics. (3) I, II, some 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-520-0-2204

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-530-0-2204

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-532-0-2204

ECON 540. Managerial Economics. (3) II. 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-540-0-2204

ECON 555. Urban and Regional Economics. (3) I, II. An examination of the determinants of the economic performance of urban and regional economies, including theory, problems, and policy. Pr.: ECON 120. ECON-555-0-2204

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-580-0-2204

ECON 599. Economics Seminar. (Var. 1-3) Seminars of special interest will be offered on sufficient demand. Pr.: Consent of instructor. ECON-599-0-2204

Undergraduate and graduate credit

ECON 620. Labor Economics. (3) I. 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-620-0-2204

ECON 627. Contemporary Labor Problems. (3) 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-627-0-2204

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 AGECE 100. ECON-631-0-2204

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 AGECE 100. ECON-633-0-2204

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 Soviet, Chinese, and other communist economies. Pr.: ECON 110. ECON-636-0-2204

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-640-0-2204

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 AGECE 100. ECON-681-0-2204

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-682-0-2204

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 AGECE 100. ECON-686-0-2204

ECON 690. Monetary, Credit, and Fiscal Policies. (3) II. Goals of aggregate 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-690-0-2204

ECON 699. Seminar in Economics. (1-3) On sufficient demand. Seminars of special interest will be offered on demand. Pr.: ECON 120. ECON-699-0-2204

ECON 730. Introduction to Econometrics. (3) II, some S. 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-730-0-2204

ECON 735. Mathematical Economics. (3) I. Application of mathematical tools of concrete problems in micro- and macroeconomics; mathematical treatment of models of consumption, production, market equilibrium, and aggregate growth. Pr.: ECON 520, MATH 221, or consent of instructor. ECON-735-0-2204

ECON 795. Problems in Economics. (Var.) I, II, S. Advanced individual study is offered in money and banking, public finance, general economics, international trade, labor relations, transportation. Pr.: Background of courses needed for problem undertaken. ECON-795-3-2204

Graduate credit

ECON 801. Topics in Monetary Theory. (3) I, in even years. Emphasis on recent literature of monetary economics; Federal Reserve control of the money stock; the demand for money; money and economic activity; monetary targets and indicators. Pr.: ECON 510 and ECON 530. ECON-801-0-2204

ECON 805. Income and Employment Theory I. (3) II. Determination of national income, employment, and the price level. The theories of J. M. Keynes are emphasized along with selected post-Keynesian developments in theories of consumption, investment, money, the interest rate, and the price level. Pr.: ECON 120 and 510 or consent of instructor. ECON-805-0-2204

ECON 810. History of Economic Thought. (3) I. Development of economic ideas and doctrines and the relation of these to conditions existing when they were formulated. Pr.: ECON 110. ECON-810-0-2204

ECON 815. Value and Distribution Theory. (3) I. Neoclassical value and distribution theory; theories of imperfect competition; introduction to general equilibrium theory and dynamic analysis. Pr.: ECON 520 or consent of instructor. ECON-815-0-2204

ECON 823. Advanced International Economics. (3) II. Theoretical and policy issues related to the international monetary system, capital movements, exchange rate systems, the U.S. balance of payments, and trade of underdeveloped countries. Pr.: ECON 681 or consent of instructor. ECON-823-0-2204

ECON 832. Public Sector Analysis. (3) II, in odd years. Conditions for economic efficiency in the public sector; public good production functions; nonmarket decision making; rationale for public sector growth; systems analysis, cost-benefit and related techniques of allocating public goods. Pr.: ECON 633 and 815. ECON-832-0-2204

ECON 840. Managerial Economics. (3) I. Economic analysis of production, cost, and demand functions. Application of economic models to managerial decision making. Pr.: ECON 520, MATH 205, and one course in statistics with a prerequisite in the same department. ECON-840-0-2204

ECON 860. Growth and Development Theories. (3) II. Advanced theories of economic growth and development models. Topics include optimum savings, allocations of investment, investment criteria, technical change, programming models, and alternative designs for development policies. Pr.: ECON 682 or consent of instructor. ECON-860-0-2204

ECON 898. Master's Report in Economics. ECON-898-4-2204

ECON 899. Master's Research in Economics. ECON-899-4-2204

ECON 905. Income and Employment Theory II. (3) I. Aggregative econometric models; dynamic analysis—growth models, the stability of macroeconomic systems. Other current developments in macroeconomic theory. Pr.: ECON 805 or consent of instructor. ECON-905-0-2204

ECON 920. Labor Economics Seminar. (3) I. A critical analysis of wage theories, collective bargaining, and unemployment problems. Pr.: ECON 620 or consent of instructor. ECON-920-0-2204

ECON 925. Location of Economic Activities. (3) II. An examination of the theory of location including central place theory, location of the individual producer, industrial location patterns, and urban land-use models. Also includes application of theoretical models to current urban problems. ECON-925-0-2204

ECON 935. Econometric Methods. (3) I. Quantitative methods of research used in economics. Pr.: ECON 730 or consent of instructor. ECON-935-0-2204

ECON 940. Economic Welfare and Public Policy. (3) II, in odd years. Theory of welfare economics, with application to current economic problems and policy. Pr.: ECON 815 or consent of instructor. ECON-940-0-2204

ECON 945. Advanced Economic Theory. (3) II. A study of traditional theories of a firm and competitive market in the light of contemporary thought. General equilibrium theory. Modern microeconomic theories, with attention given to risk and uncertainty. Pr.: ECON 815. ECON-945-0-2204

ECON 955. Theory and Methods of Regional Economic Analysis. (3) I. A consideration of differences in regional and urban growth; comparison of alternative growth theories; methods of analyzing regional economics such as input-output analysis, linear programming, industrial complex, and spatial interaction models. Pr.: ECON 925 or consent of instructor. ECON-955-0-2204

ECON 999. Ph.D. Research in Economics. ECON-999-4-2204

English

Robert M. Grindell,* Head

Professors Bixler,* Carpenter,* Dees,* Donaghy,* Eitner,* Hedrick,* Holden,* Johnston,* Keiser,* McCarthy,* McGhee,* Nyberg,* Rees,* Royster,* M. Schneider,* D. Stewart,* and L. Warren;* Associate Professors Agosta,* Brondell,* Cohen, Conrow,* Donnelly,* Geissler, Gillespie,

Grindell,* Hall,* Heller,* and H. Schneider; Assistant Professors Nelson* and Smit; Instructors Baker, Bussing, Clark, Kolonosky, P. Stewart, and A. Warren; Emeriti: Professors Davis, Higginson, Moses, Noonan, and Rogerson; Associate Professors Adams, Ansdell, Jones, and Koch; Assistant Professor Glenn; Instructors Bergman, Rochat, and Vance.

Undergraduate study

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**Core courses (9 hours):**

ENGL 250	Forms of Literature	3
ENGL 350, 716, or 717	One Shakespeare course	3
ENGL 530, 600, or 790	One language course	3

One sequence of survey courses (6 hours):

ENGL 260	British Survey I and	3
ENGL 265	British Survey II	3
or		
ENGL 280	American Survey I and	3
ENGL 285	American Survey II	3

Four three-credit courses from 600-799 offerings (12 hours)

Note: students submitting American survey sequence must take at least one 600-799 level course in British literature; students submitting British surveys must take at least one 600-799 level course in American literature.

Two electives (6 hours):**Either**

Two courses at the 500 level or above	6
or	
One course at the 500 level or above	3

and One of the following:

ENGL 310	Introduction to Fiction	3
ENGL 320	Introduction to the Short Story	3
ENGL 340	Introduction to Poetry	3
ENGL 345	Introduction to Drama	3
ENGL 230	Humanities: Classical Cultures	3
ENGL 231	Humanities: Medieval and Renaissance	3
ENGL 233	Humanities: Baroque and Enlightenment	3
ENGL 234	Humanities: Modern	3
ENGL 492	Humanities: Seminar	3

a third survey course:

ENGL 260, 265, 280, or 285 (see above)	3
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Total 33

A student must take at least six hours of American literature in the total program.

Literature and creative writing track**Core courses (9 hours)**

See above.

Any two survey courses (6 hours):

ENGL 260, 265, 280, 285	
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Two three-credit courses in literature and English language from the 600-799 offerings (6 hours)

Note: students submitting two American survey courses must take at least one 600-799 level course in British literature, and students submitting two British survey courses must take at least one 600-799 level course in American literature.

ENGL 500	Introduction to Creative Writing ...	3
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Three three-credit courses in writing at the advanced level, in at least two genres (9 hours)

Total 33

Literature with teaching certification track

Required (15 hours):

ENGL 250	Forms of Literature	3
ENGL 400	Advanced Composition	3
ENGL 530	Modern English Grammar	3
ENGL 545	Literature for Adolescents	3

One Shakespeare course:

ENGL 350	Introduction to Shakespeare	3
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or

ENGL 716	Shakespeare: Comedies and Histories	3
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or

ENGL 717	Shakespeare: Tragedies and Romances	3
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Three of the following four courses (9 hours):

ENGL 260	British Survey I	3
ENGL 265	British Survey II	3
ENGL 280	American Survey I	3
ENGL 285	American Survey II	3

Literature electives (12 hours):

Nine of these 12 hours must be courses at the 600 level or higher.

Total 36**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 major in secondary education, leading to the B.S. degree. Majors desiring certification should consult their advisors in the English department. For specific certification requirements in secondary education, please see the College of Education section of this catalog.

Courses for nonmajors

The department offers many general education courses for the nonmajor student. All are intended to introduce such students to the appreciation of language and literature. Examples are: ENGL 210, 220, 230, 231, 233, and 234; 310; 320; 340; 345; 350; 360; 365; 370; 375; 387; 492; 505; 510; 515; 520; 560; 570; and 751. In general it is proper to substitute in any program of study an advanced course for an elementary one, if the student so elects and the teacher consents. Only one course among ENGL 230, 231, 233, 234, 310, 320, 340, 345, and 492 may be taken for major credit.

Graduate study

The department awards the M.A. degree, for which the emphasis may be on British or American literature, or creative writing, or language and composition.

Candidates for graduate work should have completed an undergraduate major with at least 24 hours in English above freshman composition; otherwise, they will be asked to do additional undergraduate work to make up deficiencies. Additional requirements of the Graduate School may be found in the appropriate section of this catalog.

Requirements for the M.A. include a minimum of 30 semester hours of course work and research. Candidates in the British and American literature option must demonstrate competence in one foreign language.

Students in creative writing or in language and composition may substitute

ENGL 810, Old English, for the language requirement. A written examination is required. A two-hour report is required as are ENGL 790, History of the English Language (unless waived), and ENGL 802, Graduate Studies in English.

For more detailed and current information, consult: Director of Graduate Studies, Department of English, 107 Denison Hall, Kansas State University, Manhattan, Kansas 66506.

Courses in English

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 English Composition 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-030-1-1501

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-038-0-1508

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-060-0-1508

ENGL 075. English for International Students. (3) I, II. Distinguished from DAS 060 by being a nonintensive, three-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. ENGL-075-0-1508

Undergraduate credit

ENGL 100. English Composition I. (3) I, II, S. Instruction in the organization of expository writing. Taught as laboratory-workshop, the course offers extensive practice in the writing of English themes as models of nonfiction prose. Theme and paragraph organization and the basic elements of sentence structure and grammar receive emphasis. ENGL-100-0-1501

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 chairman of the English department honors committee. ENGL-110-0-1501

ENGL 120. English Composition II. (3) I, II, S. Continues instruction offered in English Composition I. Emphasizing the practice of expository and persuasive writing, the course analyzes prose models of expository writing and further instructs students in grammar, punctuation, and English usage. Pr.: ENGL 100 or 110. ENGL-120-0-1501

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 chairman 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-125-0-1501

ENGL 200. Intermediate Composition. (3) I, II, S. To improve and refine writing skills beyond those which are characteristic of freshman-level writing: based on individual student needs, the course provides further work on organization, sentence structure, diction, and rhetoric. Pr.: ENGL 120 or 125. ENGL-200-0-1501

ENGL 201. Writing the Public Essay. (3) I, II. Instruction in and practice of writing papers suitable for presentation to social, public, or professional forums. Pr.: ENGL 120 or 125. ENGL-201-0-1501

ENGL 205. The Research Paper. (2) I, II, S. Surveys the process of writing a research paper, from the initial choice of topic to the final documented paper. Not for major credit. Pr.: ENGL 100. ENGL-205-0-1501

ENGL 210. The Uses of Poetry. (1) I, II, S. Credit/No Credit only. Not for major credit. To provide the experience of poetry read for pleasure, for knowledge, and for personal fulfillment. Repeatable once. ENGL-210-0-1502

ENGL 220. Fiction into Film. (2) I, II, S. Discussions of film adaptation of works of literature. Not for major credit. ENGL-220-0-1501

ENGL 230. Humanities: Classical Cultures. (3) I, S. ENGL-230-0-4901

ENGL 231. Humanities: Medieval and Renaissance. (3) II, S. ENGL-231-0-4901

ENGL 233. Humanities: Baroque and Enlightenment. (3) I, S. ENGL-233-0-4901

ENGL 234. Humanities: Modern. (3) II, S. This and the three courses above seek to develop a greater understanding, appreciation, and enjoyment of the humanistic resources of Western culture. The student

is introduced to the great works of literature, philosophy, art, music, and religion in each major period. The courses may be taken individually and in any order. ENGL-234-0-4901

ENGL 250. Forms of Literature. (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 in various kinds of literary work, and thus as an introduction to literary terms commonly used in later courses. Readings from a broad range: poems, plays, essays, and novels. ENGL-250-0-1502

ENGL 260. British Survey I. (3) I, II, S. English literature from Anglo-Saxon times through Milton. Will apply to survey requirement for English majors. ENGL-260-0-1502

ENGL 265. 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-265-0-1502

ENGL 280. American Survey I. (3) I, II, S. An introductory review of our literary history from the early accounts of colonization through the American Renaissance. Will apply to survey requirement for English majors. ENGL-280-0-1502

ENGL 285. American Survey II. (3) I, II, S. An introductory review of our literary history from the Civil War to the present. Will apply to survey requirement for English majors. ENGL-285-0-1502

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. ENGL-299-1-1502

ENGL 301. Writing and the Law: Legislative Analysis. (3) I, II. Practice in criticizing and constructing arguments about interpretations of statutes (administrative regulations, ordinances, state and federal codes, constitutions) in the context of particular facts. Close attention to recognizing and resolving problems of ambiguity and vagueness. Individual tutorial is an important feature of the course: Pr.: ENGL 120 or 125. ENGL-301-0-1501

ENGL 310. Introduction to Fiction. (3) I, II, S. Selected short stories, novellas, and novels from world literature, with emphasis on the present. Concern for the forms of fiction and critical analysis. ENGL-310-0-1501

ENGL 320. Introduction to the Short Story. (3) I, II, S. Study of American, British, and Continental stories. ENGL-320-0-1501

ENGL 340. Introduction to Poetry. (3) I, II, S. Close reading of poems and analysis of poetic genres, with emphasis on modern poetry. ENGL-340-0-1502

ENGL 345. Introduction to Drama. (3) I, II, S. Study of drama from classical times to the present. ENGL-345-0-1502

ENGL 350. Introduction to Shakespeare. (3) I, II, S. Study of representative comedies, histories, and tragedies. ENGL-350-0-1502

ENGL 360. 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-360-0-1502

ENGL 365. 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-365-0-1502

ENGL 370. 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-370-0-1502

ENGL 375. 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-375-0-1502

ENGL 387. Great Books. (3) I, II, S. Introduction to world classics from past to present. Not for English majors. Repeatable once with change of syllabus. ENGL-387-0-1502

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-390-0-1502

ENGL 395. Topics in English. (0-3) I, II, S. Selected studies in literature and language. Repeatable with change in topic. Pr.: Consent of instructor. ENGL-395-0-1501

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. ENGL-399-0-1501

ENGL 400. Advanced Composition. (3) I, II, S. Expository writing, primarily for pre-professional majors (e.g., pre-med) and candidates for secondary education certification. Pr.: ENGL 120 or 125. ENGL-400-0-1501

ENGL 401. Writing and the Law: Case Analysis. (3) II, in alternate years. Practice in the close reading of judicial opinions, and in criticism and construction of

arguments about their bearing on novel facts. The focus is on accurate apprehension of constituent issues and argument structure, and careful scrutiny of potential analogies. Features individual tutorial. Pr.: ENGL 301 or 340. ENGL-401-0-1501

ENGL 405. Narrative Writing. (3) I, II. Practice in writing personal narratives including the journal, the reminiscence, journey narrative, family history. Students may choose to work on one or a variety of projects. Repeatable once. Pr.: ENGL 120 or 125. ENGL-405-0-1507

ENGL 415. Written Communication for Engineers. (3) I, II, S. Study of 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 equiv. with A or B credit, or ENGL 100 and 120 or equiv. ENGL-415-0-1501

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-492-0-1501

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-498-4-1502

ENGL 499. Senior Honors Thesis. (2) I, II, S. Open only to seniors in the arts and sciences honors program. ENGL-499-4-1501

Undergraduate and graduate credit in minor field

ENGL 500. 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-500-0-1502

ENGL 501. Writing Children's Literature. (3) I and II. Writing book-length or magazine-length prose for children or material to be presented to children. Pr.: ENGL 120 or 125. ENGL-501-0-1501

ENGL 505. Themes in Literature. (1-3) I, II, S. Explorations of the literary treatment of important and recurring themes. Repeatable with change in theme. Pr.: ENGL 120 or 125. ENGL-505-0-1502

ENGL 510. Literary Kinds. (1-3) I, II, S. Examinations of the characteristics, the growth and development, or the uses of specified literary genres. Repeatable with

change in topic. Pr.: ENGL 120 or 125. ENGL-510-0-1502

ENGL 515. Literature and Society. (1-3) I, II, S. Language and literature in relation to social and cultural patterns and influences. Repeatable with change in topic. Pr.: ENGL 120 or 125. ENGL-515-0-1502

ENGL 516. Written Communication for the Sciences. (3) I, II. Theory and intensive writing practice for students in the basic and applied sciences. Junior or senior standing and completion of ENGL 120 or 125. Will not substitute for ENGL 415. ENGL-516-0-1501

ENGL 520. Literature and Film. (3) II, S. This course deals with such matters as the turning of story, novel, play into film; the handling of point of view in fiction and film; the ways fiction and film affect each other in the development of techniques; and the comparison of the forms of literature and film. Pr.: ENGL 120 or 125, or consent of instructor. ENGL-520-0-1503

ENGL 525. Women in Literature. (3) I, II, S. Literary works, chiefly fiction, by or about women. Considers important writers since 1800 and significant themes in literature about women. Pr.: ENGL 120 or 125. ENGL-525-0-1502

ENGL 530. Modern English Grammar. (3) I, II, S. A systematic study of the structure of the English language and a consideration of current theories of analysis, such as traditional, structural, and transformational-generative. Primarily for candidates for the teaching certificate in secondary education—English or for elementary language arts majors. Pr.: ENGL 120 or 125. ENGL-530-0-1505

ENGL 535. Literature of Aging. (3) I. The process of aging, as reflected and revealed in various literary forms: short story and novella, novel, drama, and poetry. Concerned with the problems and relationships of, and the responses to aging. Pr.: ENGL 120 or 125 or consent of instructor. ENGL-535-0-1502

ENGL 540. Literature for Children. (3) I, II, S. A survey of literature for children, providing an opportunity for reading and evaluating books for children. For teachers of elementary grades and others interested in children's literature. Pr.: Sophomore standing. ENGL-540-0-1502

ENGL 545. Literature for Adolescents. (3) I, II, S. Selecting, reading, and evaluating books for adolescents. For teachers in the junior and senior high school and students of guidance for adolescents. Pr.: ENGL 120 or 125, and junior standing. ENGL-545-0-1502

ENGL 560. American Folklore and Folk Literature. (3) I, II, S. Focus on definition, form, and function of folktales and anecdotes, legends, proverbs and riddles,

and beliefs and customs. Pr.: Junior standing. ENGL-560-0-1502

ENGL 570. English Bible. (3) I, II, S. The Bible as literature and history; cultural and historical backgrounds of the Old Testament. Pr.: ENGL 120 or 125. ENGL-570-0-1504

Undergraduate and graduate credit
ENGL 600. Principles of Linguistics. (3) I, II, S. 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-600-0-1505

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-601-1-1505

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-602-0-1505

ENGL 603. Topics in Linguistics. (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 LING 603 and LG 603. ENGL-603-0-1505

ENGL 651. Twentieth Century Afro-American Literature. (3) I. A survey of Afro-American literature in the twentieth century, including Johnson, Toomer, McKay, Hurston, Petry, Wright, Ellison, and Baldwin. Pr.: Junior standing. ENGL-651-0-1502

ENGL 652. American Indian and Chicano Literature. (3) II. A survey of American Indian and Chicano literatures in the twentieth century, including Momaday, Silko, Welch, McNickle, Anaya, Villareal, Romero, and Barrio. Pr.: Junior standing. ENGL-652-0-1502

ENGL 659. Literature of the New Black Renaissance. (3) II. A chronological study of Afro-American literature from 1954, including such authors as Baraka, Morrison, Baldwin, Brooks, Dumas, Bullins. Pr.: Junior standing. ENGL-659-0-1502

ENGL 699. Special Studies in English. (3) I, II, S. Intensive study of an author, a theme, or a genre in British or American literature. Pr.: Senior or graduate standing and consent of instructor. ENGL-699-0-1501

ENGL 706. Arthurian Literature. (3) II, in alternate years. A survey of Arthurian literature in the medieval West, with emphasis on the writings of Malory and some attention to his influence on later English literature. Pr.: Junior standing. ENGL-706-0-1502

ENGL 707. Medieval Literature. (3) II, in alternate years. Study of selected themes and forms in medieval literature. Pr.: Junior standing. ENGL-707-0-1502

ENGL 708. Chaucer. (3) I, II, S. Pr.: Junior standing. ENGL-708-0-1502

ENGL 711. Elizabethan Nondramatic Literature. (3) I, in alternate years. An introduction to the literature of the English Renaissance. Pr.: Junior standing. ENGL-711-0-1502

ENGL 714. British Drama to 1642. (3) I, S, in alternate years. A survey of the dramatic literature of Elizabethan and Jacobean times, exclusive of Shakespeare. Pr.: Junior standing. ENGL-714-0-1502

ENGL 716. Shakespeare: Comedies and Histories. (3) I, S, in alternate years. A study of Shakespearean drama from the first plays through about 1600, with emphases on the histories and comedies; special attention to the criticism and bibliography. Pr.: Junior standing. ENGL-716-0-1502

ENGL 717. Shakespeare: Tragedies and Romances. (3) II, S, in alternate years. A study of Shakespearean drama from about 1601 through the last plays, with emphases on the mature tragedies and the romances; special attention to the criticism and bibliography. Pr.: Junior standing. ENGL-717-0-1502

ENGL 721. Seventeenth Century Literature. (3) II, S. A survey of the principal nondramatic writers, apart from Milton. 1600-1660. Pr.: Junior standing. ENGL-721-0-1502

ENGL 722. Milton. (3) II, S. Pr.: Junior standing. ENGL-722-0-1502

ENGL 724. Restoration and Eighteenth Century Drama. (3) I, S, in alternate years. A survey of English dramatic literature from 1660 to 1800. Pr.: Junior standing. ENGL-724-0-1502

ENGL 726. Eighteenth Century I. (3) I, S. English literature from the Restoration to the death of Swift, with emphases on Dryden, Swift, and Pope. Pr.: Junior standing. ENGL-726-0-1502

ENGL 727. Eighteenth Century II. (3) II, S. The age of Dr. Johnson and the beginnings of romanticism. Pr.: Junior standing. ENGL-727-0-1502

ENGL 731. British Novel I. (3) I, S. A survey of British fiction from Defoe to the Brontës. Pr.: Junior standing. ENGL-731-0-1502

ENGL 732. British Novel II. (3) II, S. A survey of British fiction from Dickens and Thackeray to Galsworthy and Bennett. Pr.: Junior standing. ENGL-732-0-1502

ENGL 736. The Romantic Movement. (3) I, S. The poetry and prose of Blake, Wordsworth, Coleridge, Byron, Shelley, and Keats. Pr.: Junior standing. ENGL-736-0-1502

ENGL 738. Early American Literature. (3) I. Literary beginnings in seventeenth century Virginia and New England; eighteenth century prose and poetry, including the first plays and novels. Pr.: Junior standing and at least one other literature course. ENGL-738-0-1502

ENGL 739. The New England Transcendentalists. (3) II, in alternate years, S. A study of the transcendental movement, with emphases on Emerson and Thoreau. Pr.: Junior standing. ENGL-739-0-1502

ENGL 741. Nineteenth Century American Poetry. (3) II, S. Emphases on Poe, Whitman, and Dickinson. Pr.: Junior standing. ENGL-741-0-1502

ENGL 742. Nineteenth Century American Fiction I. (3) I, S. Emphases on Cooper, Poe, Hawthorne, and Melville. Pr.: Junior standing or ENGL 280. ENGL-742-0-1502

ENGL 743. Nineteenth Century American Fiction II. (3) II, S. Emphases on Twain, James, Howells, Crane, and Norris. Pr.: Junior standing. ENGL-743-0-1502

ENGL 748. The Victorian Era. (3) II, S. The poetry of Arnold, Browning, and Tennyson; the criticism of Arnold; additional related prose. Pr.: Junior standing. ENGL-748-0-1502

ENGL 751. American Humor and Satire. (3) II, S. Emphases on works produced in the nineteenth and twentieth centuries. Pr.: Junior standing. ENGL-751-0-1502

ENGL 754. Twentieth Century British Novel. (3) II. British fiction from Conrad and Joyce to Greene and Waugh. Pr.: Junior standing. ENGL-754-0-1502

ENGL 756. Twentieth Century American Novel. (3) I, S. The American novel from Dreiser to figures of the 1940s. Pr.: Junior standing. ENGL-756-0-1502

ENGL 757. Twentieth Century American Short Story. (3) II, S. The development of the form since 1900. Pr.: Junior standing. ENGL-757-0-1502

ENGL 758. American Novel, 1950-1970. (3) II, in alternate years. A study of distinctive qualities of selected American novels since 1950. Pr.: Junior standing. ENGL-758-0-1501

ENGL 761. Advanced Creative Writing: Prose Fiction. (3) I, II, S. Advanced writing of prose fiction. Repeatable once. Pr.: ENGL 500, or proof of equiv. proficiency. ENGL-761-0-1507

ENGL 762. Advanced Playwriting. (3) Same as THTRE 762. ENGL-762-0-1507

ENGL 763. Advanced Creative Writing: Poetry. (3) I, II, S. Advanced writing of poetry. Repeatable once. Pr.: ENGL 500 or proof of equiv. proficiency. ENGL-763-0-1507

ENGL 764. Twentieth Century British Drama. (3) I, S. British drama from Wilde and Shaw to Pinter and his contemporaries. Pr.: Junior standing. ENGL-764-0-1502

ENGL 765. Twentieth Century American Drama. (3) II, S. American drama from O'Neill and Rice to Leroi Jones and his contemporaries. Pr.: Junior standing. ENGL-765-0-1502

ENGL 766. Twentieth Century British Poetry. (3) I. Development of British poetry from Hardy and Yeats to the present. Pr.: Junior standing or ENGL 265. ENGL-766-0-1502

ENGL 767. Twentieth Century American Poetry. (3) II, S. Development of American poetry from Robinson and Frost to the present. Pr.: Junior standing or ENGL 285. ENGL-767-0-1502

ENGL 790. History of the English Language. (3) II, S. The development of British and American English from Indo-European origins to the present. Pr.: Senior standing or consent of instructor. ENGL-790-0-1505

ENGL 792. Studies in Composition. (3) I, S. Examination of research and theories applicable to the study of written composition, of sources of information germane to written composition, and of current substantive issues involving written composition. Pr.: Junior standing and 18 hours of English. ENGL-792-0-1501

ENGL 793. Studies in Technical Communication (3) I. Examination of theories, research, and practices in technical communication, with some emphasis on the invention of appropriate strategies for its teaching. Pr.: Senior standing. ENGL-793-0-1505

ENGL 794. History and Theory of Composition. (3) II, S. An overview of the tradition out of which modern rhetoric and composition courses have emerged. Also an evaluation of current research in composition theory and methodology.

Pr.: Junior standing, and 18 hours of English. ENGL 400 is recommended. ENGL-794-0-1501

ENGL 795. Literary Criticism. (3) I, 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-795-0-1502

ENGL 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. Pr.: Junior standing, and ENGL 530 or ENGL 600. ENGL-796-0-1505

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. ENGL-799-3-1501

Graduate credit

ENGL 802. Graduate Studies in English. (1) I, II, S. A survey of the principles of research and scholarship, the range of literary studies, basic bibliographies and other aids, and the techniques of writing documented papers. Required in the first year of study toward the M.A. in English as an orientation to the profession. ENGL-802-0-1502

ENGL 810. Old English. (3) I, S. The elements of Old English grammar, with readings in prose and poetry. Pr.: Consent of instructor. ENGL-810-0-1505

ENGL 820. Selected Topics in the Study of Language. (3) Pr.: ENGL 790 or consent of instructor. ENGL-820-0-1505

ENGL 825. Selected Topics in the Study of Literature. (3) Intensive study of a topic covering one or more literary genres, periods, or authors. Pr.: Graduate standing. ENGL-825-0-1502

ENGL 850. Shakespeare Seminar. (3) Pr.: ENGL 716 or 717. ENGL-850-0-1502

ENGL 861. Creative Writing Workshop: Short Fiction. (3) I, II, S. Advanced writing of short prose fiction. May be repeated twice for credit. Pr.: ENGL 761 or equiv. ENGL-861-0-1507

ENGL 862. Workshop in Playwriting. (3) I, II, S. Advanced writing in drama. May be repeated once for credit. Same as THTRE 862. Pr.: THTRE 762 (or ENGL 762). ENGL-862-0-1507

ENGL 863. Creative Writing Workshop: Poetry. (3) I, II, S. Advanced writing of poetry. May be repeated twice for credit. Pr.: ENGL 763 or equiv. proficiency. ENGL-863-0-1507

ENGL 864. Creative Writing Workshop: The Novel. (3) II. May be repeated twice for credit. Pr.: ENGL 761 or equiv. ENGL-864-0-1507

ENGL 898. Master's Report. (2) I, II, S. ENGL-898-4-1501

ENGL 900. Bibliography and Methods of Research. (3) I, S. An introduction to textual, bibliographic, and professional problems, required of Ph.D. candidates. ENGL-900-0-1502

ENGL 930. Studies in Medieval English Literature. (3) I, II, S. Pr.: Consent of instructor. ENGL-930-0-1502

ENGL 940. Studies in Sixteenth Century Literature. (3) Pr.: Consent of instructor. ENGL-940-0-1502

ENGL 950. Studies in Seventeenth Century Literature. (3) Pr.: Consent of instructor. ENGL-950-0-1502

ENGL 960. Studies in Eighteenth Century Literature: British. (3) Pr.: Consent of instructor. ENGL-960-0-1502

ENGL 965. Studies in American Literature before 1800. (3) Pr.: Consent of instructor. ENGL-965-0-1502

ENGL 970. Studies in Nineteenth Century Literature: British. (3) Pr.: Consent of instructor. ENGL-970-0-1502

ENGL 975. Studies in Nineteenth Century Literature: American. (3) Pr.: Consent of instructor. ENGL-975-0-1502

ENGL 980. Studies in Twentieth Century Literature: British. (3) Pr.: Consent of instructor. ENGL-980-0-1502

ENGL 985. Studies in Twentieth Century Literature: American. (3) Pr.: Consent of instructor. ENGL-985-0-1502

ENGL 999. Research in English. (Var.) I, II, S. Pr.: Sufficient training to carry on the research undertaken. ENGL-999-4-1501

Courses in linguistics

Undergraduate and graduate credit

ENGL 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 LING 600 and LG 600. ENGL-600-0-1505

ENGL 601. General Phonetics. (3) I or II, in alternate years. Description and classification of speech sounds according to point and manner of articulation. Tran-

scription in the International Phonetic Association Alphabet. Includes sounds of English, French, Spanish, German, and others. Same as LING 601 and LG 601. ENGL-601-1-1505

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-602-0-1505

ENGL 603. Topics in Linguistics. (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 LING 603 and LG 603. ENGL-603-0-1505

ENGL 783. Phonology I. (3) Same as LING 783 and MLANG 783. ENGL-783-0-1502

ENGL 785. Syntax I. (3) Same as LING 783 and MLANG 785. ENGL-785-0-1502

ENGL 791. Methods and Techniques of Learning a Second Language. (3) ENGL-791-0-1502

Geography

M. D. Nellis,* Head

Professors Kromm,* Siddall,* and White;* Associate Professors Bussing,* Nellis,* Seamon,* Seyler,* and Stover;* Adjunct Professor Nair; Emeritus: Professor Self.

Geographers, in studying the differences in human activities from one place to another, deal with vital questions about current national and international situations.

Geography is a very broad inquiry into the state of the world today, advanced by bringing together the ideas and concepts of many disciplines, especially the social sciences, to obtain some measure of understanding about specific areas.

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, 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 numerous factors such as

technology, population density, legal structure, affluence, cultural traditions, and environment.

Undergraduate study

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.

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

Requirements for a major in geography follow:

GEOG 100	World Regional Geography	3
	or	
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, or 705)

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.

The student may pursue a general program in geography, or may choose to develop a concentration in either environmental studies or community studies. Other concentrations also 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 (B.A. or B.S.)

Geography is a very 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 is designed to provide a student with both a broad interdisciplinary background and a geographic core curriculum.

The geography course requirements for the pre-planning option are identical to those listed above for the geography major. In addition students must take:

PLAN 315	Introduction to Planning	3
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and at least three of the following:

ECON 555	Urban and Regional Economics	3
HIST 551	American Urban History	3
POLSC 718	Urban Politics	3
SOCIO 531	Urban Sociology	3
PLAN 715	Planning Principles	3

Graduate study

Graduate work in geography is offered in the cultural, economic, and environmental aspects of the discipline. Closely related courses in the social sciences, history, planning, and agriculture may be made an integral part of the student's program, and it is possible to arrange a primary concentration in geography with a secondary specialization in regional or community planning for those students interested in a planning career. All candidates for the master of arts degree are required to take GEOG 700, Quantitative Analysis in Geography (except option B students), GEOG 800, Graduate Colloquium, and GEOG 820, History and Philosophy of Geography.

Students may choose, in consultation with their advisors, one of three programs leading to the M.A. degree.

Option A requires 30 hours of graduate credit including six hours of credit for a thesis. Of the 24 hours of credit required in course work, no fewer than 15 hours must be in geography.

Option B is for students who intend to pursue or continue a career in public school or junior college teaching. It is open only to persons who are already certified to teach at the public school or junior college level in any state, or to those who will make courses required for such certification an integral part of their program. Thirty hours of graduate-level course work is required including two credits of GEOG 898, Master's Report, which shall consist of the design of a teaching syllabus in some subfield of geography. At least 18 credit hours must be in geography. This option is not suitable for any student who may ultimately continue for the doctorate.

Option C is a nonthesis program designed for students who have a specific professional goal in mind other than teaching at any level, and who do not intend to continue for a Ph.D. The student may choose from several approved course groupings. Thirty hours of graduate level work are required of which 12 hours may be outside the geography department.

The geography department is equipped with a small reference library, a good collection of research maps, a cartography and remote sensing laboratory, microcomputers, computer mapping and geographic information system software, a remote sensing digital image processing system, and a seminar room. The University library contains a large collection of geographical journals. Computer time is available without charge to students for thesis and other research.

Courses in geography

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-100-0-2206

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-200-0-2206

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-201-0-2206

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-220-1-1917

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-221-1-1917

GEOG 310. Geography of Kansas. (3) I, II. 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-310-0-2206

GEOG 399. Honors Seminar in Geography. (2-3) I, in odd years. Selected topics. Open to nonmajors in the honors program. GEOG-399-0-2206

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-440-0-2206

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-450-0-2206

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-460-0-2206

GEOG 470. Cartography. (3) I. Theory, interpretation, design, and drafting of maps, with emphasis on presenting quantitative data. GEOG-470-1-2206

GEOG 490. Problems in Geography. (Var.) I, II, S. Pr.: Consent of instructor. GEOG-490-4-2206

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 three hours. Pr.: Sophomore standing, membership in the honors program of the College of Arts and Sciences, and permission of the instructor. GEOG-498-4-2206

GEOG 499. Senior Honors Thesis (2) I, II, S. Open only to seniors in the arts and sciences honor program. GEOG-499-4-2206

Undergraduate and graduate credit

GEOG 500. Geography of the United States. (3) II, in even 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-500-0-2206

GEOG 505. Introduction to the Civilization of South Asia I. (3) 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-505-0-2206

GEOG 506. Introduction to the Civilization of South Asia II. (3) 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-506-0-2206

GEOG 620. Geography of Latin America. (3) II. 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-620-0-2206

GEOG 640. Geography of Europe. (3) I, in odd years. 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-640-0-2206

GEOG 650. Geography of the Soviet Union. (3) I, in even years. Soviet physical limitations, resource potentials, economic capabilities, and social issues, with particular emphasis on agriculture, manufacturing, urbanization, cultural diversity, and regional development. Pr.: Six hours of social science. GEOG-650-0-2206

GEOG 680. Seminar in Regional Geography. (1-3) Pr.: Consent of instructor. GEOG-680-0-2206

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-700-0-2206

GEOG 702. Computer Mapping. (3) I, II, in odd years; and I, in even years. 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-702-0-2206

GEOG 705. Remote Sensing of the Environment. (3) I, 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-705-1-2206

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-710-0-2206

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-715-0-2206

GEOG 720. Geography of Land Use. (3) II, in even 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-720-0-2206

GEOG 725. Geography of Water Resources. (3) II, in even years. Interpretation and analysis of water as a resource. Evaluation of water use emphasizing problems associated with geographic distribution, conflicting demands, regional development, and pollution. Pr.: Senior standing. GEOG-725-0-2206

GEOG 730. World Agricultural Systems. (3) I, in even 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-730-0-2206

GEOG 740. Geography of Transportation. (3) I, in odd 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-740-0-2206

GEOG 750. Urban Geography. (3) I. 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-750-0-2206

GEOG 760. Human Impact on the Environment. (3) II, 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-760-0-2206

GEOG 770. Perception of the Environment. (3) II, in odd 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 environmental processes are

explored. Pr.: Six hours of social science with one course above the introductory level, and six hours of natural science with one course above the introductory level. GEOG-770-0-2206

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-780-0-2206

GEOG 790. Seminar in Cultural-Economic Geography. (1-3) Pr.: Consent of instructor. GEOG-790-0-2206

Graduate credit

GEOG 800. Graduate Colloquium. (2) I. The nature, aims, methods, and evaluation of geographical research. Required of all graduate students majoring in geography. GEOG-800-0-2206

GEOG 820. History and Philosophy of Geography. (2) I. A critical examination of the aims and methods of geography, especially in terms of its historical development and its logical structure. Pr.: Open to all graduate students in social sciences. GEOG-820-0-2206

GEOG 850. Topics in Environmental Geography. (1-3) I, II, S. Pr.: Consent of instructor. GEOG-850-3-2206

GEOG 860. Topics in Economic Geography. (1-3) I, II, S. Pr.: Consent of instructor. GEOG-860-3-2206

GEOG 870. Topics in Cultural Geography. (1-3) I, II, S. Pr.: Consent of instructor. GEOG-870-3-2206

GEOG 898. Master's Report. (2) I, II, S. For students enrolled in geography option B. Pr.: Registration in Graduate School, with sufficient training to carry on the line of research undertaken. Consent of instructor. GEOG-898-4-2206

GEOG 899. Master's Thesis. (6) I, II, S. For students enrolled in geography option A. Pr.: Registration in Graduate School, with sufficient training to carry on the line of research undertaken. Consent of instructor. GEOG-899-4-2206

Geology

Joseph L. Graf,* Head

Professors Chaudhuri,* Clark,* Cullers,* Doveton, Rose, Schultze,* Twiss,* Underwood,* and West;* Associate Professor Graf;* Assistant Professors Busch,* Maples,* McConnell, Oviatt,* 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.

The earth and other members of the solar system are dynamic physical systems composed of atoms interacting under varied conditions of temperature and pressure. Geology relies heavily on mathematics and other sciences—physics, chemistry, biology, and astronomy. In the solar system, the earth has been the only known habitat of life, where it has existed for at least the last three billion years.

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.

Undergraduate study

The Department of Geology offers optional 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 and in a degree in geological engineering. 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:

GEOL 100	Introductory Geology	3
GEOL 130	Elementary Geology Laboratory	1
GEOL 300	Historical Geology	4
GEOL 490	Geological Data Analysis	2
GEOL 502	Mineralogy	3
GEOL 503	Petrology	3
GEOL 507	Introductory Geochemistry	3
GEOL 520	Geomorphology	3
GEOL 530	Structural Geology	3
GEOL 570	Field Methods in Geology	1
GEOL 581	Paleobiology	5
GEOL 601	Geologic Presentation	1
GEOL 603	Sedimentary Processes and Systems	3
GEOL 605	Exploration Geophysics	3
GEOL 608	Optical Mineralogy-Petrography	3
GEOL 630	Stratigraphic Geology	3
GEOL 680	Field Geology	6
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
CHM 210	Chemistry I	4

CHM 230	Chemistry II	4
BIOL 198	Principles of Biology	4
CMPSC 200	Fundamentals of Computer Programming	2
CMPSC 201	FORTLAN Language Laboratory	2
STAT 490	Statistics for Geology	1

Geophysics option

In addition to the general requirements for the B.A. or B.S. degree, the following must be completed:

GEOL 100	Introductory Geology	3
GEOL 130	Elementary Geology Laboratory	1
GEOL 300	Historical Geology	4
GEOL 490	Geological Data Analysis	2
GEOL 502	Mineralogy	3
GEOL 503	Petrology	3
GEOL 530	Structural Geology	3
GEOL 570	Field Methods in Geology	1
GEOL 601	Geologic Presentation	1
GEOL 605	Exploration Geophysics	3
GEOL 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
PHYS 561	Geophysics	3
BIOL 198	Principles of Biology	4
CHM 210	Chemistry I	4
CHM 230	Chemistry II	4
EECE 519	Electric Circuits and Control	4
CMPSC 200	Fundamentals of Computer Programming	2
CMPSC 201	FORTLAN Language Laboratory	2
STAT 490	Statistics for Geology	1
Science elective (course at the 500 level or above in mathematics, physics, or geology)		3

Earth science options 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:

GEOL 100	Introductory Geology	3
GEOL 130	Elementary Geology Laboratory	1
GEOL 502	Mineralogy	3
GEOL 520	Geomorphology	3
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
PHYS 193	Descriptive Meteorology	3
BIOL 198	Principles of Biology	4
CHM 210	Chemistry I	4
CHM 230	Chemistry II	4

See College of Education section for teacher certification requirements.

Special courses

Two courses outside the Department of Geology are offered especially for majors in geology and geophysics. These courses are: HIST 594, History of Geology in the Department of History, and PHYS 561, Geophysics in the Department of Physics.

Geological engineering

The Department of Geology cooperates with the Department of Civil Engineering in their option in geological engineering. Seventeen credit hours of geology are required in this option, including GEOL 100, 130, 300, 502, 503, and 530 (see lists above).

Dual degrees 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: GEOL 300, 502, 503, 520, 530, 630, and 680 (see lists above).

Transfer students

In addition to the general instructions to transfer students, those 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	English Composition I	3
ENGL 120	English Composition 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
GEOL 100	Introductory Geology	3
GEOL 130	Elementary Geology Laboratory	1
GEOL 300	Historical Geology	4
PHYS 213	Engineering Physics I	5
PHYS 214	Engineering Physics II	5
BIOL 198	Principles of Biology	4
CMPSC 200	Fundamentals of Computer Programming	2
CMPSC 201	FORTLAN Language Laboratory	2

Graduate study

Graduate degrees are essential for those who want careers as professional geologists in business, government, or higher education.

The prerequisite to graduate work for the M.S. degree in geology is the completion of a four-year undergraduate program including suitable preparatory work in geology, chemistry, physics, biology, and mathematics. The Graduate Record Examination (aptitude test and advanced geology test) is required for entrance. Additional requirements of the Graduate School are listed in the appropriate section of this catalog.

The minimum requirement for the M.S. in geology is 30 semester hours, which includes at least two courses in supporting areas other than geology and six hours of research leading to successful completion of a thesis.

Research facilities include: a six-inch, 60-degree solid source mass spectrometer; hydrothermal equipment; x-ray diffractometer and spectrograph; atomic absorption/flame emission spectrophotometer; cathode luminescence microscope; heating/cooling stage for fluid inclusion studies; a fully equipped geochemistry laboratory for isotopic work; instrumentation for chemical analysis of natural waters;

and complete petrographic, paleobiological, and general geology laboratories.

The University area contains excellent outcrops and is unusually well situated for field work involving studies in sedimentary petrology, geochemistry, stratigraphy, groundwater geology, soil mineralogy, petroleum geology, midcontinent-type structure, invertebrate paleobiology, and paleoecology.

Courses in geology

Undergraduate credit

GEOL 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. GEOL-100-0-1914

GEOL 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. GEOL-101-0-1914

GEOL 105. Oceanography. (3) I, II. The oceans: their boundaries, contents, and processes. Three hours rec. a week. GEOL-105-0-1919

GEOL 110. Introductory Geology, Honors. (3) I. Survey of earth materials, features, and processes. Higher level of sophistication and challenge than GEOL 100. Three hours rec. a week. GEOL-110-0-1914

GEOL 125. Natural Disasters. (2) 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. Two hours rec. a week. GEOL-125-0-1914

GEOL 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.: GEOL 100, 105, or 125 or conc. enrollment. GEOL-130-1-1914

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-300-1-1914

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-310-0-1914

GEOL 399. Honors Seminar in Geology. (1-3) I, II. Selected topics. Open to nonmajors in the honors program. GEOL-399-0-1914

GEOL 490. Geological Data Analysis. (2) I. Collection, evaluation, and processing of numerical data in the geological sciences. Two hours lec. and two hours lab a week, 10 weeks only. Pr.: CMPSC 200, 201; open only to juniors and seniors in geology or geophysics; must be taken conc. with STAT 490. GEOL-490-1-5-1914

GEOL 499. Senior Honors Thesis. (2) I, II, S. Open only to seniors in the arts and sciences honors program. GEOL-499-4-1914

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-501-0-1914

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-502-1-5-1914

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-503-1-5-1914

GEOL 504. Oil and Gas Exploration and Evaluation Methods. (3) I. Geology of oil and gas accumulation, drilling and testing methods, exploration costs and risks, procedures for securing drilling rights, and appraisal of proved and unproved areas. For nongeology majors only. Pr.: Junior standing or equiv. experience. GEOL-504-0-1914

GEOL 505. Earth Resources. (3) I, II. Geology of petroleum, natural gas, coal, and other sources of energy and of metallic and nonmetallic ore deposits. Additional emphasis will be placed upon exploration and development of energy and mineral resources. Three hours rec. a week. Pr.: GEOL 100 or GEOG 221. GEOL-505-0-1914

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-506-0-1914

GEOL 507. Introductory Geochemistry. (3) I. Chemical principles involved in the understanding of geologic processes. Two hours rec. and three hours lab a week.

Pr.: GEOL 503 and MATH 221. GEOL-507-1-4-1915

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-510-0-1914

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-512-1-1917

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, 105, or 120. GEOL-515-0-1914

GEOL 520. Geomorphology. (3) I, II. Systematic approach to origin and operation of geomorphic processes in evaluating present and past surficial forms of earth. Geomorphic and geologic interpretation of topographic maps and remotely sensed data. Two hours rec. and two hours lab a week. Pr.: GEOL 100. GEOL-520-1-1914

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 570 or conc. enrollment. GEOL-530-1-5-1914

GEOL 570. Field Methods in Geology. (1) II. Use of instruments and remote sensing materials along with field study to produce geologic maps and subsurface interpretations. Three hours lab a week. Pr.: GEOL 300, 503, and 520. GEOL-570-1-1914

GEOL 581. Paleobiology. (5) II. Biological principles applied to fossils; introduction to contributions of bacteria, algae, and invertebrates to the fossil record using living and fossil forms. Three hours rec. and six hours lab a week. Pr.: GEOL 300 and 503; BIOL 198 or 201; PHYS 214. GEOL-581-1-1918

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-601-0-1914

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-602-0-1914

GEOL 603. Sedimentary Processes and Systems. (3) I. Sedimentary processes and depositional systems and their use in interpreting the sedimentary rock record. Two hours rec. and three hours lab a week. Pr.: GEOL 507 and 581. GEOL-603-1-1914

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-605-0-1916

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-708-1-3-1914

GEOL 630. Stratigraphic Geology. (3) II. Description, classification, and correlation of stratigraphic units; understanding of geological time relationships; paleogeographic reconstruction. Two hours rec. and three hours lab a week. Pr.: GEOL 300 and 603. GEOL-630-1-1914

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 and 530. GEOL-680-2-1914

GEOL 702. Economic Geology. (4) II. Geology and origin of metallic mineral deposits and of some nonmetallic deposits, including coal. Three hours rec. and three hours lab a week. Pr.: GEOL 507. GEOL-702-1-1914

GEOL 704. Paleoecology. (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-704-1-1918

GEOL 705. Geobiology. (3) II. Discussion and critique of current and classic research in geobiology. Three hours rec. a week. Pr.: GEOL 581. GEOL-705-0-1918

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 and one field trip a semester. Pr.: GEOL 507 or AGRON 705 or 755 or consent of instructor. GEOL-711-0-1915

GEOL 712. Advanced Geochemistry. (4) II. Application of chemical principles to igneous, metamorphic systems; emphasis on equilibria, oxidation-reduction, crystal

chemistry, and thermodynamics. Three hours lec. and three hours lab a week. Pr.: GEOL 507 and CHM 585 or CHM 500. GEOL-712-1-5-1915

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-716-0-1914

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-720-0-1914

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-730-0-1914

GEOL 740. Regional Geology. (3) I. Structure and stratigraphy of the major tectonic units of North America. Pr.: GEOL 530, 630. GEOL-740-0-1914

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-770-1-1914

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. GEOL-790-3-1914

Graduate Credit

GEOL 800. Graduate Seminar in Geology. (Var.) I, II. Topics in geology, geochemistry, and geophysics. GEOL-800-3-1914

GEOL 801. Advanced Paleobiology. (2) On sufficient demand. Detailed study of the functional morphology, ecology, biogeography, evolution, and classification of selected groups. Pr.: GEOL 704 or 705. GEOL-801-0-1918

GEOL 804. Igneous and Metamorphic Petrology. (4) On sufficient demand. Selected problems in the petrogenesis of igneous and metamorphic rocks. Three hours lec. and three hours lab a week. Pr.: GEOL 608. GEOL-804-1-5-1914

GEOL 805. Advanced Igneous and Metamorphic Petrology. (2) On sufficient demand. Field and laboratory study of selected problems in the origin of igneous

and metamorphic rocks. Pr.: GEOL 804. GEOL-805-1-5-1914

GEOL 806. Sedimentary Petrology. (4) II. Petrography, classification, and origin of terrigenous and chemical sedimentary rocks. Three hours lec. and three hours lab a week. Pr.: GEOL 608. GEOL-806-1-5-1914

GEOL 807. Advanced Sedimentary Petrology. (2) I, II. Field and laboratory study of selected problems in the origin of sedimentary rocks. Pr.: GEOL 806. GEOL-807-1-5-1914

GEOL 810. Isotope Geology. (3) I. Principles, techniques, and applications of natural radioactive isotopes to geochronology; application of isotopes to problems of petrogenesis. Three hours rec. a week. Pr.: GEOL 608 or consent of instructor. GEOL-810-0-1914

GEOL 830. Geotectonics. (3) I. Origin and history of major tectonic elements of the earth, especially their interaction through time. Pr.: GEOL 530. GEOL-830-0-1914

GEOL 840. Planetology. (3) II. Geologic principles applied to a study of the solar system. Pr.: GEOL 530, 712, or consent of instructor. GEOL-840-0-1914

GEOL 880. Clay Mineralogy. (3) II. Geologic occurrences, physical properties, atomic structures, and the identification of clay minerals, including thermal analytical methods and the study of X-ray diffraction patterns. Two hours rec. and three hours lab a week. Pr.: GEOL 507 or AGRON 515. GEOL-880-1-1914

GEOL 899. Research in Geology, M.S. (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.: Registration in Graduate School, with sufficient training to undertake research in specific area. GEOL-899-4-1914

History

John M. McCulloh,* Head

Professors Frey,* Hamscher,* Higham,* Jones,* Kaufman,* Kren,* Linder,* Mrozek,* Socolofsky,* and Wilcoxon;* Associate Professors Donovan,* Ferguson,* Gray,* Nieman,* and Page;* Assistant Professors Daly and Zschoche; Emeriti: Professors Carey,* and Sageser;* Associate Professors Alsop* and Crawford.*

The history program at Kansas State University appeals not only to majors but to all students seeking a rewarding educa-

tional 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 Kansas State University (courses numbered HIST 100 through HIST 299) may receive credit for the history major.

Undergraduate study

Requirements for a major in history consist of a minimum of 36 hours in history, including HIST 101, Western Civilization: The Rise of Europe; HIST 102, Western Civilization: The Modern Era; HIST 251, The United States to 1877; and HIST 252, The United States since 1877; a minimum of 18 hours in courses numbered 500 and above; and HIST 586 in the junior year. Students must distribute their upper division courses over at least three of the following fields:

Ancient, medieval, and early modern Europe

Modern Europe (including Great Britain)

The third world (Asia, Africa, Latin America)

The United States (including the colonial period)

Topical courses not focusing upon a specific geographical region, such as history of science, technology, dance, sport, military history, psychohistory, and other similar 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 bachelor of arts (B.A.) degree in history. In order 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 (six 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 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.

Secondary education certification

Students majoring in history may also prepare for teacher certification at the secondary level. This program leads to the bachelor of science or the bachelor of arts degree in history. The sequence of courses should be planned in cooperation with advisors in both history and education to ensure that the requirements of both programs are met. (See College of Education section for history education requirements.) Students taking this program must include in their 18 hours of upper division courses HIST 599, Senior Seminar for Secondary Teachers.

Graduate study

Graduate study leading to the master of arts and doctor of philosophy degrees is offered in most fields, including the history of science and technology, intellectual history, military history, psychohistory, and economic and agricultural history. General requirements for these degrees are set forth in the Graduate School section of this catalog.

Candidates for the master of arts degree must take a course in historiography. If they write a thesis or report they must offer two seminars and pass a written or oral final examination. If they take the nonthesis, nonreport degree, they must offer three seminars and pass a written final examination.

For the doctor of philosophy degree, candidates must present a general field in European or American history, two special fields in history, and an outside minor field. The preliminary examinations are both written and oral. Reading proficiency in two acceptable foreign languages is required.

A detailed description of the graduate programs and information regarding financial support may be obtained by writing the head of the department.

The department cooperates with a number of other departments in the South Asia program, which is described in detail in the Academic Programs section of this catalog. It also publishes *Military Affairs*, the journal of military, naval, and air history, theory, and technology.

Facilities for graduate study

The University's Farrell Library has a number of large, specialized collections. In addition, nearby are several excellent research facilities: the Eisenhower Presidential Library, with outstanding holdings relating to the Eisenhower administration and recent military history; the Truman Presidential Library, with valuable collections on the Truman administration, the history of the American presidency, and foreign policy; the Linda Hall Library, emphasizing materials pertaining to the history of science; the library of the United States Army Command and General Staff College at Fort Leavenworth; and the regional Federal Records Center at Kansas City, currently rich in military and civil records and eventually to have a microfilm duplication of the main holdings of the National Archives in Washington.

Courses in history

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-100-0-2205

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-101-0-2205

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-102-0-2205

HIST 103. Overseas European Studies. (2-3) Intercession 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-103-0-2205

HIST 105. Western Civilization: The Rise of Europe (Honors). (3) I, in alternate years. Course description same as HIST 101. HIST-105-0-2205

HIST 106. Western Civilization: The Modern Era (Honors). (3) II, in alternate years. Course description same as HIST 102. HIST-106-0-2205

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-200-0-2205

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 period. Knowledge of Russian language is not required. Same as MLANG 250. HIST-250-0-2205

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-251-0-2205

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-252-0-2205

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, PHILO 297. HIST-297-0-2205

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-298-0-2205

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 de-

stroyed the British Empire and created the new countries of India and Pakistan. HIST-350-0-2205

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-398-0-4900

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-401-0-2205

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-459-0-2205

HIST 460. Dance Styles and Personalities. (3) On sufficient demand. Brief overview of dance, primitive to the Renaissance. Primary focus is on the contributions of persons and styles to the development of the dance, ballet de cour to contemporary trends. Same as DANCE 460. HIST-460-0-2205

HIST 498. Senior Thesis. (3-6) I, II, S. May be repeated once to a maximum of six hours credit. Pr.: Senior standing. HIST-498-1-4-2205

HIST 499. Senior Honors Thesis in History. (2) I, II, S. Open only to seniors in the arts and sciences honors program. HIST-499-4-2205

Undergraduate and graduate credit in minor field

HIST 501. Heritage of the Western World. (3) I, II, in alternate years. The heritage and legacies of Western civilization, designed for the nonmajor. Emphasizes broad themes in the evolution of the political, economic, social, cultural, and ideological inheritance. Not for major credit. Pr.: Sophomore standing. HIST-501-0-2205

HIST 503. Overseas European Studies. (2-3) Intercession 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-503-0-2205

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 develop-

ment of related religions such as Buddhism, Jainism, and Sikhism. Pr.: Sophomore standing. HIST-504-0-2205

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-505-0-2205

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-506-0-2205

HIST 510. History of Marxism: Theory and Praxis. (3) II, in alternate years. Analysis of the origins of Marxism, stressing the impact of German idealism, French radicalism, utopian socialism, and British industrialization. Development of Marx's thought from the *Philosophical Manuscripts* to *Kapital*. Second half of the course concerns the organization of Marxist parties and movements from the Second International to polycentrism. The course will treat the Marxist-humanist response to Stalinism. Pr.: Sophomore standing. HIST-510-0-2205

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-512-0-2205

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-513-0-2205

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-514-0-2205

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 PE 515. Pr.: Sophomore standing. HIST-515-0-2205

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-516-0-2205

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-517-0-2205

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-518-0-2205

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-519-0-2205

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-520-0-2205

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-521-0-2205

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-522-0-2205

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-523-0-2205

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-525-0-2205

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-526-0-2205

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-527-0-2205

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-529-0-2205

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-531-0-2205

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-533-0-2205

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-536-0-2205

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-537-0-2205

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-538-0-2205

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-539-0-2205

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-541-0-2205

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 American's response to war and revolution in the twentieth century. Pr.: Sophomore standing. HIST-543-0-2205

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-544-0-2205

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 Indochinese 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-545-0-2205

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-546-0-2205

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-548-0-2205

HIST 550. American Economic History. (3) In alternate years. Development of the American economy from colonial times to the present including colonial agriculture and mercantilism, the emergence of the factory system, industrial capitalism, large-scale business and agricultural enterprises, classical and Keynesian economics. Pr.: Sophomore standing. HIST-550-0-2205

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-552-0-2205

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-553-0-2205

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-555-0-2205

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-557-0-2205

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-558-0-2205

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-560-0-2205

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-561-0-2205

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-562-0-2205

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-563-0-2205

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-564-0-2205

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-565-0-2205

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-566-0-2205

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-567-0-2205

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-568-0-2205

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-569-0-2205

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-570-0-2205

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-571-0-2205

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-572-0-2205

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-573-0-2205

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-574-0-2205

HIST 576. European Diplomatic History to Napoleon. (3) I, in alternate years. The nature, evolution, and functions of the European diplomatic system from 1500 to 1815. Includes a study of the personality and roles of prominent rulers, spies, and diplomats. Analyzes the Greek and Roman diplomatic tradition, international relations during the Middle Ages, the Venetian system, the struggle for European hegemony, the emergence of the Great Powers, the French Revolution, and the Napoleonic empire. Discusses the use of major diplomatic archives and the interpretation of ambassadorial instructions and reports. Pr.: Sophomore standing. HIST-576-0-2205

HIST 577. European Diplomatic History Since Napoleon. (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, diplomacy of Bismarck, international developments between the two world

wars, and the cold war. Pr.: Sophomore standing. HIST-577-0-2205

HIST 578. Emperors and Peoples: The House of Hapsburg. (3) In alternate years. The diplomatic, military, political, economic, and social aspects of the Hapsburg empire in central Europe, the Iberian Peninsula, Italy, and the Netherlands from its foundation to its dissolution in the twentieth century. Pr.: Sophomore standing. HIST-578-0-2205

HIST 579. England to 1603. (3) In alternate years. English medieval institutions with some regard to their interrelation when possible. Approached through selected topics including Anglo-Saxon society as a folk culture, Anglo-Norman military customs, English monastic and mystical life, the origins of Parliament, the Reformation, etc. Pr.: Sophomore standing. HIST-579-0-2205

HIST 580. England since 1603. (3) In alternate years. English society and politics in modern times. Emphasis on topics such as the three orders of society (king, lords, and commons), the English church, the rise of the House of Commons, the extension of the vote, and relations with Scotland and Ireland. Pr.: Sophomore standing. HIST-580-0-2205

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-582-0-2205

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-583-0-2205

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-584-0-2205

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-586-0-2205

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-587-0-2205

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-588-0-2205

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-590-0-2205

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-591-0-2205

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 in-

telligentsia, 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-592-0-2205

HIST 594. History of Geology. (3) I, in alternate years. Important trends and individuals in geology from the seventeenth century to the present, with emphasis on the nineteenth century. Substantial use will be made of primary sources. Pr.: Sophomore standing. HIST-594-0-2205

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-596-0-2205

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-597-0-2205

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-598-0-2205

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. HIST-599-0-2205

Undergraduate and graduate credit

HIST 617. Theories and Methods of Psychohistory. (3) I, in alternate years. The origin of psychohistory in works by Freud and Neo-Freudians such as Erikson and Lifton, the emerging methods and theories in such areas as psychobiography, history of childhood, large group processes, and the attempts to construct philosophical and ideological systems out of the combination of history and psychology. Same as PSYCH 617. Pr.: Junior standing. HIST-617-0-2205

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-648-0-2205

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-649-0-2205

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-650-1-2-2205

HIST 655. 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-655-0-2205

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-703-0-2205

HIST 798. Readings in History. (1-3) Students will read on a central theme, attend weekly discussions, and write a final report. HIST-798-3-2205

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. HIST-799-3-2205

Graduate credit

HIST 801. Historiography. (3-4) Main currents in historical research, the writing of history, and the influence of the great historians from Herodotus to the present. Required of all graduate students in history. HIST-801-0-2205

HIST 899. Master's Research in History. (Var.) HIST-899-4-2205

HIST 901. Advanced Historiography. (1-4) Advanced work offered on demand and by arrangement, in main currents in historical research, the writing of history,

and the influence of great historians. HIST-901-4-2205

HIST 919. Seminar in History of Christianity. (3) HIST-919-0-2205

HIST 920. Seminar in American Social History. (3) HIST-920-0-2205

HIST 921. Seminar in Latin American History. (3) HIST-921-0-2205

HIST 922. Seminar in American Diplomatic History. (3) HIST-922-0-2205

HIST 923. Seminar in the History of the American West. (3) HIST-923-0-2205

HIST 924. Seminar in Colonial America. (3) HIST-924-0-2205

HIST 926. Seminar in American Economic History. (3) HIST-926-0-2205

HIST 927. Seminar in American Science and Technology. (3) HIST-927-0-2205

HIST 928. Seminar in American History. (3) HIST-928-0-2205

HIST 930. Seminar in Modern European History. (3) HIST-930-0-2205

HIST 931. Seminar in German History. (3) HIST-931-0-2205

HIST 932. Seminar in French History. (3) HIST-932-0-2205

HIST 933. Seminar in European Diplomatic History. (3) HIST-933-0-2205

HIST 935. Seminar in Modern Russian History. (3) HIST-935-0-2205

HIST 936. Seminar in Renaissance and Reformation. (3) HIST-936-0-2205

HIST 937. Seminar in British History. (3) HIST-937-0-2205

HIST 940. Seminar in Military History. (3) HIST-940-0-2205

HIST 950. Seminar in South Asian History. (3) HIST-950-0-2205

HIST 979. Seminar in the History of Science. (3) HIST-979-0-2205

HIST 980. Topics in European History. (1-3) HIST-980-0-2205

HIST 981. Topics in Third World History. (1-3) HIST-981-0-2205

HIST 982. Topics in the History of Science. (1-3) HIST-982-0-2205

HIST 983. Topics in Military History. (1-3) HIST-983-0-2205

HIST 984. Topics in American History. (1-3) HIST-984-0-2205

HIST 985. Readings in History. (1-3) HIST-985-3-2205

HIST 986. Problems in History. (1-3) HIST-986-3-2205

HIST 999. Ph.D. Research in History. (Var.) HIST-999-4-2205

Journalism and Mass Communications

Carol Oukrop, Head

Professors Marsh* and Oukrop;* Associate Professors D. Adams, Bontrager,* Chastain, Daly, Holt, MacFarland,* Parsons,* Pearce, and Prince;* Assistant Professors W. Adams, Buller, Freeland, and Ramsey.*

Journalism and mass communications encompasses the broad field of journalism, advertising, public relations, and radio-television. Students majoring in JMC follow a general course of study in the College of Arts and Sciences and a specialized professional curriculum. 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 1987, both the *Collegian* and the *Royal Purple* were awarded the prestigious national Pacemaker Award. On the broadcast side, majors 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. The department also has a typing lab, a photo lab, and a word-processing and computer graphics lab.

The JMC program is housed in Kedzie Hall, with radio-television studios and offices in McCain Auditorium Annex.

Undergraduate study

Students in journalism and mass communications must fulfill the general requirements of the College of Arts and Sciences for either a B.S. or a B.A. degree. Beyond this they develop, in consultation with their advisors, individualized programs within the framework of a liberal arts education. Approximately one-quarter of a student's total course work is taken in JMC, and an additional 15-hour outside concentration is taken in a supporting discipline.

All majors are required to achieve a 2.5 grade point average in journalism and mass communications courses in order to qualify for graduation. Courses in JMC are in two areas: those which focus on the relationship of mass communications to society and those designed for professional training and skill development. Passage of the JMC Language Skills Exam is required of all majors for entry into all professional

training and skills courses. In JMC, students may select from several options within two majors, and must specify major, option, and outside concentration upon completion of 40 to 50 semester hours or, for transfer students, at the beginning of the junior year.

A major requires a minimum of 30 credit hours within JMC and a minimum of 90 non-JMC hours, 15 of which compose the outside concentration in a supporting discipline. No more than two courses of the outside concentration may also be used to fulfill general arts and sciences requirements. At least two of the courses in the outside concentration must be 500 level or above or have a prerequisite in the department chosen for the concentration. Of the 90 non-JMC hours, at least 65 must be in the basic, liberal arts and sciences.

Enrollment guides for majors are available in 104 Kedzie Hall.

Journalism and mass communications major

All JMC majors will be required to complete ECON 110, Economics I, and EDCI 217, Introduction to the Library, and the following courses:

JMC 235	Introduction to Mass Communications	3
JMC 275	News and Feature Writing	3
JMC 665	Law of Mass Communications	3

Courses listed under one of the following options are also required:

Journalism option		
JMC 300	Editing and Design	3
JMC 380	Advanced News and Feature Writing	3
JMC 480	Advanced Editing and Design	3
JMC 600	Public Affairs Reporting	3

or		
RTV 240	Audio I	3
RTV 320	Fundamentals of RTV Performance	3
RTV 330	Broadcast News Writing	3
JMC 600	Public Affairs Reporting	3

Public relations option		
JMC 300	Editing and Design	3
JMC 380	Advanced News and Feature Writing	3
JMC 515	Fundamentals of Public Relations ..	3
JMC 635	Public Relations Techniques	3
JMC 642	Seminar in Public Relations Management	3
JMC 550	Mass Communications Internship	1-3

Advertising option		
JMC 320	Principles of Advertising	3
JMC 545	Advertising Media	3
JMC 555	Advertising Copy and Layout	3
RTV 620	Electronic Media Advertising Sales	3
JMC 640	Seminar in Advertising Management	3

General option		
JMC 300	Editing and Design	3
JMC 320	Principles of Advertising	3
JMC 380	Advanced News and Feature Writing	3
JMC 660	History of Journalism	3
or		
JMC 685	The Mass Communicator: Ethics and Issues	3

Radio-television major

All RTV majors will be required to complete: ECON 110, Economics I, and EDCI 217, Introduction to Library, plus two courses in political science or two courses in the College of Business Administration, and the following courses:

JMC 235	Introduction to Mass Communications	3
RTV 237	Writing for the Electronic Media ...	3
RTV 240	Audio I	3
RTV 250	Video I	3
RTV 490	Senior Seminar	3

and one of the following:		
RTV 340	Audio II	3
RTV 350	Video II	3

and one of the following:		
RTV 620	Electronic Media Ad Sales	3
RTV 630	Electronic Media Programming	3
RTV 685	Electronic Media Management	3

and one of the following:		
JMC 560	Non-Traditional Press	3
JMC 612	Women and the Media	3
JMC 645	The Minority Press in America	3
JMC 660	History of Journalism	3
RTV 660	History of Telecommunications	3
RTV 665	Radio-Television Rules and Regulations	3
JMC 670	International Communications	3
JMC 685	The Mass Communicator: Ethics and Issues	3
JMC 730	Seminar in the Future of the Media	3
JMC 740	Colloquium in Mass Communications	3

Agricultural journalism major

Students may enroll in the College of Agriculture and earn a major in agricultural journalism by taking courses in JMC. See the College of Agriculture section for details.

Human ecology and mass communications

Students may enroll in the College of Human Ecology and earn a degree in human ecology and mass communications with options in journalism and mass communications or radio-television. See the College of Human Ecology section for details.

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 completion of specified courses in the College of Education. See that college's section 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 head a portfolio or tapes or other suitable evidence of performance which would allow assessment of course-related experience. After review of the material, the

head 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 18 of the student's journalism credit hours must be KSU resident hours.

Transfer students

Students transferring to the undergraduate program in journalism and mass communications at Kansas State University 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 KSU 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 the transfer student and may accept a maximum of three credit hours for all such work, equivalent to courses such as publications practices or radio or cable television participation.

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.

Graduate study

Graduate students in mass communications at Kansas State University may work toward the M.S. degree in mass communication.

Courses provide for professional practice along with studies in research methods and in communication process and theory. Students are encouraged to plan a program of study to help meet individual goals in such areas of interest as journalism, public relations, advertising, and radio-TV management.

Many graduate students structure a specialized academic program which combines mass communication with another interest such as agriculture, human ecology, wildlife conservation, and education.

Students whose undergraduate major is not in journalism or radio-TV may be admitted provisionally, with a requirement to com-

plete basic undergraduate courses along with their graduate work.

The master of science in mass communication includes the following requirements: (a) 12 hours of 700-level or above courses in JMC/RTV, including JMC 780, Research Methods; JMC 765, Communication Theory; and RTV 850, Applied Research in Mass Media

(b) 6 hours of 700-level or above supporting courses (outside JMC/RTV) in the same subject area

(c) a thesis (6 credit hours) or a report (2 credit hours)

(d) a minimum of 30 graduate-level hours

(e) written comprehensive examinations and a final oral examination.

Additional details are included in the JMC guide to graduate study, available in 104 Kedzie Hall.

Courses in journalism

Undergraduate credit

JMC 235. Introduction to Mass Communications. (3) I, II. A historical, social, legal, economic, and technological study of mass communications. Current practices and responsibilities, consumer rights, and career opportunities will be detailed. JMC-235-0-0601

JMC 245. Color Photography. (3) II. Introduction to the advanced 35 mm camera in producing color slides. On-location photography; no processing. Students supply 35 mm camera and film. Not open to those students who have taken JMC 310. JMC-245-0-0602

JMC 275. News and Feature Writing. (3) I, II, S. Instruction in information gathering and writing techniques for the various media. Pr.: JMC 235 or conc. enrollment, passage of the JMC Language Skills Exam, and ability to type 30 words a minute. JMC-275-1-4-0602

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 passage of the JMC Language Skills Exam. JMC-300-1-4-0602

JMC 310. Photography I. (3) I, II, S. Basic camera and laboratory techniques of photography. Not open to students who have taken JMC 245. JMC-310-1-4-0602

JMC 320. Principles of Advertising. (3) An examination of the advertising field and its relationship to marketing and journalism. JMC-320-0-0602

JMC 350. Agricultural Journalism. (3) Agricultural information techniques and methods of working with the mass media. Emphasis on writing experience. Ability to type helpful. Pr.: ENGL 100. For nonmajors only. JMC-350-1-6-0602

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-360-2-0602

JMC 380. Advanced News and Feature Writing. (3) Three hours rec. and six hours reporting for the *Kansas State Collegian* each week. Pr.: JMC 300 with grade of C or better and passage of the JMC Language Skills Exam. JMC-380-1-2-0602

JMC 399. Honors Seminar in Mass Communications. (3) Pr.: Honors students only; consent of supervising instructor. JMC-399-0-0601

JMC 480. 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. Two hours of rec. and six hours editing for the *Kansas State Collegian* each week. Pr.: JMC 380 with grade of C or better. JMC-480-1-2-0602

JMC 499. Seminar Honors Thesis. (2) Pr.: Honors students only; consent of supervising instructor. JMC-499-4-0601

Undergraduate and graduate credit in minor field

JMC 500. Topics in Mass Communication. (1-3) Selected topics in mass communication research and practice. JMC-500-0-0601

JMC 510. Yearbook Editing and Management. (2) Planning, editing, layout, writing, and financing a publication. JMC-510-1-4-0602

JMC 512. Introduction to Public Relations. (3) Media, methods, principles, and practices of public relations. Pr.: Junior standing. JMC-512-0-0602

JMC 515. Fundamentals of Public Relations. (3) Management of communications between an organization and its publics. Pr.: JMC 275 with a grade of C or better and passage of the JMC Language Skills Exam. AJN/HECOM/JMC/RTV majors only. JMC-515-0-0602

JMC 520. The Modern Magazine. (3) I, II. An overview of the magazine field. Development of magazines in the United States; the magazine industry; functions of contemporary magazines. Study of the structure, content, and style of different magazines. Pr.: Junior standing or consent of instructor. JMC-520-0-0602

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 310 with grade of C or better and either JMC 275 or JMC 350 and access to a 35 mm or $2\frac{1}{4} \times 2\frac{1}{4}$ camera. May be repeated for a maximum of four semester hours. JMC-535-1-0602

JMC 545. Advertising Media. (3) I, II. The selecting, scheduling, selling, and buying of the various advertising media. Pr.: JMC 275 and JMC 320 with grades of C or better and passage of the JMC Language Skills Exam or, for non-majors, consent of instructor. JMC-545-0-0602

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 semester hours of JMC courses and consent of instructor. JMC-550-2-0601

JMC 555. Advertising Copy and Layout. (3) The creating, designing, and writing of advertising copy for the print media stressing the production of a workable advertising campaign. Pr.: JMC 320 with grade of C or better. JMC-555-1-7-0602

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-560-0-0602

Undergraduate and graduate credit

JMC 600. Public Affairs Reporting. (3) Investigative reporting of local, state, and national affairs. Pr.: JMC 380. JMC-600-0-0602

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-605-0-0602

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 380. May be repeated once for credit with written permission of instructor and department head required. JMC-610-0-0602

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-612-0-0602

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 380. JMC-615-0-0602

JMC 620. Magazine Production. (3) The practical application of theory to writing, editing, graphic reproduction, layout, and management of magazines. Pr.: JMC 380. JMC-620-0-0602

JMC 625. Public Opinion. (3) Role of interpersonal communication and mass communication on public opinion. Practical survey experience. Pr.: Junior standing and consent of instructor. JMC-625-0-0602

JMC 635. Public Relations Techniques. (3) Application of the principles of public relations to actual and hypothetical cases. Emphasis on communications techniques used in public relations. Pr.: JMC 515 with a grade of C or better and passage of the JMC Language Skills Exam. JMC-635-0-0602

JMC 640. Seminar in Advertising Management. (3) The managerial development and execution of consumer, industrial, and institutional advertising campaigns. Pr.: JMC 545 and JMC 555 with grades of C or better; senior standing. JMC-640-0-0602

JMC 642. Seminar in Public Relations Management. (3) In-depth study of an organization's public relations, to include analyzing the situation, planning a program, and designing specific communications. Pr.: JMC 635 with grade of C or better; senior standing. JMC-642-0-0602

JMC 645. The Minority Press in America. (3) Consideration of the growth, development, and current status of the ethnic minority press in the United States. JMC-645-0-0602

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 480 or conc. enrollment. JMC-650-0-0602

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 or consent of instructor. JMC-660-0-0602

JMC 665. 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 or consent of instructor. JMC-665-0-0601

JMC 670. International Communications. (3) Comparative study of world press systems and the role of communications in national development. JMC-670-0-0601

JMC 680. Readings in Mass Communications. (1-3) Investigation of the literature of mass communications. Pr.: Minimum of nine hours of completed course work in JMC, senior or graduate standing, and consent of supervisory instructor. JMC-680-3-0602

JMC 685. The Mass Communicator: Ethics and Issues. (3) A consideration of influences and controls that define the role of the mass communicator in American society. Pr.: Senior standing. JMC-685-0-0602

JMC 690. Problems in Mass Communications. (1-4) Pr.: Background of courses needed for problem undertaken. JMC-690-3-0602

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-730-0-0601

JMC 740. Colloquium in Mass Communications. (1-3) Discussion of selected topics in mass communications research and practice. Pr.: Senior or graduate standing. JMC-740-0-0601

JMC 765. Communication Theory. (3) An examination of major communication theories as they relate to individual, interpersonal, group, and mass communications. JMC-765-0-0601

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 280 or RTV 330 and consent of supervising instructor. JMC-770-2-0602

JMC 780. Research Methods in Mass Communications. (3) Survey of research methods used in the study of the mass media. JMC-780-0-0602

Graduate credit

JMC 899. Research in Mass Communications. (Var.) Pr.: Registration in the Graduate School and sufficient training to carry on the line of research undertaken. JMC-899-4-0602

Courses in radio and television**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 passage of the JMC Language Skills Exam. RTV-237-0-3-0603

RTV 240. Audio I. (3) I, II, S. Basic instruction in audio for radio and TV, emphasizing laboratory experiences. Pr.: RTV 237 with grade of C or better. RTV-240-1-0603

RTV 250. Video I. (3) I, II, S. 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-250-1-0603

RTV 265. Public Broadcasting. (2) Intersession only. A study of the history, current status, and future of noncommercial radio and television. The role of public broadcasting within the spectrum of the mass media: its strengths, its weaknesses, and its current directions. The course will include field trips to public broadcast stations, and visits to campus by persons actively engaged in public broadcasting. RTV-265-0-0603

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. RTV-300-0-0603

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 SPCH 105. RTV-320-1-0603

RTV 330. Broadcast News Writing. (3) Practical experience in gathering, writing, editing, and presenting news for KSDB-FM and cable television, and study of current issues and federal/state regulations and laws. Pr.: JMC 275 and RTV 240 with grades of C or better. RTV-330-1-5-0603

RTV 340. Audio II. (3) I, 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-340-1-0603

RTV 350. Video II. (3) I, II. 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-350-1-0603

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-355-5-0603

RTV 360. Radio News Practicum. (2) Intersession only. A concentrated course in writing and performing radio news stories. The course will emphasize development of broadcast reading style and presence. Pr.: RTV major. RTV-360-1-0603

RTV 365. Radio Automation. (2) Intersession only. Instruction in theory and technique. Practical experience in programming and operating radio program automation systems. Appropriate FCC regulations are covered. Pr.: Consent of instructor. RTV-365-1-0603

RTV 370. Agriculture Broadcasting. (2) Intersession only. Training in performance of farm markets and farm news, as well as theory behind the markets and how such information affects the entire Kansas economy. Guest lecturers share their expertise. Pr.: JMC, RTV, ag journalism, or home economics mass communications major. RTV-370-0-0603

RTV 455. KSDB Board/Production. (1) I, II, S. Supervised performance in the operation of the University's student FM radio station, emphasizing music announcing, board work, recorded production, and FCC operating regulations. May not be repeated. Pr.: RTV 355. RTV-455-5-0603

RTV 460. KSDB News/Sports. (3) I, II, S. Supervised performance in the operation of the University's student FM radio station, emphasizing newscast and sports play-by-play announcing and appropriate FCC regulations. May not be repeated. Pr.: RTV 330 and RTV 355. RTV-460-5-0603

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-475-5-0603

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-490-0-0603

RTV 540. Advanced Reporting for the Electronic Media. (3) Reporting of issues of local importance, information-gathering techniques, in-depth writing, and electronic media news production methods. Pr.: RTV 330. RTV-540-0-0603

Undergraduate and graduate credit

RTV 610. Entertainment Script Writing. (3) I. The principles and preparation of dramatized broadcast programs. Pr.: RTV 240 with a grade of C or better. RTV-610-0-0603

RTV 615. Documentary Script Writing. (3) II. Study of the principles and preparation of nonfiction broadcast programs and industrial communication. Pr.: RTV 237, 240, 250 with a grade of C or better. RTV-615-0-0603

RTV 620. 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. RTV-620-0-0603

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-630-0-0603

RTV 660. History of Telecommunication. (3) History of the telecommunication industries; their effects on American life; the economic, political, and social significance of electronic media. Pr.: Junior standing. RTV-660-0-0603

RTV 665. Radio-Television Regulation and Responsibility. (3) II. The major laws and legal decisions which affect broadcasting and cable, with attention to the Federal Communication Act, rules and regulations, and other laws relating to broadcasting and cable management. Pr.: Senior standing. RTV-665-0-0603

RTV 675. Radio-Television Criticism. (3) II. The principles and criteria of mass media criticism, with emphasis on broadcasting. Pr.: Junior standing. RTV-675-0-0603

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. RTV-685-0-0603

RTV 750. Applied Research in Mass Media. (3) II. Study and application of mass media research, its literature and methodology. Pr.: Graduate or senior standing. RTV-750-0-0603

Mathematics

Louis Pigno,* Head

Professors Burckel,* Curtis,* Dixon,* Dressler,* Greechie,* Lee,* Marr,* F. Miller,* Pigno,* Ramm,* Saeki,* Shult,* Strecker,* and Stromberg;* Associate Professors Chermak,* Delgado,* Herman,* Muenzenberger,* W. Parker,* Summerhill,* and Surowski;* Assistant Professors Barab,* Cochrane,* Halasi,* Li,* Willis, and Zou;* Emeriti: Professors Fuller,* T. Parker,* 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.

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.

Undergraduate study

Students in mathematics may obtain either the B.A. or B.S. degree. For either degree, in addition to the requirements of the University and college, students must take:

MATH 220	Analytic Geometry and Calculus I and	4
MATH 221	Analytic Geometry and Calculus II and	4
MATH 222	Analytic Geometry and Calculus III	4
	or	
MATH 225	Analytic Geometry and Calculus I-S and	6
MATH 226	Analytic Geometry and Calculus II-S	6
MATH 240	Elementary Differential Equations	4
	or	
MATH 250	Linear Algebra and Differential Equations I and	3
MATH 251	Linear Algebra and Differential Equations II	3
CMPSC 200	Fundamentals of Computer Programming	2
STAT 510	Introductory Statistics and Probability I	3
MATH 512	Introduction to Modern Algebra ...	3
	or	
MATH 511	Introduction to Algebraic Systems ..	3
MATH 663	Advanced Calculus I	3
	or	
MATH 520	Foundations to Analysis	3

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.

For the B.A. degree, students must take 15 additional hours in mathematics numbered 400 or above; PHIL 510 may be substituted for 3 of these hours.

The pre-graduate program

Students who intend to enter graduate school to work toward an advanced degree in either pure or applied mathematics should include among their upper division mathematics courses:

MATH 700	Set Theory and Logic	3
MATH 721	Analysis I	3
MATH 722	Analysis II	3
MATH 730	Abstract Algebra I	3
MATH 731	Abstract Algebra II	3

They should also take courses in related scientific fields, especially physics and computer science. At least one foreign language, preferably French, German, or Russian, should be studied as a research tool for graduate work.

The mathematics education program

Students who intend to become secondary school mathematics teachers may prepare for teacher certification while completing the requirements for a degree in mathematics. A number of upper-division courses offered by the mathematics department are designed particularly for such students. These include:

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 573	Transformation and Vector Geometry	3
MATH 791	Topics in Mathematics for Secondary School Teachers	3

For specific certification requirements for secondary education, please see the College of Education section.

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 308	Topics in Mathematics for Elementary School Teachers	4
MATH 309	Intuitive Geometry	2
MATH 312	Finite Applications of Mathematics	3
MATH 313	Computational Number Theory	3

The applied mathematics program

Students who intend to seek employment in business, industry, or government after earning a bachelor's degree should take Advanced Calculus I, II (MATH 553, 554) in the junior year. In addition, the following courses are strongly recommended:

MATH 510	Discrete Mathematics	3
MATH 551	Applied Matrix Theory	3
MATH 628	Vector Analysis	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

It is recommended that the student also take at least six hours of upper-division courses outside the mathematics department in areas such as engineering, physics, statistics, or computer science.

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 dual degree in mathematics 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.

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 the student's ACT score to select the appropriate entry-level mathematics course. Advisors also have access to extended mathematics course descriptions that will help them to advise students.

Graduate study

The Department of Mathematics offers work leading to the degrees of master of science and doctor of philosophy. Students planning a career in college or university teaching or research in mathematics should plan a program leading to an advanced degree. For admission to graduate work in mathematics, a student should have completed work in mathematics equivalent to what is required for a B.S. or B.A. degree at KSU with a B average or better. Prospective graduate students whose undergraduate training does not meet these requirements may be admitted on a provisional basis. Such students are required to remedy deficiencies in undergraduate preparation by completing the undergraduate courses without receiving graduate credit. University requirements for advanced degrees are given in the Graduate School section of the catalog. Information on mathematics departmental programs and requirements and on facts concerning courses offered during the summer term may be obtained by writing to the Department of Mathematics, 136 Cardwell Hall, Manhattan, Kansas 66506.

Courses in mathematics

MATH 010. Intermediate Algebra. (3) I, II, S. Review of elementary algebra; topics preparatory to MATH 100. Pr.: One unit of high school algebra. MATH-010-0-1701

Undergraduate credit

MATH 100. College Algebra. (3) I, II, S. Pr.: Plane geometry and satisfactory placement test score in algebra. Students with one and one-half entrance units of algebra should normally be eligible for this course. MATH-100-0-1701

MATH 101. The Metric System. (1) 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 on competent use of metric terms in problem solving. MATH-101-0-1701

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-110-0-1701

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.: One unit plane geometry and one and one-half units of high school algebra. MATH-150-0-1701

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-199-2-1701

MATH 201. Elementary Applied Mathematics. (3) I, II. Applications of precalculus mathematics with emphasis on the techniques of problem solving. Pr.: One and one-half years of high school algebra, one year of high school geometry, one-half year of high school trigonometry, and satisfactory placement test score. MATH-201-0-1701

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-205-0-1701

MATH 210. Technical Calculus I. (3) I, II. 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-210-0-1701

MATH 211. Technical Calculus II. (3) I, II. A continuation of MATH 210 to include integral calculus with an emphasis on application. Pr.: MATH 210. MATH-211-0-1701

MATH 220. Analytic Geometry and Calculus I. (4) I, II, S. Analytic geometry, differential and integral calculus of algebraic and trigonometric functions. Pr.: MATH 150 or two years of high school algebra and one semester of high school trigonometry. MATH-220-0-1701

MATH 221. Analytic Geometry and Calculus II. (4) I, II, S. Continuation of MATH 220 to include transcendental functions, technique of integration, and infinite series. Pr.: MATH 220. MATH-221-0-1701

MATH 222. Analytic Geometry and Calculus III. (4) I, II, S. Continuation of MATH 221 to include functions of more than one variable. Pr.: MATH 221. MATH-222-0-1701

MATH 225. Analytic Geometry and Calculus I-S. (6) I. Analytic geometry, differential and integral calculus of functions of one variable. Accelerated coverage of the material in MATH 220, 221, 222. Pr.: Consent of department. MATH-225-0-1701

MATH 226. Analytic Geometry and Calculus II-S. (6) II. Continuation of MATH 225 to include calculus of functions of several variables, vectors, multiple integrals, and line integrals. Pr.: MATH 225. MATH-226-0-1701

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.: MATH 222. MATH-240-0-1701

MATH 250. Linear Algebra and Differential Equations I. (3) I. An integrated introduction to linear algebra and differential equations, including matrices and determinants, linear systems, eigenvalues, first and second order differential equations with emphasis on applications, Laplace transforms, and systems of differential equations. Pr.: MATH 221 or MATH 225. MATH-250-0-1701

MATH 251. Linear Algebra and Differential Equations II. (3) II. Continuation of MATH 250. Pr.: MATH 250 or consent of department. MATH-251-0-1701

MATH 308. Topics in Mathematics for Elementary School Teachers. (4) I, II, S. Systems of numeration, sets and numbers, properties of the number system, relations, real numbers, elementary logic, concept of proof, elements of algebra, and statistics. Pr.: Consent of instructor. MATH-308-0-0833

MATH 309. Intuitive Geometry. (2) S. Measurement, triangles, quadrilaterals, nonmetric geometry, similarity, volumes, elementary coordinate geometry. Pr.: Consent of instructor. MATH-309-0-1701

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-312-0-1701

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-313-0-1701

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-350-0-1701

MATH 398. Sophomore Seminar. (3) II. Seminar in mathematics for honors students. Pr.: Membership in honors program. MATH-398-3-4900

MATH 399. Seminar in Mathematics. (Var.) On sufficient demand. Primarily for honors students. Pr.: Consent of instructor. MATH-399-3-1701

MATH 498. Senior Honors Thesis. (2) I, II, S. Open only to seniors in the arts and sciences honors program. MATH-498-3-1701

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. MATH-499-3-1701

Undergraduate and graduate credit in minor field

MATH 501. Introduction to Mathematics in the Behavioral Sciences. (3) I, II. Introduction of matrices, relations, sets, and groups with applications to the behavioral sciences. Pr.: Student must be a major in anthropology, economics, history, political science, psychology, or sociology; or have the consent of the instructor. MATH-501-0-1701

MATH 505. 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-505-0-1701

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-510-0-1701

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 or 226. MATH-511-0-1701

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-512-0-1701

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 or 226. MATH-520-0-1701

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 or 225. MATH-521-0-1701

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 100 and junior standing. MATH-551-0-1703

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 or 225. MATH-570-0-1701

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 222 or MATH 226. MATH-572-0-1701

MATH 573. Transformation and Vector Geometry. (3) I. Concepts of transformations and vectors and their applications to

Euclidean geometry. Pr.: MATH 222 or MATH 226. MATH-573-0-1799

MATH 575. Advanced Analytic Geometry. (3) On sufficient demand. Properties of conic sections; poles and polars; selected topics in solid analytic geometry. Pr.: MATH 240 or 250. MATH-575-0-1701

Undergraduate and graduate credit
MATH 628. Vector Analysis. (3) A standard introduction to vector algebra and calculus in two and three dimensions. Dot and cross products, differentiation of vector functions, the operators div, grad and curl, line and surface integrals and the theorems of Green, Gauss, and Stokes. Applications to physics and other sciences will be included. Pr.: MATH 222 or consent of instructor. MATH-628-0-1703

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 or 250. MATH-630-0-1703

MATH 632. Elementary Partial Differential Equations. (3) I. Orthogonal functions, Fourier Series, boundary value problems in partial differential equations. Pr.: MATH 240 or 250. MATH-632-0-1703

MATH 633. Advanced Calculus I. (3) I. Functions of one real variable: limits, continuity, differentiability, Riemann-Stieltjes integral, sequences, series, power series, improper integrals. Pr.: MATH 222, MATH 226, or MATH 350. MATH-633-0-1701

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-634-0-1701

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 or MATH 251. MATH-640-0-1703

MATH 641. Ordinary Differential Equations II. (3) II. Continuation of MATH 640. Pr.: MATH 640. MATH-641-0-1703

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 one of MATH 251, 505, or 551. MATH-655-0-1701

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 either MATH 240 or 251. MATH-656-0-1701

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-670-0-1701

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-689-0-1701

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-700-0-1701

MATH 701. Elementary Topology I. (3) I. Introduction to axiomatic topology including a study of compactness, connectedness, local properties, cardinal invariants, and metrizability. Pr.: MATH 700. MATH-701-0-1701

MATH 702. Elementary Topology II. (3) II. Continuation of MATH 701. Pr.: MATH 701. MATH-702-0-1701

MATH 704. Introduction to the Theory of Groups. (3) II. Introduction to abstract group theory; to include permutation groups, homomorphisms, direct products, Abelian groups. Jordan-Holder and Sylow theorem. Pr.: MATH 512. MATH-704-0-1701

MATH 706. Theory of Numbers. (2-3) II, in alternate years. Divisibility properties of integers, prime numbers, congruences, multiplicative functions. Pr.: MATH 221 or 226. MATH-706-0-1701

MATH 710. Introduction to Category Theory. (3) Categories, duality, special morphism, functors, natural transformations, limits and colimits, adjoint situa-

tions, and applications. Pr.: MATH 701 and MATH 730. MATH-710-0-1701

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-711-0-1701

MATH 713. Advanced Applied Matrix Theory. (3) II. 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 MATH 505. MATH-713-0-1701

MATH 721. Analysis I. (3) I, II, S. Metric spaces, limits, continuity, differentiation, mean value theorems, Riemann-Stieltjes integral, series. Pr.: MATH 240 or 250 or graduate standing. MATH-721-0-1701

MATH 722. Analysis II. (3) I, II. Function spaces, Stone-Weierstrass Theorem, Ascoli Theorem, series, introduction to Lebesgue measure. Pr.: MATH 721. MATH-722-0-1701

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-730-0-1701

MATH 731. Abstract Algebra II. (3) II. Continuation of MATH 730. Pr.: MATH 730 or consent of instructor. MATH-731-0-1701

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-740-0-1701

MATH 772. Elementary Differential Geometry. (3) I. 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 or 250. MATH-772-0-1701

MATH 781. Differentiable Manifolds I. (3) I, in alternate years. Differentiable structures, tangent bundles, tensor bundles, vector fields and differential equations, integral manifolds, differential forms, introduction to Lie groups. Pr.: MATH 772 or consent of instructor. MATH-781-0-1701

MATH 782. Differentiable Manifolds II. (3) II, in alternate years. Fibre bundles, theory or connections, linear and affine connections, Riemann manifolds, submanifolds of Riemann manifolds, complex manifolds. Pr.: MATH 781. MATH-782-0-1701

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. MATH-791-0-0833

Graduate credit

MATH 801. Numerical Solution of Differential Equations I. (3) I. Single and multistep methods for initial value problems for ordinary differential equations; discretization and round off error; consistency, convergence, and stability of these methods; stiff equations and implicit methods; two point boundary value problems; initial and boundary value problems for partial differential equations; finite difference methods; marching schemes for parabolic and hyperbolic problems; consistency, stability, convergence, and the Lax equivalence theorem; treatment of boundary conditions; boundary value problems for elliptic equations; relaxation, alternating direction, and strongly implicit iterative methods; nonlinear problems; finite element methods. Pr.: MATH 655 and knowledge of a programming language. MATH-801-0-1701

MATH 802. Numerical Solution of Differential Equations II. (3) II. Continuation of MATH 801. Pr.: MATH 801. MATH-802-0-1701

MATH 810. Higher Algebra I. (3) I. Theory of groups, theory of rings and ideals, polynomial domains, theory of fields and their extensions. Pr.: MATH 731. MATH-810-0-1701

MATH 811. Higher Algebra II. (3) II. Continuation of MATH 810. Pr.: MATH 810. MATH-811-0-1701

MATH 821. Real Analysis I. (3) I. Measurability, integration theory, regular Borel measures, the Riesz representation theorem, and Lebesgue measure in Euclidean spaces. Pr.: MATH 722. MATH-821-0-1701

MATH 822. Real Analysis II. (3) II. The L^p -spaces, Banach spaces, and Hilbert spaces, complex measures and the Radon-Nikodym theorem, the Fubini theorem on double integration, and differentiation. Pr.: MATH 821. MATH-822-0-1701

MATH 825. Complex Analysis I. (3) I. Holomorphic functions, harmonic functions, the Cauchy integral theorem, normal families and the Riemann mapping theorem, and the Mittag-Leffler theorem.

Pr.: MATH 822 or consent of department. MATH-825-0-1701

MATH 826. Complex Analysis II. (3) II. Analytic continuation, the Picard theorem, H^p -spaces, elementary theory of Banach algebra, the theory of Fourier transforms, and the Paley-Wiener theorems. Pr.: MATH 825. MATH-826-0-1701

MATH 852. Functional Analysis I. (3) I, in alternate years. Topics to be selected from linear topological spaces, seminormed linear spaces, Banach spaces, Hilbert spaces, Banach algebras, spectral theory, harmonic analysis, and others. May be taken four times for a total of 12 hours credit. Pr.: MATH 822. MATH-852-0-1701

MATH 853. Functional Analysis II. (3) II, in alternate years. Continuation of Functional Analysis I. May be repeated for credit. Pr.: MATH 852. MATH-853-0-1701

MATH 855. Methods of Applied Mathematics I. (3) An introduction to the mathematical techniques of problem solving in the sciences and engineering. Construction of mathematical models; problem formulation, dimensional analysis and scaling; solution methods for differential equations and difference equations; methods for obtaining approximate solutions; regular and singular perturbation methods, asymptotic series, applications to specific equations and scientific problems. Pr.: MATH 630, MATH 633, and MATH 551. MATH-855-0-0701

MATH 856. Methods of Applied Mathematics II. (3) A continuation of MATH 855. Asymptotic expansion of integrals; the methods of stationary phase and steepest descent; summation of series, the Shanks transformation and Pade fractions; boundary layer theory; the WKB and Langer approximations; the method of averaging and the method of multiple scales. Pr.: MATH 855. MATH-856-0-1701

MATH 861. Numerical Analysis I. (3) I. Topics covered may include elementary functional analysis relevant to numerical analysis; numerical solution of differential or integral equations: analysis of stability and convergence; numerical linear algebra including large-scale systems; approximation theory. Pr.: MATH 634, 655. MATH-861-0-1701

MATH 862. Numerical Analysis II. (3) II. Continuation of MATH 861. Pr.: MATH 861. MATH-862-0-1701

MATH 866. Partial Differential Equations I. (3) I. Elliptic, parabolic, and hyperbolic partial differential equations of the second order. First order partial differential equations, characteristics. Linear and nonlinear hyperbolic systems, nonlinear

elliptic equations. Pr.: MATH 634, 641. MATH-866-0-1701

MATH 867. Partial Differential Equations II. (3) II. Continuation of MATH 866. Pr.: MATH 866. MATH-867-0-1701

MATH 871. General Topology I. (3) I. Topological spaces and topological invariants; continuous mappings and their invariants perfect mappings; topological constructs (product, quotient, direct and inverse limit spaces). Pr.: MATH 702. MATH-871-0-1701

MATH 872. General Topology II. (3) II. Compact spaces and compactification, uniform and proximity spaces, metric spaces and metrization, topology of D^n , function spaces, complete spaces, introduction to homotopy theory. Pr.: MATH 871. MATH-872-0-1701

MATH 897. Seminar in Mathematics Education. (1-3) II, S. Topics in mathematics and the related applications in mathematics education. Pr.: Graduate standing and consent of instructor. MATH-897-2-0833

MATH 898. Topics in Mathematics. (Var.) I, II, S. Pr.: Background of courses needed for topic undertaken and consent of instructor. MATH-898-4-1701

MATH 899. Thesis Topics. (Var.) I, II, S. MATH-899-4-1701

MATH 914. Lattice Theory I. (3) I, in alternate years. Posets, quantum logics, orthocomplemented, orthomodular, and Boolean lattices; the concepts of atomicity, completeness, reducibility, modularity, M-symmetry, O-symmetry, distributivity, algebraic coordinization, and specific realizations. Pr.: Consent of instructor. MATH-914-0-1701

MATH 915. Lattice Theory II. (3) II, in alternate years. Continuation of MATH 914. Pr.: MATH 914. MATH-915-0-1701

MATH 971. Algebraic Topology I. (3) I. Homotopy groups, covering spaces, fibrations, homology, general cohomology theory and duality, homotopy theory. Pr.: MATH 811 and 872. MATH-971-0-1701

MATH 972. Algebraic Topology II. (3) II. Continuation of Algebraic Topology I. Pr.: MATH 971. MATH-972-0-1701

MATH 991. Topics in Algebra. (3) On sufficient demand. Selected topics in modern algebra. May be taken more than once for credit. Pr.: Consent of instructor. MATH-991-0-1701

MATH 992. Topics in Analysis. (3) On sufficient demand. Selected topics in modern analysis. May be taken more than once for credit. Pr.: Consent of instructor. MATH-992-0-1701

MATH 993. Topics in Harmonic Analysis. (3) On sufficient demand. Selected topics in harmonic analysis. May be taken more than once for credit. Pr.: Consent of instructor. MATH-993-0-1701

MATH 994. Topics in Applied Mathematics. (3) On sufficient demand. Selected topics in applied mathematics. May be taken more than once for credit. Pr.: Consent of instructor. MATH-994-0-1701

MATH 995. Topics in Geometry. (3) On sufficient demand. Selected topics in geometry, such as convex sets of distance geometry. May be taken more than once for credit. Pr.: Consent of instructor. MATH-995-0-1701

MATH 996. Topics in Topology. (3) On sufficient demand. Selected topics in topology, such as homotopy, topological groups, topological dynamics, or algebraic topology. May be taken more than once for credit. Pr.: Consent of instructor. MATH-996-0-1701

MATH 997. Topics in Number Theory. (3) I, II. On sufficient demand. Selected topics in number theory. May be taken more than once for credit. Pr.: MATH 706 or consent of instructor. MATH-997-0-1702

MATH 999. Research in Mathematics. (Var.) I, II, S. Pr.: Sufficient training to carry on the line of research undertaken and consent of instructor. MATH-999-4-1701

Military Science

Lieutenant Colonel John D. Evans, Jr., Head

Assistant Professors Major Pepperd, Captain Booker, Captain Bres, Captain Clark, and Captain Shoemaker; Instructors Sergeant Major Guillory and Sergeant First Class Marvin.

The Army Reserve Officers' Training Corps (Army ROTC) program emphasizes the leadership and management skills required for success in military or civilian careers. Students find 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 University students. Students, both undergraduate and graduate, with two years remaining at Kansas State University 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: (1) the basic course, normally completed during the freshman and sophomore years; and (2) 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 two-hour courses open to all University students. Enrollment in any basic course class 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, Ranger, 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 four hours academic credit and satisfies all prerequisites for entry into the advanced course. Attendance at the summer 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 (SMP). 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 two-, three-, or 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 Scholarship pays in-state tuition only.

Voluntary organizations

The department sponsors three voluntary organizations, a student chapter of the Association of the United States Army (AUSA), the KSU Rifle Club, 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 Rifle Club participates in intercollegiate rifle matches. The ROTC Ranger Company provides valuable training and leadership experience required for Army ROTC cadets desiring to attend Ranger School. It also supplements ROTC classroom instruction and field training to better prepare cadets for Advanced Camp and active duty.

Students desiring additional information on these organizations are invited to contact the department.

Recommended courses

In recognition of leadership's many facets, the department requires that students enrolled in ROTC select from a number of University courses which complement the leadership program. One course each in written communication skills, human behavior, and military history 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.

Acceptable courses include:

Written communication skills	
ENGL 120	English Composition II 3
ENGL 200	Intermediate Composition 3
ENGL 400	Advanced Composition 3
ENGL 415	Written Communication for Engineers 3
Human behavior	
PSYCH 425	Problem Solving and Decision Making 3
PSYCH 550	Group Dynamics 3
PSYCH 560	Industrial Psychology 3
Military history	
HIST 102	Western Civilization: The Modern Era 3
HIST 252	History of U.S. Since 1877 3
HIST 513	Battles and Leaders 3
HIST 514	World War II 3
HIST 526	American Revolution 3
HIST 533	Topics: The Vietnamese War 3
HIST 543	The United States and World Affairs 3
HIST 544	History of U.S.-Soviet Relations Since 1917 3
HIST 545	War in the Twentieth Century 3
HIST 546	History of American Military Affairs 3
HIST 564	Russian Revolution and the Soviet System 3
HIST 573	Twentieth-Century Europe 3
HIST 648	Naval History 3
National security policy	
POLSC 110	Introduction to Political Science ... 3
POLSC 519	National Security Policy and Process 3
POLSC 627	Soviet-Style Regimes 3
POLSC 628	Comparative Security Establishments 3
POLSC 642	International Conflict 3
POLSC 649	International Defense Strategies ... 3
Management	
MANGT 390	Business Law I 3
MANGT 420	Management Concepts 3
MANGT 421	Production/Operations Management 3
MANGT 466	Management Information Systems 3
MANGT 520	Organizational Behavior 3

Basic course

Undergraduate credit

MSCI 100. Mountaineering and Introduction to Military Science. (1) I, II. Basic mountaineering and introduction to Army ROTC. MSCI-100-0-1801

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-102-0-1801

MSCI 103. Orienteering and Introduction to Military Science. (1) I, II. Introduction to orienteering and land navigation. One hour rec. a week. Also includes a brief introduction to the Army ROTC program. MSCI-103-0-1801

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-104-0-1801

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-105-0-1801

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-106-0-1801

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-201-0-1801

MSCI 202. Map Reading. (1) I, II. Military geography, map reading, and land navigation. MSCI-202-0-1801

MSCI 203. Care of Combat Casualties. (1) I, II. Care and treatment of wounds and injuries normally associated with the modern battlefield; includes casualty evaluation, treatment, and medical prevention programs. MSCI-203-1-1801

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 material covered in MSCI 203 and 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. Credit may not be received for both MSCI 203 and 204. MSCI-204-0-1801

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-205-0-1801

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. MSCI-250-0-1801

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-300-0-1801

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-302-0-1801

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-400-0-1801

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-402-0-1801

Modern Languages

Bradley Shaw,* Head

Professor O'Connor,* Associate Professors Alexander,* Beeson,* Benson,* Corum,* Dehon,* Kolonosky,* McGraw,* Ossar,* Shaw,* and Tunstall,* Assistant Professors Garavito,* Mendenhall,* and Miller,* Instructor Driss; Emeriti: Associate Professor Pettis.*

Undergraduate study

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 on such an opinion. 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.

The attention of the student preparing for graduate school or for high school teaching is directed to the corollary course in

linguistics, LG 600. Six hours of history in 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 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 KSU should consult with the head of the Department of Modern Languages.

Graduate study

In modern languages, the M.A. degree master of art is offered in the fields of French, German, and Spanish. General requirements for the master of arts degree can be found in the Graduate School section of this catalog.

Detailed information concerning the graduate program in modern languages and financial support available may be obtained by writing to the head of the department.

The department cooperates with several others in the South Asia language and area studies program, details of which are given in the Academic Programs section of the catalog.

The Department of Modern Languages co-sponsors a national literary journal, *Studies in Twentieth Century Literature*.

Programs abroad

The Department of Modern Languages sponsors summer study programs in both Paris and Jalapa, Mexico, and cooperates in the German program in Eutin. All inquiries should be addressed to the head of the department.

Honors program

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-297-0-1101

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-298-0-1101

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 nonlanguage majors in the honors program. MLANG-399-0-1101

MLANG 499. Senior Honors Thesis. (2) I, II, S. Open only to seniors in the arts and sciences honors program. MLANG-499-4-1101

Courses in modern languages 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. FREN-502-0-1102

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. GRMN-503-0-1103

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. LATIN-501-0-1110

MLANG 507. European Literature in Translation. (3) Selected readings in English from the major authors of Europe and the Spanish-speaking world. MLANG-507-0-1505

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-504-0-1106

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. RUSSN-508-0-1106

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. SPAN-505-0-1105

Graduate credit

MLANG 800. Colloquium in Modern Languages. (2) I. A graduate colloquium for M.A. candidates in French, German, and Spanish. Variable topics in literary and cultural fields appropriate to study in common by students in these languages. Pr.: Graduate standing. MLANG-800-0-1101

Arabic**Undergraduate credit**

ARAB 181. Arabic I. (4) Introduction to the structure of modern Arabic. Essentials of grammar, speaking, reading, and writing. ARAB-181-0-1107

ARAB 182. Arabic II. (4) Continuation of Arabic I. Pr.: ARAB 181 or equiv. ARAB-182-0-1107

ARAB 281. Arabic III. (4) Further development of language skills. Pr.: ARAB 182 or equiv. ARAB-281-0-1107

ARAB 282. Arabic IV. (3) Continuation of Arabic III. Pr.: ARAB 281 or equiv. ARAB-282-0-1107

Undergraduate and graduate credit in minor field

ARAB 540. Special Studies in Arabic. (Var.) Pr.: Consent of the department head and instructor involved. ARAB-540-0-1107

French

FREN 001. Orientation for Summer School Program in Paris. (0) FREN-001-0-1102

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. FREN-109-0-1102

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. FREN-110-0-1102

FREN 111. French I. (4) Introduction to the structure of modern French, emphasizing the spoken language with practice in the language laboratory. FREN-111-0-1102

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-112-0-1102

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-211-0-1102

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-212-0-1102

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-213-0-1102

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-214-0-1102

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-502-0-1102

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. FREN-510-0-1102

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-511-0-1102

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-512-0-1102

FREN 513. French Composition and Conversation. (3) Review in depth of the structure of the language. Intensive practice in written and conversational French. Pr.: FREN 213 or equiv. FREN-513-0-1102

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-514-0-1102

FREN 516. Readings in French. (3) Practice in reading a variety of literary, journalistic, and specialized texts. Pr.: FREN 213 or equiv. FREN-516-0-1102

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-517-0-1102

FREN 518. Advanced French Conversation. (2) 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. May be repeated once for credit. Pr.: FREN 513. FREN-518-0-1102

FREN 519. Special Studies in French. (Var.) Pr.: Consent of department head and instructor involved. FREN-519-3-1102

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-709-0-1102

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-710-0-1102

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-711-0-1102

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-712-0-1102

FREN 713. Eighteenth-Century French Literature. (3) Critical study of the literature of the Enlightenment. Pr.: 21 hours of college French or equiv. FREN-713-0-1102

FREN 714. Nineteenth-Century French Literature I. (3) A study of preromanticism and romanticism. Pr.: 21 hours of college French or equiv. FREN-714-0-1102

FREN 715. Nineteenth-Century French Literature II. (3) A study of realism, naturalism, and symbolism. Pr.: 21 hours of college French or equiv. FREN-715-0-1102

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-716-0-1102

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-717-0-1102

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-718-0-1102

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-719-0-1102

FREN 720. Seminar in French. (3) A seminar with variable topics. Pr.: Senior standing or consent of the instructor. FREN-720-0-1102

FREN 799. Problems in Modern Languages. (Var.) FREN-799-3-1101

Graduate credit

FREN 899. Research in Modern Languages. (Var.) Pr.: 30 hours in one modern language or equiv. FREN-899-4-1101

German

GRMN 002. Orientation for Summer School Program in Germany. (0) GRMN-002-0-1103

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. GRMN-119-0-1103

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. GRMN-120-0-1103

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-121-0-1103

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-122-0-1103

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-221-0-1103

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-222-0-1103

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-223-0-1103

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-224-0-1103

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. GRMN-503-0-1103

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-521-0-1103

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-522-0-1103

GRMN 523. German Composition. (3) A study of German syntax and exercises in composition. Pr.: GRMN 223 or equiv. GRMN-523-0-1103

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-524-0-1103

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-525-0-1103

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-526-0-1103

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-527-0-1103

GRMN 529. Special Studies in German. (Var.) Pr.: Consent of department head and instructor involved. GRMN-529-3-1103

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. GRMN-530-0-1103

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-721-0-1103

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-722-0-1103

GRMN 723. Goethe and *Faust*. (3) I. The writings of Goethe and his masterpiece, *Faust*. Pr.: 21 hours of college German or equiv. GRMN-723-0-1103

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-724-0-1103

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-725-0-1103

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-726-0-1103

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-727-0-1103

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-728-0-1103

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-729-0-1103

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-731-0-1103

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-732-0-1103

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-733-0-1103

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-734-0-1103

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-740-0-1103

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-741-0-1103

GRMN 799. Problems in Modern Languages. (Var.) GRMN-799-3-1101

Graduate credit

GRMN 899. Research in Modern Languages. (Var.) Pr.: 30 hours in one modern language or equiv. GRMN-899-4-1101

Italian

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. ITAL-129-0-1104

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. ITAL-130-0-1104

ITAL 131. Italian I. (4) Introduction to the structure of modern Italian. ITAL-131-0-1104

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-132-0-1104

ITAL 231. Italian III. (4) Grammar review and reading selections from Italian literature. Pr.: ITAL 132 or equiv. ITAL-231-0-1104

ITAL 232. Italian IV. (3) Selective review of grammar and reading of examples of modern Italian literature. Pr.: ITAL 231 or equiv. ITAL-232-0-1104

ITAL 520. Special Studies in Italian. (Var.) Pr.: Consent of department head and instructor involved. ITAL-520-0-1104

Latin

Undergraduate credit

LATIN 105. Latin and Greek for Scientists. (1) II. 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-105-0-1109

LATIN 141. Latin I. (4) An introductory study of the structure of Latin. LATIN-141-0-1109

LATIN 142. Latin II. (4) Continuation and completion of the study of the structure of Latin. Pr.: LATIN 141. LATIN-142-0-1109

LATIN 241. Latin III. (4) Review of Latin grammar and reading of an anthology of Roman prose and poetry. Pr.: LATIN 142. LATIN-241-0-1109

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-242-0-1109

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. LATIN-501-0-1110

Undergraduate and graduate credit in minor field

LATIN 549. Special Studies in Latin. (Var.) Pr.: Consent of the department head and instructor involved. LATIN-549-3-1109

Linguistics

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. LG-730-0-1505

Undergraduate and graduate credit

LG 600. Principles of Linguistics. (3) Same as LING 600 and ENGL 600. LG-600-0-1505

LG 601. General Phonetics. (3) Same as LING 601 and ENGL 601. LG-601-1-1505

LG 602. Historical Linguistics. (3) Same as LING 602 and ENGL 602. LG-602-0-1505

LG 603. Topics in Linguistics. (3) Same as LING 603 and ENGL 603. LG-603-0-1505

LG 783. Phonology I. (3) Same as LING 783 and ENGL 783. LG-783-0-1505

LG 785. Syntax I. (3) Same as LING 785 and ENGL 785. LG-785-0-1505

LG 792. Field Methods in Linguistics. (3) Same as LING 792. LG-792-0-1505

Portuguese

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-163-0-1199

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-164-0-1199

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-266-0-1199

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. PORT-267-0-1199

Undergraduate and graduate credit in minor field

PORT 572. Special Studies in Portuguese. (1-3) Pr.: 15 hours of Portuguese and consent of instructor. PORT-572-0-1199

Russian**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. RUSSN-149-0-1106

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. RUSSN-150-0-1106

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-151-0-1106

RUSSN 152. Russian II. (4) II. Continuation of the study of Russian grammar and oral communication. Pr.: RUSSN 151 or equiv. RUSSN-152-0-1106

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-250-0-1307

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-251-0-1106

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-252-0-1106

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-504-0-1106

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. RUSSN-508-0-1106

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-551-0-1106

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-552-0-1106

RUSSN 553. Russian Conversation and Composition. (3) Discussion in Russian. Extensive practice in writing Russian compositions. RUSSN-553-0-1106

RUSSN 559. Special Studies in Russian. (Var.) Pr.: Consent of department head and instructor involved. RUSSN-559-3-1106

Spanish

SPAN 003. Orientation for Summer School Abroad Program in Mexico City. (0) SPAN-003-0-1105

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. SPAN-159-0-1105

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. SPAN-160-0-1105

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-161-0-1105

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-162-0-1105

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-261-0-1105

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-262-0-1105

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-263-0-1105

SPAN 264. Elementary Spanish Conversation IVA. (2) Continuation of Elementary Spanish Conversation IIIA. Should be taken conc. with Spanish IV. SPAN-264-0-1105

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. SPAN-505-0-1105

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-563-0-1105

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-564-0-1105

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-565-0-1105

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-566-0-1105

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-567-0-1105

SPAN 569. Special Studies in Spanish. (Var.) Pr.: Consent of department head and instructor involved. SPAN-569-3-1105

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-571-0-1105

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-573-0-1105

SPAN 574. Hispanic Readings. (3) Practice in reading a variety of literary, journalistic, and specialized texts. Pr.: SPAN 263 or equiv. SPAN-574-0-1105

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-751-0-1105

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-752-0-1105

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-755-0-1105

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-756-0-1105

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-757-0-1105

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-760-0-1105

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 *cronicas* and *La Celestina*, studied within the historical and cultural context of each. Pr.: 21 hours of college Spanish or equiv. SPAN-761-0-1105

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-763-0-1105

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-764-0-1105

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-771-0-1105

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-772-0-1105

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-775-0-1105

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 EDCI 771. SPAN-777-0-1105

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-778-0-1105

SPAN 779. Seminar in Spanish. (3) A seminar with variable topics. Pr.: Senior standing or consent of the instructor. SPAN-779-0-1105

SPAN 799. Problems in Modern Languages. (Var.) SPAN-799-3-1101

Graduate credit

SPAN 899. Research in Modern Languages. (Var.) Pr.: 30 hours in one modern language or equiv. SPAN-899-4-1101

South Asian Languages

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-171-0-1113

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-172-0-1113

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-273-0-1113

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. URDU-274-0-1113

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. URDU-575-0-1113

Undergraduate and graduate credit

URDU 799. Problems in Modern Languages. (Var.) URDU-799-3-1101

Music

Jack Flouer,* Acting Head

Professors Brookhart,* R. Edwards,* Flouer,* Jackson,* Langenkamp,* Shull,* Sloop,* Steinbauer,* R. Walker,* and White;* Associate Professors Funkhouser,* Polich, Sidorfsky,* and Sutton;* Assistant Professors Bryttan, A. Cochran,* Finck, Littrell,* and Parker;* Instructors Funk and Rushing; Assistant Instructor J. Edwards; Teaching Associates Betton, M. L. Cochran, Harshbarger, and McFarlin; Emeriti: Professor W. Walker;* Assistant Professors Caine* and M. Walker.*

Undergraduate study

The Department of Music is a member, with institutional accreditation, of the National Association of Schools of Music.

Curricula in performance and music education with majors in music theatre, theory and 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.

In regard to transfer students, divisional hearings will determine the number of upper level hours which will be accepted.

Bachelor of arts

120 hours required for graduation

The bachelor of arts with major in music emphasizes the liberal arts tradition. The program provides enough flexibility in electives for the student 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
Studio performance		8
History, theory, or composition		minimum 8

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 in one of these fields: music literature, music theory and composition, or performance.

The music literature field requires eight hours of electives in music history and music literature. In addition, eight semester hours in a single performance area are required, of which half must be from the 400 level.

If the field is music theory and composition, the program calls for MUSIC 503, 521 (three hours), 615, 616, three semester hours elected in music literature, and eight semester hours of piano, of which half must be from the 400 level.

If the field is performance, the program 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.

Requirements in general education are stated earlier in the College of Arts and Sciences section.

Bachelor of music

126 hours required for graduation

A four-year program is offered with concentrations in voice, strings, wind or percussion instruments, music theatre, and theory/composition.

The general education requirements for this degree may be found at the beginning of the 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 207 or 270	Piano Class or Piano	1
MUSIC 417	Conducting	2
Music organizations		4
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 286	Voice	9
MUSIC 466	Voice	11
MUSIC 285 and 287 or 465	Singers' Diction	2
MUSIC 475	Opera Workshop	4
MUSIC 492	Methods and Materials of the Studio	2
THTRE 260	Stage Movement	3
THTRE 560	Advanced Stage Movement	3
THTRE 261	Fundamentals of Acting	3
THTRE 161	Improvisation, 361 Intermediate Acting, or 761 Advanced Acting	3
THTRE 267	Fundamentals of Costuming and Makeup	3
THTRE 266	Fundamentals of Technical Production	3
THTRE 671	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:

Voice (half of which is from the 400 level)	28	
Piano Class or Piano	3	
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
Diction		4
Vocal ensemble or Opera Workshop		4
Additional music electives		3
Primary modern language (1 additional course)		4
Secondary modern language (1 course)		4

Additional requirements for instrumental performance:

(keyboard, strings, wind, and percussion instruments):	
Instrumental Performance (half of which is from the 400 level)	32
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 theory/composition:

Major Performance Area (If piano is major area then 8 hours of a secondary performance area)	8
MUSIC 270 and/or 450	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
Additional music electives	7
Additional non-music electives	10

Bachelor of music education

134-135 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 options—one is vocal/choral music, the other is instrumental music.

Professional educational requirements:

General education—DED 100

Administration and foundations—

EDAF 215, 315, 611, 622 or 623 (623 is recommended)

Curriculum and instruction—

EDCI 318, 451, and 582

Note: ENGL 100 and 120 (or ENGL 110 and 125), and SPCH 105 or 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, 202, 213, 218, 398, 406, 407, 417, and 473

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

Music education—MUSIC 511 and 512

Recital attendance—MUSIC 050 is required for a minimum of seven semesters.

Additional music requirements for instrumental emphasis:

Performance—MUSIC 203, 204, 206, 207, and nine semester hours chosen according to the major instrument from: MUSIC 232, 233, 234, 235, 427, 428, 429

Enrollments in major organizations must include at least two semesters in a choral organization; or, upon the recommenda-

tion of the advisor, one additional semester of individual or class instruction in voice may be substituted.

Restricted electives—minimum three hours from: MUSIC 420, 422, 601, 615, 616, 631, 632, 650, 702, 704, 705, 706, 708, 711, 714, 737, 738, 765, 766, 770, 772, 774, 776

Additional requirements for vocal/choral emphasis:

Performance—If voice is the major performance area, MUSIC 232, 233, 234, 235, 285, and 287 or 465; four hours of keyboard. If keyboard is major area of performance, MUSIC 203, 204, 210, 211, 232, 233, 234, 235, 350 (two semesters)

Enrollments in major organizations must include at least two semesters in an instrumental organization; or, upon the recommendation of the advisor, one semester of advanced instrumental techniques classes may be substituted.

Restricted electives—minimum of five hours from: MUSIC 420, 422, 465 or 467, 570, 601, 615, 616, 631, 632, 650, 702, 704, 705, 706, 708, 711, 714, 737, 738, 765, 766, 770, 772, 774, 776

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 are held regularly as well as general student recitals. 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, or the bachelor of arts in music degrees with a major in music are exempt from fees for private music lessons and music practice facilities.

University students not majoring in one of the three music curricula may take private music instruction (pending availability of

staff and facilities) by paying fees as listed in the general information section earlier in this catalog.

Graduate study

The Department of Music offers work leading to the master of music degree.

Admission to the graduate program normally requires a B.M., B.M.E., B.S. in music, or B.A. in music, with curriculum substantially equivalent to that of this University. All entering students are encouraged to take the advanced music test of the Graduate Record Examinations.

Emphasis in the graduate program may be placed on music education, performance, pedagogy, theory and composition, or music history and literature. All areas of emphasis center on a common core of study, with ample flexibility for the development of personal interests. The degree requires a minimum of 32 hours, including a master's report (may be recital) or master's thesis. Students emphasizing music education may choose a 36-hour degree without report or thesis.

Details concerning the graduate program and opportunities for financial aid may be obtained by writing to the coordinator of graduate studies, Department of Music, 109 McCain Auditorium, Manhattan, Kansas 66506.

Courses in comprehensive musicianship

Undergraduate credit

The musical styles courses are required of all undergraduate music majors at KSU 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. Lectures in theory and history are included in each course as well as laboratory work in performance, conducting, keyboard application, aural skills, analysis, and creative writing.

Styles courses are governed by the philosophy that (1) all musicians need practical skills in performance, composition, and analysis; (2) the music student should recognize a coherent link between all facets of his/her musical training (including those requirements outside the styles courses); and (3) all musical studies should, as closely as possible, relate to one's own time.

MUSIC 200. Styles I, Elements of Musc.

(3) I, II. The musical language and its relationship between mind and ear. Formation of interval, scale, and chord patterns; basic notational procedures. MUSIC-200-1-1004

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-201-1-1004

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-202-1-1004

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-213-1-1006

MUSIC 218. Aural Skills Proficiency. (0) I, II. Required for graduation of all music majors. Pr.: MUSIC 213 or conc. enrollment. MUSIC-218-1-1006

MUSIC 398. Musical Styles of the Baroque Period. (4) II. Historical survey from 1600 to 1750; counterpoint with emphasis on invention, canon, and fugue; scoring for strings. Pr.: MUSIC 213. MUSIC-398-1-1006

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-406-1-1006

MUSIC 407. Musical Style of the Twentieth Century. (4) II. Modern music; contemporary practice and aesthetics; polytonality, serial techniques, electronic music. Pr.: MUSIC 398. MUSIC-407-1-1006

MUSIC 473. Seminar in Comprehensive Musicianship. (2) I, II, S. A study of music technology and computer applications; popular and non-Western styles. Pr.: MUSIC 213. Required for music education majors. MUSIC-473-1-1006

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-474-2-1004

Courses in music history, literature, and theory

Undergraduate credit

MUSIC 100. Music Fundamentals. (3) I, II, S. Elementary instruction in the theory of music. MUSIC-100-1-1004

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 non-music majors. MUSIC-150-1-1005

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-220-4-1004

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. MUSIC-250-0-1005

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-310-1-1005

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-385-0-1005

MUSIC 390. Special Studies in Music. (1-3) I, II, S. Pr.: Background of courses needed for studies undertaken. MUSIC-390-4-1004

MUSIC 399. Honors Seminar. (3) II. On sufficient demand. For selected sophomores. MUSIC-399-1-1005

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-420-0-1005

MUSIC 422. A History of American Music. (3) Offered on sufficient demand. A survey of all aspects of American music and musical styles from the seventeenth century to the present, including the music of native Americans, and folk, popular, and classical music of the nineteenth and twentieth centuries. Pr. MUSIC 150 or 250. MUSIC-422-0-1006

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-424-0-1005

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-425-4-1004

MUSIC 470. Diatonic Harmony and the American Song. (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-470-0-1004

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 three hours. Pr.: Sophomore standing, membership in the honors program of the College of Arts and Sciences, and permission of the instructor. MUSIC-498-1-1005

MUSIC 499. Senior Honors Thesis. (2) I, II, S. Open only to seniors in the arts and sciences honors program. MUSIC-499-1-1005

Undergraduate and graduate credit

MUSIC 555. Black Music of the Americas. (3) II. Black American music from its roots in Africa to the current styles. Emphasizing the cultural contexts in which it developed into such styles as vodun, shango, arhoolies, work songs, shouts, spirituals, blues, jazz, soul, and reggae. Offered jointly by anthropology and music. Same as ANTH 555. Pr.: Junior standing. MUSIC-555-0-1006

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 THTRE 570. MUSIC-570-0-1006

MUSIC 601. Western Music before 1750. (2-3) I, alternate S. A survey of the development of Western music from early Greek civilization to 1750. Pr.: MUSIC 398 and 406. MUSIC-601-0-1006

MUSIC 602. Western Music from 1750 to the Present. (3) II, alternate S. The development of Western music from 1750 to the present. Pr.: MUSIC 407. MUSIC-602-0-1006

MUSIC 615. Canon and Fugue. (2) I, S. Counterpoint in eighteenth century style. Pr.: MUSIC 398, consent of instructor. MUSIC-615-0-1004

MUSIC 616. Twentieth-Century Counterpoint. (2) II, S. Contrapuntal devices used by twentieth-century composers; serial techniques. Pr.: MUSIC 398, consent of instructor. MUSIC-616-0-1004

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-631-0-1004

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-632-3-1004

MUSIC 650. History of the Opera. (3) II. 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. Same as THTRE 671. MUSIC-650-0-1006

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-702-0-1004

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-704-0-1006

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-705-0-1006

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-706-0-1006

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-708-0-1006

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-711-0-1004

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-714-0-1004

MUSIC 737. Organ Literature. (3) II, in alternate years. A survey of significant compositions from the Renaissance to the present, with emphasis on performance practice. Pr.: MUSIC 407. MUSIC-737-0-1006

MUSIC 738. Piano Literature. (3) I, in alternate years. Selective survey of music for piano from 1750 to the present. Pr.: MUSIC 407. MUSIC-738-0-1006

MUSIC 765. Music of the Twentieth Century. (3) II. The historical aspect in musical analysis of composition since the Romantic period. Pr.: MUSIC 407. MUSIC-765-0-1006

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-766-0-1006

MUSIC 799. Problems in Music. (Var.) I, II, S. Individual guided work in a selected area. Pr.: Six hours graduate credit in music. MUSIC-799-4-1004

Graduate credit

MUSIC 801. Introduction to Graduate Study in Music. (2) I, S. Library procedures, bibliography, research methods, and practice in preparing scholarly papers. Required of all graduate students in music. Pr.: At least 30 hours of music theory and music history. MUSIC-801-0-1006

MUSIC 802. Seminar in Music Theory. (3) I, alternate S. Comparison of major theoretical treatises and historical compositional practices; practical application for the modern musician. Pr.: Twenty hours music theory. MUSIC-802-0-1004

MUSIC 803. Seminar in Music History. (2) S. The history of music with emphasis on the correlation of stylistic factors and man's cultural environment. Pr.: MUSIC 407. MUSIC-803-0-1006

MUSIC 804. Advanced Analysis. (3) In alternate S. An in-depth study of works by later Romantic and modern composers: techniques and styles in relation to form. Pr.: Twenty hours music theory. MUSIC-804-0-1004

MUSIC 830. Seminar in Medieval and Renaissance Music. (3) II. In-depth investigation of a selected area or problem in medieval or Renaissance music. Emphasis on individual research. Pr.: MUSIC 601 and consent of instructor. MUSIC-830-0-1006

MUSIC 832. Seminar in Baroque Music. (3) I. In-depth investigation of a selected area or problem in Baroque music. Emphasis on individual research. Pr.: MUSIC 601 and consent of instructor. MUSIC-832-0-1006

MUSIC 834. Seminar in Classical Music. (3) II. In-depth investigation of a selected area or problem in classical music. Emphasis on individual research. Pr.: MUSIC 601 and consent of instructor. MUSIC-834-0-1006

MUSIC 836. Seminar in Romantic Music. (3) II. In-depth investigation of a selected area or problem in Romantic music. Emphasis on individual research. Pr.: MUSIC 601 and consent of instructor. MUSIC-836-0-1006

MUSIC 898. Master's Report in Music. (2) I, II, S. Independent directed research leading to master's report. Pr.: Sixteen hours graduate credit in music. MUSIC-898-1-1006

MUSIC 899. Research in Music. (Var.) I, II, S. Independent research that may lead to master's thesis. Pr.: Sixteen hours graduate credit in music. MUSIC-899-4-1006

Music education

Undergraduate credit

MUSIC 232. Woodwind Techniques and Materials. (1) I, II, S. 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-232-1-1004

MUSIC 233. Brass Techniques and Materials. (1) I, II, S. 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-233-1-1004

MUSIC 234. String Techniques and Materials. (1) I, II, S. 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-234-1-1004

MUSIC 235. Percussion Techniques and Materials. (1) I, II, S. The fundamentals of playing and methods of teaching percussion instruments. For music majors only, and not open to percussion majors. MUSIC-235-1-1004

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-405-0-0832

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-427-1-1004

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-428-1-1004

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. MUSIC-429-1-1004

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-511-0-0832

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-512-0-0832

MUSIC 513. The Choral Program in Secondary Schools. (3) I. Organization and administration of the comprehensive choral program in junior and senior high schools, including a study of voice-training methods, ensemble development, rehearsal techniques, and selection of repertoire. Pr.: Junior standing in music. MUSIC-513-0-0832

MUSIC 514. The Instrumental Program in Secondary Schools. (3) I. Organization and administration of the comprehensive instrumental music program in junior and senior high schools; including a study of ensemble development, rehearsal techniques, selection of repertoire, and marching band techniques. Pr.: Junior standing in music. MUSIC-514-0-0832

MUSIC 731. Marching Band and Stage Band Techniques. (3) S. Show ideas and organization, music selection, rehearsal techniques, organization, and administration of the marching band and stage band. Pr.: Nine hours credit in music education. MUSIC-731-1-0832

MUSIC 770. Advanced Studies in Elementary School Music. (2-3) On sufficient demand. Individual and small group studies of special problems in the teaching of music to children. Pr.: Nine hours credit in music education. MUSIC-770-0-0832

MUSIC 772. Advanced Studies in Secondary School General Music. (2-3) On sufficient demand. Individual and small group studies of special problems in teaching music classes in grades 7-12. Pr.: Nine hours credit in music education. MUSIC-772-0-0832

MUSIC 774. Advanced Studies in Secondary School Choral Music. (2-3) On sufficient demand. An intensive study of the training of choral ensembles in secondary schools, with particular emphasis on tone production, expressive singing, diction, rehearsal, and performance techniques. Pr.: Nine hours credit in music education. MUSIC-774-0-0832

MUSIC 776. Advanced Studies in Secondary School Instrumental Music. (2-3) On sufficient demand. Individual and small group studies of special problems in the training of instrumental ensembles in grades 7-12. Pr.: Six hours graduate credit in music education. MUSIC-776-0-0832

Graduate credit

MUSIC 805. Theories of Music Teaching. (3) On sufficient demand. A survey of the history of music teaching in the United States, with emphasis on the relationship of various theories of music, musical perception, and musical cognition to current practices in teaching music at all levels. Pr.: Nine hours graduate credit in music. MUSIC-805-0-0832

MUSIC 806. Foundations of Music Education I. (3) On sufficient demand. Survey of the development of school music in the United States, and the study of basic concepts in aesthetics and curriculum theory as sources of principles in music education at all levels. Pr.: Nine hours credit in music education. MUSIC-806-0-0832

MUSIC 807. Foundations of Music Education II. (3) On sufficient demand. A study of basic concepts in the psychology of music and learning theory as sources of principles in music education, and an introduction to experimental research in music teaching. Pr.: Nine hours credit in music education. MUSIC-807-0-0832

Workshops in music Undergraduate credit

MUSIC 489. Workshop in Music. (1-2) S. Specialized interest areas for undergraduate students only. Pr.: Consent of instructor. MUSIC-489-2-0832

Graduate credit

MUSIC 812. Workshop in Service Playing for the Church Organist. (1-2) S. The church organist in service playing including liturgy, hymn playing, accompanying, repertoire, and registration for both pipe and electronic organs. MUSIC-812-2-0832

MUSIC 813. Workshop: American Symposium for Choral Music. (1-2) S. MUSIC-813-2-0832

MUSIC 814. Workshop in Music. (1-2) S. Studies in specialized interest areas. MUSIC-814-2-0832

MUSIC 815. Workshop in Percussion Instruments. (1-2) S. Survey and demonstration of the methods, materials, and teaching techniques of percussion instruments. MUSIC-815-2-0832

MUSIC 816. Workshop in Woodwind Instruments. (1-2) S. Survey and demonstration of the methods, materials, and teaching techniques of woodwind instruments. MUSIC-816-2-0832

MUSIC 817. Workshop in Brass Instruments. (1-2) S. Survey and demonstration of the methods, materials, and teaching techniques of brass instruments. MUSIC-817-2-0832

MUSIC 818. Workshop in Stringed Instruments. (1-2) S. Survey and demonstration of the methods, materials, and teaching techniques of stringed instruments. MUSIC-818-2-0832

MUSIC 819. Workshop in Electronic Music. (1-2) S. A practical and nontechnical explanation of synthesizers, synchronous tape recorders, and audio mixing devices. Applications for the classroom. Pr.: Consent of instructor. MUSIC-819-2-0832

MUSIC 820. Workshop in Marching Band. (1-2) S. Survey of the methods, materials, and the teaching techniques for the marching band. MUSIC-820-2-0832

MUSIC 821. Workshop in Junior High School Vocal Music. (1-2) S. Survey of the methods, materials, and the teaching techniques of vocal music for the junior high school. MUSIC-821-2-0832

MUSIC 822. Workshop in Elementary Music. (1-2) S. Organizing old and new materials for various levels of elementary music; correlation of academic subjects with the music program. MUSIC-822-2-0832

MUSIC 823. Workshop in Choral Music. (1-2) S. Choral techniques and interpretation of Baroque, classical, Romantic, and modern styles. MUSIC-823-2-0832

MUSIC 824. Workshop in Instrumental Music. (1-2) S. Teaching techniques, methods, and materials for woodwind, brass, string, and percussion sections of bands and orchestras. MUSIC-824-2-0832

MUSIC 825. Workshop in Piano Pedagogy. (1-2) S. Methods, materials, and teaching techniques for all grade levels. MUSIC-825-2-0832

MUSIC 826. Workshop in Jazz Ensemble Techniques. (1-2) S. Methods, materials, and improvisational techniques for teaching jazz in the public schools. MUSIC-826-2-0832

Organizations and ensembles Undergraduate credit

MUSIC 111. Concert Choir. (1) I, II. Admission by audition. MUSIC-111-5-1004

MUSIC 115. Marching Band. (1) I, II. Admission by audition. MUSIC-115-5-1004

MUSIC 116. Concert Band. (1) II. Open to all interested wind and percussion performers without audition. MUSIC-116-5-1004

MUSIC 117. Symphonic Wind Ensemble. (1) I, II, S. A select performing organization. Admission by audition. MUSIC-117-5-1004

MUSIC 120. Chamber Singers. (1) I, II, S. Admission by audition. MUSIC-120-5-1004

MUSIC 121. Collegiate Chorale. (1) I, II, S. Open to all interested singers. Audition determines membership in other choral organizations. MUSIC-121-5-1004

MUSIC 125. K-State Singers. (1) I, II. Admission by audition. (Not open to music majors.) MUSIC-125-5-1004

MUSIC 130. Symphony Orchestra. (1) I, II, S. Admission by audition. MUSIC-130-5-1004

MUSIC 131. Theatre Orchestra. (1) I, II. Admission by audition. MUSIC-131-5-1004

MUSIC 135. Men's Glee Club. (1) I, II. Admission by audition. MUSIC-135-5-1004

MUSIC 140. Women's Glee Club. (1) I, II. Admission by audition. MUSIC-140-5-1004

MUSIC 288. Instrumental Ensemble. (1) I, II, S. Elective for selected students. MUSIC-288-5-1004

MUSIC 289. Concert Jazz Ensemble. (1) I, II, S. Admission by audition. MUSIC-289-5-1004

MUSIC 290. Vocal Ensemble. (1) I, II, S. Elective for selected students. MUSIC-290-5-1004

MUSIC 292. Jazz Instrumental Ensemble. (1) I, II, S. MUSIC-292-5-1004

MUSIC 293. String Ensemble. (1) I, II, S. MUSIC-293-5-1004

MUSIC 294. Brass Ensemble. (1) I, II, S. MUSIC-294-5-1004

MUSIC 295. Wind Ensemble. (1) I, II, S. MUSIC-295-5-1004

MUSIC 296. Jazz Lab A. (1) I, II. Elective for selected students. MUSIC-296-5-1004

MUSIC 297. Jazz Lab B. (1) I, II. Elective for selected students. MUSIC-297-5-1004

MUSIC 350. Studio Accompanying. (1) On sufficient demand. Piano student assigned to studio instructor. Accompanies lessons for at least two hours per week. Ensemble credit for pianists. Pr.: Consent of instructor. MUSIC-350-1-1004

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-351-1-1004

MUSIC 400. Concert Choir. (1) I, II. Admission by audition. MUSIC-400-5-1004

MUSIC 401. Concert Band. (1) I, II, S. Open to all interested wind and percussion performers without audition. MUSIC-401-5-1004

MUSIC 402. Symphonic Wind Ensemble. (1) I, II. A select performing organization. Admission by audition. MUSIC-402-5-1004

MUSIC 403. Collegiate Chorale. (1) I, II, S. Open to all interested singers. Audition determines membership in other choral organizations. MUSIC-403-5-1004

MUSIC 404. Symphony Orchestra. (1) I, II, S. Admission by audition. MUSIC-404-5-1004

MUSIC 408. Men's Glee Club. (1) I, II. Admission by audition. MUSIC-408-5-1004

MUSIC 409. Women's Glee Club. (1) I, II. Admission by audition. MUSIC-409-5-1004

MUSIC 410. Concert Jazz Ensemble. (1) I, II, S. Admission by audition. MUSIC-410-5-1004

MUSIC 411. Marching Band. (1) I, II. Admission by audition. MUSIC-411-5-1004

MUSIC 414. Theatre Orchestra. (1) I, II. Admission by audition. MUSIC-414-5-1004

MUSIC 415. Chamber Singers. (1) I, II, S. Admission by audition. MUSIC-415-5-1004

MUSIC 418. Jazz Lab A. (1) I, II. Elective for selected students. MUSIC-418-5-1004

MUSIC 419. Jazz Lab B. (1) I, II. Elective for selected students. MUSIC-419-5-1004

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-475-1-1004

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. MUSIC-490-5-1004

Graduate credit

MUSIC 838. Opera Workshop. (Var.) I, II, S. Opera workshop for graduates. MUSIC-838-1-1004

MUSIC 839. Vocal Ensemble. (1) I, II, S. Performance and study with established University vocal organization or small ensemble. MUSIC-839-5-1004

MUSIC 840. Instrumental Ensemble. (1) I, II, S. Performance and study with an established University instrumental organization or in a small ensemble. MUSIC-840-5-1004

MUSIC 841. Collegium Musicum. (1) I, II, S. An ensemble devoted primarily to the performance of music written before 1700. Authentic instruments used when possible. MUSIC-841-5-1004

MUSIC 842. Concert Choir. (1) I, II. Pr.: Baccalaureate degree and previous experience at the undergraduate level. MUSIC-842-5-1004

MUSIC 843. Symphony Orchestra. (1) I, II. Pr.: Baccalaureate degree and previous experience at the undergraduate level. MUSIC-843-5-1005

MUSIC 844. Concert Jazz Ensemble. (1) I, II, S. Pr.: Baccalaureate degree and previous experience at the undergraduate level. MUSIC-844-5-1005

MUSIC 845. Symphonic Wind Ensemble. (1) I, II, S. Pr.: Baccalaureate degree and previous experience at the undergraduate level. MUSIC-845-5-1005

Performance classes

Undergraduate credit

MUSIC 050. Recital Attendance. (0) I, II. MUSIC-050-0-0000

MUSIC 060. Piano Proficiency. (0) I, II, S. Required for graduation of all music majors. MUSIC-060-2-1004

MUSIC 203. Voice Class I. (1) I, II. Not for voice majors. MUSIC-203-1-1004

MUSIC 204. Voice Class II. (1) I, II. Not for voice majors. MUSIC-204-1-1004

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 non-degree students. MUSIC-206-1-1004

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-207-1-1004

MUSIC 210. Voice Class III. (1) I, II. Not for voice majors. MUSIC-210-1-1004

MUSIC 211. Voice Class IV. (1) I, II. Not for voice majors. MUSIC-211-1-1004

MUSIC 285. Italian Diction. (1) I. Rules for pronouncing and translating Italian vocal texts. MUSIC-285-0-1004

MUSIC 287. German Diction. (1) I. Rules for pronouncing and translating German vocal texts. MUSIC-287-0-1004

MUSIC 391. Keyboard Pedagogy. (2) I, II, S. 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 450, 446, or 443. MUSIC-391-3-1004

MUSIC 417. Conducting. (2) I, II, S. 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-417-1-1004

MUSIC 465. French Diction I. (1) I. Rules for pronouncing and translating French vocal texts. MUSIC-465-0-1004

MUSIC 467. French Diction II. (1) II. Rules for pronouncing and translating French vocal texts. MUSIC-467-0-1004

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. MUSIC-492-2-1004

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-501-1-1004

MUSIC 502. Full Recital. (0) I, II, S. Public performance; vocal or instrumental with suggested performing time of 50 minutes. MUSIC-502-1-1004

Graduate credit

MUSIC 828. Methods and Materials for the Studio. (1-3) I, II, S. Methods of teaching fundamental techniques; selection of teaching materials outlining courses of study. For graduate students in performance curricula. Taught in divisions ac-

according to the major. Practical application through supervised studio teaching. Pr.: MUSIC 391 or MUSIC 492. May be repeated for a maximum of three hours. MUSIC-828-2-1004

MUSIC 859. Advanced Conducting. (Var.) I, II, S. Pr.: MUSIC 417 and consent of instructor. MUSIC-859-3-1004

MUSIC 885. Advanced Diction. (1) On sufficient demand. Concentrated study of Italian, German, and French diction for singing. Materials are related to work in the voice studio, and concurrent registration in MUSIC 886 is required. Pr.: MUSIC 466. May be repeated once. MUSIC-885-0-1004

Studio Performance

MUSIC 251. Pre-Performance Study. (Var.) I, II, S. For students who do not meet standards for regular performance study. MUSIC-251-3-1004

The following undergraduate courses in performance are offered each semester and summer. The student may earn one to four hours per semester.

Lower-level performance (freshman-sophomore)

MUSIC 252. Baritone. MUSIC-252-3-1004

MUSIC 254. Bassoon. MUSIC-254-3-1004

MUSIC 256. Clarinet. MUSIC-256-3-1004

MUSIC 258. Double Bass. MUSIC-258-3-1004

MUSIC 259. Early Winds. (1-2) MUSIC-259-3-1004

MUSIC 260. Flute. MUSIC-260-3-1004

MUSIC 262. French Horn. MUSIC-262-3-1004

MUSIC 263. Harpsichord. MUSIC-263-3-1004

MUSIC 264. Oboe. MUSIC-264-3-1004

MUSIC 266. Organ. MUSIC-266-3-1004

MUSIC 267. Harp. MUSIC-267-3-1004

MUSIC 268. Percussion. MUSIC-268-3-1004

MUSIC 270. Piano. MUSIC-270-3-1004

MUSIC 272. Saxophone. MUSIC-272-3-1004

MUSIC 275. Trombone. MUSIC-275-3-1004

MUSIC 276. Trumpet. MUSIC-276-3-1004

MUSIC 278. Tuba. MUSIC-278-3-1004

MUSIC 280. Viola. MUSIC-280-3-1004

MUSIC 281. Viola Da Gamba. (1-2) MUSIC-281-3-1004

MUSIC 282. Violin. MUSIC-282-3-1004

MUSIC 284. Violoncello. MUSIC-284-3-1004

MUSIC 286. Voice. MUSIC-286-3-1004

Upper-level performance (junior-senior)

MUSIC 432. Baritone. MUSIC-432-3-1004

MUSIC 434. Bassoon. MUSIC-434-3-1004

MUSIC 436. Clarinet. MUSIC-436-3-1004

MUSIC 438. Double Bass. MUSIC-438-3-1004

MUSIC 439. Early Winds. (1-2) MUSIC-439-3-1004

MUSIC 440. Flute. MUSIC-440-3-1004

MUSIC 442. French Horn. MUSIC-442-3-1004

MUSIC 443. Harpsichord. MUSIC-443-3-1004

MUSIC 444. Oboe. MUSIC-444-3-1004

MUSIC 446. Organ. MUSIC-446-3-1004

MUSIC 447. Harp. MUSIC-447-3-1004

MUSIC 448. Percussion. MUSIC-448-3-1004

MUSIC 450. Piano. MUSIC-450-3-1004

MUSIC 452. Saxophone. MUSIC-452-3-1004

MUSIC 454. Trombone. MUSIC-454-3-1004

MUSIC 456. Trumpet. MUSIC-456-3-1004

MUSIC 458. Tuba. MUSIC-458-3-1004

MUSIC 459. Viola Da Gamba. (1-2) MUSIC-459-3-1004

MUSIC 460. Viola. MUSIC-460-3-1004

MUSIC 462. Violin. MUSIC-462-3-1004

MUSIC 464. Violoncello. MUSIC-464-3-1004

MUSIC 466. Voice. MUSIC-466-3-1004

MUSIC 521. Composition. MUSIC-521-3-1004

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. MUSIC-641-3-1004

Graduate credit

MUSIC 852. Baritone. MUSIC-852-3-1004

MUSIC 854. Bassoon. MUSIC-854-3-1004

MUSIC 856. Clarinet. MUSIC-856-3-1004

MUSIC 857. Composition. MUSIC-857-3-1004

MUSIC 858. Double Bass. MUSIC-858-3-1004

MUSIC 860. Flute. MUSIC-860-3-1004

MUSIC 862. French Horn. MUSIC-862-3-1004

MUSIC 863. Harpsichord. MUSIC-863-3-1004

MUSIC 864. Oboe. MUSIC-864-3-1004

MUSIC 866. Organ. MUSIC-866-3-1004

MUSIC 868. Percussion. MUSIC-868-3-1004

MUSIC 870. Piano. MUSIC-870-3-1004

MUSIC 872. Saxophone. MUSIC-872-3-1004

MUSIC 875. Trombone. MUSIC-875-3-1004

MUSIC 876. Trumpet. MUSIC-876-3-1004

MUSIC 878. Tuba. MUSIC-878-3-1004

MUSIC 880. Viola. MUSIC-880-3-1004

MUSIC 881. Viola Da Gamba. (1-2) MUSIC-881-3-1004

MUSIC 882. Violin. MUSIC-882-3-1004

MUSIC 884. Violoncello. MUSIC-884-3-1004

MUSIC 886. Voice. MUSIC-886-3-1004

MUSIC 887. Early Winds. (1-2) MUSIC-887-3-1004

Philosophy

Robin Smith, Head

Professors Reagan,* Smith,* and Tilghman;* Associate Professors Exdell,* Hamilton,* and Scheer;* Assistant Professors Merrill and O'Neil; 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.

Undergraduate study

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. In addition to the traditional major in philosophy there are: pre-professional options designed to meet the special needs of students aiming for careers in law, business, and the ministry; and the interdisciplinary option that gives students whose interests do not coincide with traditional disciplinary lines the opportunity to design a course of study that fits their special concerns.

All philosophy students are required to take the core curriculum:

One course in logic:

PHILO 110	Introduction to Formal Logic	3
	or	
PHILO 220	Symbolic Logic I	3
	or	
PHILO 510	Symbolic Logic II	3
and		
PHILO 300	History of Ancient Philosophy	3
PHILO 301	History of Modern Philosophy	3
PHILO 555	Ethical Theories	3

Traditional philosophy option (B.A. only)

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. Thirty-six hours in philosophy are required including: the core curriculum (the logic course must be PHILO 220, Symbolic Logic I); and 24 additional hours in philosophy, of which 18 must be at or above the 400 level.

Philosophy: pre-law (B.A. or B.S.)

While no one major emphasis in college is given preference by law school admission boards, 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 philosophy department requires that students have a well-balanced curriculum in other areas suitable as preparation for law school, including the social sciences, history, and literature. In addition to the college requirements for either the B.A. or B.S. degree, students must take 27 hours of philosophy, including: core curriculum; 15 additional hours at or above the 400 level including PHILO 535, Philosophy of Law, and either PHILO 500, Philosophy of Social Science, or PHILO 525, Social and Political Philosophy.

Philosophy: pre-business (B.A. or B.S.)

The pre-business option in philosophy is designed for the student who plans to do further work in a college of business leading to a master's in business administration (M.B.A.). This program has been developed in accordance with the results of a number of surveys in professional business journals which rate this type of program an excellent preparation for a career in business leadership. The following curriculum meets the admission requirements of Kansas State University's M.B.A. program:

Requirements for admission to the M.B.A. program, see College of Business Administration section of this catalog. Courses which satisfy these requirements will also partially satisfy requirements for the B.A. and B.S. degrees in the College of Arts and Sciences.

Philosophy, 24 hours, including: core curriculum; and 12 additional hours in philosophy at or above the 400 level, including PHILO 545, Philosophy of Economics, and either PHILO 525, Social and Political Philosophy, or PHILO 535, Philosophy of Law.

Philosophy: pre-ministry (B.A. only)

The pre-ministry option in philosophy is a nonsectarian program designed for students who are interested in the religious ministry

as a profession. Students will be advised on courses in psychology, sociology, and literature which satisfy the general college requirements and are recommended by most American schools of theology. The requirements are as follows: philosophy, 30 hours, including: core curriculum; PHILO 310, Comparative Religion; and 15 additional hours in philosophy at or above the 400 level, including PHILO 515, Philosophy of Religion, and PHILO 540, Metaphysics.

Three courses in other disciplines, approved by the department, in which religion is studied.

Interdisciplinary options (B.A. or B.S.)

These options permit students to combine a philosophy major with a concentration of studies in some other general area. There are no specific limitations of the area of study; it does not, for example, have to fall within a single department. However, it should encompass a group of courses with some underlying theme. Typical interdisciplinary areas of concentration are the various social sciences, history, the life sciences and natural sciences, psychology, journalism, language and literature, art and design, mathematics, and linguistics. Students develop their programs in consultation with a faculty member of the philosophy department. All programs must be approved by the department. The general requirements are as follows: 24 hours of philosophy, including the core curriculum and 12 additional hours above the 400 level; 12 hours above the 400 level in the area of the program (in philosophy or in other departments).

Courses in philosophy

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-100-0-1509

PHILO 105. Introduction to Critical Thinking. (3) I, II, S. 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-105-0-1509

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-110-0-1509

PHILO 115. Introduction to Philosophy of Religion. (3) I, II, S. 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-115-0-1509

PHILO 120. Introduction to the Philosophy of Art and Literature. (3) I, II, S. 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-120-0-1509

PHILO 125. Introduction to Philosophy of Science. (3) I, II, S. Examines the nature of science and how it differs from pseudosciences such as astrology, and raises questions about the nature of reality and social value of science. PHILO-125-0-1509

PHILO 130. Introduction to Ethics. (3) I, II, S. Examines the nature of morality, moral knowledge, and moral justifications, and the relation between morality, religion, and culture. These issues are approached through a study of contemporary moral problems concerning abortion, war, sexuality, etc. PHILO-130-0-1509

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-135-0-1509

PHILO 140. Introduction to Philosophy of Mind. (3) I, II, S. 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-140-0-1509

PHILO 145. Introduction to Philosophical Classics. (3) I, II, S. An introduction to philosophy through the careful reading of selected works of a major influence in the history of philosophy. PHILO-145-0-1509

PHILO 215. Honors Introduction to Philosophy. (3) I, II. An introduction to the main problems in philosophy. For students in the honors program. PHILO-215-0-1509

PHILO 220. Symbolic Logic I. (3) I, II, S. A systematic introduction to modern logic. Truth-functions, truth tables, and calculus of propositions, classes, and relations. PHILO-220-0-1509

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-297-0-1509

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-298-0-1509

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-300-0-1509

PHILO 301. History of Modern Philosophy. (3) II. The development of philosophical ideas from the Renaissance to the nineteenth century. PHILO-301-0-1509

PHILO 310. Comparative Religion. (3) II. An introduction to the central beliefs of the major religions of both East and West and an examination of philosophical problems that arise in the comparative study of religions (for example, the problems of the relativity of religious belief). Pr.: One course in philosophy. PHILO-310-0-1509

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-397-0-1509

PHILO 399. Honors Seminar in Philosophy. (3) I, 1979. PHILO-399-0-4900

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 CMPSC 492; CMPSC 520. PHILO-492-0-1509

PHILO 499. Senior Honors Thesis. (2) I, II, S. Open only to honor students in the arts and sciences honors program. PHILO-499-4-1509

Undergraduate and graduate credit in minor field

PHILO 500. Philosophy of the Social Sciences. (3) II. An examination of the possibility of a science of man 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. PHILO-500-0-1509

PHILO 505. The Philosophy of Science. (3) I or II. Philosophical problems concerning science, its methods, laws, and theories. Pr.: One course in philosophy. PHILO-505-0-1509

PHILO 510. Symbolic Logic II. (3) I. An advanced study of logical systems and problems in logical theory. Pr.: PHILO 220. PHILO-510-0-1509

PHILO 515. Philosophy of Religion. (3) II. 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-515-0-1509

PHILO 520. The Philosophy of Mind. (3) I. 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. PHILO-520-0-1509

PHILO 525. Social-Political Philosophy. (3) I or II and alternate S. 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-525-0-1509

PHILO 530. Knowledge and Perception. (3) I. An examination of philosophical problems about the nature of our knowledge of the world. Pr.: One course in philosophy. PHILO-530-0-1509

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. PHILO-535-0-1509

PHILO 540. Metaphysics. (3) II. A critical examination of theories about things and their qualities, causality, space, and time. Both traditional and contemporary sources will be used, but emphasis will be placed on the latter. Pr.: One course in philosophy. PHILO-540-0-1509

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 one course in social science. PHILO-545-0-1509

PHILO 550. The Philosophy of Language. (3) I or II. Philosophical problems concerning the nature of language and such concepts as meaning and truth. Pr.: One course in philosophy. PHILO-550-0-1509

PHILO 555. Ethical Theories. (3) I or II. 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-555-0-1509

PHILO 560. Advanced Ethics. (3) I or II. Detailed examination of selected topics in contemporary ethical theory. Pr.: PHILO 130 or junior standing. PHILO-560-0-1509

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-565-0-1509

PHILO 570. Recent Aesthetic Theory. (3) II. A study of selected work of current importance in the philosophy of art. Pr.: PHILO 120. PHILO-570-0-1509

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-575-0-1509

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-580-0-1509

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-585-0-1509

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. PHILO-590-0-1509

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-600-0-1509

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-605-0-1509

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-610-0-1509

PHILO 620. The Development of Analytical Philosophy. (3) I. 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-620-0-1509

PHILO 630. Recent British-American Philosophy. (3) II. A detailed study of selected philosophical writings of current interest in Great Britain and the United States. Pr.: One course in philosophy. PHILO-630-0-1509

PHILO 680. Problems in Philosophy. (Var.) I, II, S. Independent study for qualified students. Pr.: Background of courses required for problem undertaken. PHILO-680-3-1509

PHILO 701. Topics in Metalogic. (3) I or II. Selected topics in the analysis of first-order theories and the foundations of mathematics. Pr.: PHILO 510 or MATH 511. PHILO-701-0-1509

Physical Education and Leisure Studies

Larry Noble, Head

Professor Noble;* Associate Professors Johnson,* Laurie,* Lindley,* McElroy,* Wiggins,* and Williams;* Assistant Professors Dzewaltowski,* Hunter,* Kraemer,* Rinehardt,* Stevenson,* and Satern;* Instructors Christie, Coleman, Cramer, Hopper, Kellstrom,* and Roschke; Emeriti: Professors Evans and Geyer; Associate Professors McKinney, Snyder, and Wauthier; Instructor Poole; Adjunct Faculty: Stumpfauer.

Students enrolling in the Department of Physical Education and Leisure Studies may earn a degree in physical education or leisure studies. Majors in physical education may select specializations such as human movement studies, exercise science, elementary physical education, secondary physical education, athletic coaching, or athletic training.

Majors in leisure studies specialize in recreation and park management and/or therapeutic recreation.

Transfer students

Students transferring to Kansas State University and desiring to complete a major in the PELS department should send an up-to-date transcript to the coordinator of professional preparation, Department of Physical Education and Leisure Studies, Kansas State University, and to the College of Arts and Sciences. It will be evaluated before entrance to the University. If possible, transfer students should adhere to the following:

Check the general requirements of Kansas State University and of the college in which you intend to enroll. Try to complete as many of these requirements as possible before arrival. This is especially true of those transfer students who are completing two years of community college work prior to transfer.

Avoid taking major courses until transferring to Kansas State University if enrolled at a community college. If there are other courses you desire to take at the institution from which you are transferring, check with the KSU Department of Physical Education and Leisure Studies for clearance prior to taking the courses.

Undergraduate study

Basic physical education requirement

All KSU freshmen enroll in one semester of the course PE 101, Concepts in Physical Education, to satisfy the physical education requirement. After completion of Concepts in Physical Education, students are encouraged to enroll in a one-credit-hour course (PE 104 through 193), where an opportunity will be given for gaining knowledge, skill, and appreciation of lifetime recreational activities.

Physical education major

For a degree in physical education students should take the following:

General education requirements—See general College of Arts and Sciences requirements for B.A. and B.S.

Physical education core—To be taken by all majors

PE 101	Concepts in Physical Education	....	1
Core courses to be taken by all majors:			
PE 206	Professional Orientation	.....	1
PE 320	Motor Development and Learning	..	3
PE 325	History and Philosophy of Physical Education	.....	3
PE 330	Kinesiology	.....	3
PE 335	Physiology of Exercise	.....	3
PE 340	Social-Psychological Dimensions of Physical Activity	.....	3
PE 561	Adapted Physical Education	3
PE 710	Measurement and Evaluation in Physical Education	3
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Physical education specialization areas

To earn a major in physical education a student must complete one of the following in addition to the professional physical education core:

A. Human movement studies

Fifteen hours of physical education classes numbered 300 or above, plus enough elective hours to fulfill 120-hour University requirement.

B. Exercise science

PE 635	Nutrition and Exercise	.....	3
PE 755	Adult Exercise Programs	.....	3
PE 759	Exercise Testing and Prescription	..	3
PE 375* or 376*	First Aid and CPR	.....	1
CHM 110	General Chemistry	.....	5
BIOCH 120	Introductory Organic and Biological Chemistry	.....	5

plus six hours of physical education course work numbered 300 or above

For internship, a student must meet the following qualifications: have completed all of the physical education major courses; have an overall 2.2 GPA with a 2.5 GPA in the physical education major courses; pass a physical examination.

*Or minimum of current standard first aid and CPR certification at time of petition.

C. Elementary specialization

PE 315	Treatment of Athletic Injuries	....	3
PE 359	Administration of Physical Education, Athletic, and Intramural Programs	.....	3
PE 375* or 376*	First Aid and CPR	.....	1
PE 410	Gymnastics in Physical Education	..	3
PE 420	Rhythms in Physical Education	....	3
PE 445	Movement Exploration and Creative Dance for Children	.....	3
PE 455	Physical Education Activities for Elementary Schools	.....	3
DANCE 120	Modern Dance I	.....	1
Skill competency**			0-6
			<hr/>
			20-26

D. Secondary specialization

PE 315	Treatment of Athletic Injuries	....	3
PE 359	Administration of Physical Education, Athletic, and Intramural Programs	.....	3
PE 375* or 376*	First Aid and CPR	.....	1
PE 410	Gymnastics in Physical Education	..	3
PE 415	Team Sports for Secondary Schools	.....	3
PE 420	Rhythms in Physical Education	....	3
PE 425	Individual and Dual Sports for Secondary Schools	.....	3
DANCE 120	Modern Dance I	.....	1
or			
DANCE 165	Ballet I	.....	1
or			
DANCE 171	Jazz Dance I	.....	1
Skill competency**			0-6
			<hr/>
			20-26

E. K-12 specialization

PE 315	Treatment of Athletic Injuries	....	3
PE 359	Administration of Physical Education, Athletic, and Intramural Programs	.....	3
PE 375* or 376*	First Aid and CPR	.....	1
PE 410	Gymnastics in Physical Education	..	3
PE 415	Team Sports for Secondary Schools	.....	3
PE 425	Individual and Dual Sports for Secondary Schools	.....	3
PE 420	Rhythms in Physical Education	....	3
PE 445	Movement Exploration and Creative Dance for Children	.....	3

PE 455	Physical Education Activities for Elementary Schools	3
DANCE 120	Modern Dance I	1
Skill competency**	0-6	26-32

*or minimum of current first aid and CPR certification at time of petition.

**Competency must be demonstrated in two activities in Category A and four activities in Category B by: satisfactory completion of the lifetime sport class if available, satisfactory completion of the appropriate coaching class, or intercollegiate playing experience. Category A. Team sports and aquatics: basketball, football/baseball/softball, soccer, volleyball, aquatics (WSI or current WSI certification). Category B. Individual sports and fitness: archery, badminton, golf, racquetball/handball, tennis, wrestling, gymnastics and apparatus, weight training, tumbling and floor exercise, bowling, track and field, aerobic dance and exercise, trap shooting, backpacking.

Nutrition and exercise sciences

dual-degree program

B.S. in foods and nutrition

B.S. as physical education major with exercise science specialization

A 150-credit-hour dual-degree program

General education requirements

See general College of Arts and Sciences requirements for B.S.

Physical education core

Exercise science

PE 375*	First Aid and CPR	1
	or	
PE 376*	First Aid—Standard and CPR	1
PE 635	Nutrition and Exercise	3
PE 755	Adult Exercise Programs	3
PE 759	Exercise Testing and Prescription ..	3
BIOL 555	Microbiology	5
CHM 110	General Chemistry	5
CHM 190	Elementary Organic Chemistry	3
CHM 191	Elementary Organic Chemistry Laboratory	2
BIOCH 201	Elementary Biochemistry	3

Nutrition science

FN 300	Food Preparation and Meal Management	4
FN 301	Trends in Food Products	3
HDFS 352	Concepts of Personal Health	3
DRIM 440	Fundamentals of Quantity Food Production	5
FN 501	Food Science	3
FN 502	Principles of Nutrition	3
FN 610	Nutrition Needs Throughout the Life Cycle	3
FN 680	Seminar in Foods and Nutrition	2
FN 700	Community Nutrition	3
FN 706	Practicum in Community Nutrition	3
FN 712	Diet Therapy	3

*Or minimum of current standard first aid and CPR certification at time of petition.

Professional education requirements

For those seeking teacher certification

EDAF 215	Educational Psychology I	3
EDAF 315	Educational Psychology II	3
Physical education professional semester teaching participation (must be done in area of specialization)	8	
EDCI 451	Principles of Secondary Education	3
	or	
EDCI 300	Principles of Elementary Education	3
EDAF 611	Educational Sociology	3

EDCI 476	Methods of Teaching in the Secondary School	2-3
	and/or	
EDCI 469	Physical Education in Elementary Schools	3
EDCI 316	Introduction to Instructional Media	1
EDAF 622	Psychology of Exceptional Children	3
	or	
EDAF 623	The Exceptional Child in the Regular Classroom	3
EDCI 715	Reading in Content Area	3
DED 100	Pre-Professional Laboratory Experiences	1
Pre-professional skills test		

The following natural science and social science courses should be taken by physical education majors:

BIOL 198	Principles of Biology	4
BIOL 240	Structure and Function of the Human Body	6
PHYS 115	Descriptive Physics	4
PSYCH 110	General Psychology	3
SOCIO 211	Introduction to Sociology	3

Leisure studies major

For a degree in leisure studies students should take the following:

General education requirements

See general College of Arts and Sciences requirements for B.A. and B.S.

Leisure studies core

CMPSC 110	Introduction to Personal Computing	3
LS 210	Leisure in Society	3
LS 320	Recreation Leadership	3
LS 390	Principles and Philosophy of Recreation	3
LS 481	Participation in Recreation	2
LS 487	Recreation Facility Management ...	3
LS 488	Recreation for Special Populations	3
LS 489	Recreation Program	3
LS 490	Recreation Administration I	3
LS 491	Seminar in Recreation	2
LS 520	Leisure Studies Research Methods	3
		31

*Current American Red Cross first aid/CPR certifications are required for the pre-internship and internship.

Leisure studies specialization

Select and complete A and/or B.

A. Recreation and park management—19 hours

This option is designed for the person who will be conducting and operating a recreation/park program in a variety of leisure settings.

Required:		
LS 725	Recreation Administration II	3
LAR 756	Design of Recreation and Park Areas	3
FOR 590	Park Operations	4
JMC 512	Public Relations	3
PSYCH 545	Consumer Psychology	3
	or	
MKTG 400	Marketing	3
PSYCH 560	Industrial Psychology	3
	or	
MGMT 420	Management Concepts	3
TOTAL		19

B. Therapeutic recreation—18 hours

Required:		
LS 493	Therapeutic Recreation Service	3
LS 501	Therapeutic Recreation in Rehabilitation Agencies	3

Six hours from the following:

PSYCH 505	Abnormal Psychology	3
EDAF 622	Psychology of Exceptional Children	3
EDAF 663	Education of Exceptional Children	3
EDAF 664	Mental Retardation	3
SOCIO 560	Juvenile Delinquency	3
SOCIO 561	Criminology	3
SOCIO 744	Social Gerontology: An Introduction to the Sociology of Aging	3
PSYCH 715	Psychology of Aging	3
EDAF 628	Characteristics of the Emotionally Disturbed	3
EDAF 721	Mental Hygiene in School and Community	3
EDAF 755	Guidance of the Exceptional Individual	3

Six hours from Group I or II as listed on the leisure studies major approved course list.

Directed field experience

A. Recreation and park management

LS 492	Internship in Leisure Service Agencies	15
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Internship is a one-semester, minimum 15-week, 600-hour experience in an approved recreation/leisure service agency.

B. Therapeutic recreation

LS 494	Internship in Therapeutic Recreation Agencies	15
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Intensive practical experience over a 15-week, 600-hour period in an approved therapeutic recreation site.

Student must meet the following qualifications:

2.2 GPA in all course work attempted at KSU, 2.5 GPA in all leisure studies major core courses; leisure studies majors must have satisfactory pre-internship experiences in leisure/recreation field, minimum of 280 hours during college/university preparation.

Departmental options

Coaching certification program

This program prepares coaches in all areas of varsity athletics, and is open to nonmajors as well as students majoring in physical education and leisure studies. Students completing the following courses will receive an athletic coaching endorsement from the Department of Physical Education and Leisure Studies. Majors taking this program must also complete all requirements for a major in either physical education or leisure studies. The coaching program is not a substitute for specialization requirements. Nonmajors are not required to take any work in the department in addition to the coaching program.

Coaching program requirements

PE 315	Treatment of Athletic Injuries	3
PE 359	Organization and Administration of Athletics	3
PE 202	Physiological Foundations of Coaching	2
	or	
PE 335	Physiology of Exercise	3
PE 203	Kinesiological Foundations of Coaching	2
	or	
PE 330	Kinesiology	3
PE 204	Psychological Foundations of Coaching	2
	or	
PE 320	Motor Behavior and Skill Learning	3

Four hours selected from the following:

PE 298	Coaching and Officiating Wrestling	2
PE 299	Coaching and Officiating Swimming	2

PE 300	Coaching and Officiating Volleyball	2
PE 301	Coaching and Judging Gymnastics	2
PE 302	Coaching and Officiating Basketball	2
PE 303	Coaching and Umpiring Baseball ..	2
PE 304	Coaching and Officiating Track and Field	2
PE 305	Coaching and Officiating Football ..	2
PE 309	Coaching and Officiating Tennis and Golf	2

Athletic training certification program

This program prepares athletic trainers for all levels of athletics. It is especially applicable to those teacher preparation students desiring to serve as junior or senior high school athletic trainers. Physical education majors taking this program must also complete the PE core and selected specialization area. Non-physical education majors are not required to take any work in the department in addition to the athletic training program. Successful completion of this program allows the student to take the National Trainers Association (NATA) Board Certification Examination.

Athletic training option for physical education majors—any specialization

FN 132	Basic Nutrition	3
PE 315	Treatment of Athletic Injuries	3
PE 550	Rehabilitation/Conditioning and Modalities	3
PE 551	Evaluation and Emergency Management	3
PE 585	Internship in Techniques of Athletic Training (minimum of 2 credit hours each semester for four semesters)	8
HDFS 352	Concepts of Personal Health	3
		23

1,800 hours supervised clinical experience

Athletic training option for non-physical education majors

BIOL 240	Structure and Function of the Human Body	6
FN 132	Basic Nutrition	3
HDFS 352	Concepts of Personal Health	3
PE 376	First Aid and CPR	1
PE 330	Kinesiology	3
PE 335	Physiology of Exercise	3
PE 340	Social and Psychological Dimensions of Physical Activity	3
PE 561	Adapted Physical Education	3
PE 315	Treatment of Athletic Injuries	3
PE 550	Rehabilitation/Conditioning and Modalities	3
PE 551	Evaluation and Emergency Management	3
PE 585	Internship in Athletic Training (minimum of 2 credit hours each semester for four semesters)	8
		42

1,800 hours supervised clinical experience

Adapted physical education certification

The Department of Physical Education and Leisure Studies in cooperation with the College of Education offers a State Department of Education approved certification program in adapted physical education. Each applicant for an adapted physical education endorsement shall have successfully completed a state approved

adapted physical education program and meet state requirements to receive a teacher certification degree in physical education. Following are the required courses for certification in adapted P.E.

PE 561	Adapted Physical Education	3
PE 599	Independent Study (Adaptive)	3
EDAF 623	Exceptional Child in Regular Classroom	3
PE 735	Physical Education for the Atypical	3
		12

Graduate study

The Department of Physical Education and Leisure Studies offers a master of science in physical education.

Master of science

The M.S. degrees in physical education and leisure studies assist students in developing professional and research skills in a variety of areas. In working toward the degree, students have the opportunity to study with faculty possessing specialized expertise in many scientific foundations and program and administration areas. Examples of courses and areas of study include: exercise physiology, biomechanics, motor behavior, sports administration, sport psychology, sport sociology, and sport history. Students may choose from three different degree plans (30 hours each) depending on their individual needs and interests: thesis; master's report; or nonthesis. The student and the supervisory committee are responsible for developing the student's curriculum. Individual programs are designed to meet the unique needs of each student. Up to 12 hours related to the student's area of emphasis may be taken outside the department.

The program is outlined below:

Research core

PE 815	Research Methods in Physical Education and Leisure Studies	3
STAT 702	Statistical Methods for Social Sciences	3
or		
STAT 703	Statistical Methods for Natural Sciences	3

Subject core

2 of the following courses required for thesis option:
3 of the following courses required for non-thesis or report option:

PE 700	Principles and Philosophy of Physical Education	3
PE 800	Advanced Physiology of Exercise ...	3
PE 805	Sport and Human Behavior	3
PE 806	Motor Development	3
PE 807	Motor Learning and Control	3
PE 825	Mechanical Analysis of Human Movement	3
PE 808	Advanced Issues in Sport Sociology	3

Support courses

Taken from physical education or related area to be decided upon by the student and supervisory committee.

Further details about programs and information about possible financial assistance may be obtained by writing to the department.

Physical education

Undergraduate credit

The following courses may be taken for elective credit:

Adaptive physical education

PE 100. Adaptive Physical Education. (1) I, II. Exercise programs adapted to the needs of the special student. May be repeated eight times. PE-100-5-0835

Concepts of physical education

PE 101. Concepts in Physical Education. (1) PE-101-1-5-0835

Lifetime sports

Aquatics

PE 104. Swimming I. (1) Beginning instruction for students who have no previous experience with swimming. PE-104-5-0835

PE 105. Swimming II. (1) For the beginning swimmer who has had some previous swimming experience. PE-105-5-0835

PE 106. Swimming III. (1) Pr.: PE 105 or consent of instructor. PE-106-5-0835

PE 107. Fitness Swimming. (1) Pr.: PE 116 or consent of instructor. PE-107-5-0835

PE 108. Advanced Lifesaving. (1) Pr.: PE 107 or consent of instructor. PE-108-5-0835

PE 109. Water Safety I Instruction (3) I, II. Methods of teaching swimming, lifesaving, and water safety. An overview of the Red Cross and basic teaching and learning concepts. Students who receive an A or B in this course obtain a Water Safety Instructor Certification and an Introduction to Health Services Education Certification from the American Red Cross. Pr.: A current Advanced Lifesaving Certificate. PE-109-5-0835

PE 110. Scuba Diving. (1) PE-110-5-0835

PE 111. Diving. (1) PE-111-5-0835

PE 112. Synchronized Swimming. (1) PE-112-5-0835

PE 113. Water Polo. (1) PE-113-5-0835

PE 114. Lifeguard Training. (2)

Pr.: PE 108, 375, or 376. PE-114-5-0835

PE 118. Lifeguard Instructor. (1)

Pr.: PE 109, 114, and lifeguard experience. PE-118-5-0835

Team sports

PE 120. Basketball. (1) Beginning instruction for students who have had no previous instruction in basketball. PE-120-5-0835

PE 121. Field Hockey. (1) PE-121-5-0835

PE 122. Flag Football. (1) Beginning instruction for students who have had no previous instruction in football. PE-122-5-0835

PE 123. Soccer. (1) PE-123-5-0835

PE 124. Softball. (1) PE-124-5-0835

PE 125. Team Handball. (1) PE-125-5-0835

PE 126. Volleyball I. (1) PE-126-5-0835

PE 127. Volleyball II. (1) Pr.: PE 126 or consent of instructor. PE-127-5-0835

Individual and dual sports

- PE 135. Archery.** (1) PE-135-5-0835
PE 136. Badminton. (1) PE-136-5-0835
PE 138. Bowling. (1) PE-138-5-0835
PE 139. Fencing. (1) PE-139-5-0835
PE 140. Golf. (1) PE-140-5-0835
PE 141. Gymnastics and Apparatus I. (1) PE-141-5-0835
PE 142. Gymnastics and Apparatus II. (1) Pr.: PE 141 or consent of instructor. PE-142-5-0835
PE 143. Handball. (1) PE-143-5-0835
PE 144. Judo I. (1) PE-144-5-0835
PE 145. Judo II. (1) Pr.: PE 144 or consent of instructor. PE-145-5-0835
PE 146. Karate I. (1) PE-146-5-0835
PE 147. Karate II. (1) Pr.: PE 146 or consent of instructor. PE-147-5-0835
PE 148. Racquetball. (1) PE-148-5-0835
PE 149. Riflery. (1) PE-149-5-0835
PE 150. Self Defense. (1) Instruction in selected self-defense techniques derived from judo, karate, and other martial arts. PE-150-5-0835
PE 151. Tennis I. (1) PE-151-5-0835
PE 152. Tennis II. (1) Pr.: PE 151 or consent of instructor. PE-152-5-0835
PE 153. Track and Field. (1) PE-153-5-0835
PE 154. Tumbling and Floor Exercise. (1) PE-154-5-0835
PE 155. Wrestling. (1) PE-155-5-0835

Training and conditioning activities

- PE 160. Aerobic Dancing and Exercise.** (1) PE-160-5-0835
PE 161. Fitness and Conditioning. (1) PE-161-5-0835
PE 162. Jogging. (1) PE-162-5-0835
PE 163. Weight Training. (1) PE-163-5-0835

Indoor and outdoor recreational games and sports

- PE 170. Angling.** (1) PE-170-5-0835
PE 171. Backpacking and Hiking. (1) PE-171-5-0835
PE 172. Bicycle Touring. (1) PE-172-5-0835
PE 173. Billiards and Snooker. (1) PE-173-5-0835
PE 174. Bow Hunting. (1) PE-174-5-0835
PE 175. Camping. (1) PE-175-5-0835
PE 176. Canoeing I. (1) Pr.: PE 105 or equiv. PE-176-5-0835
PE 177. Canoeing II. (1) Pr.: PE 176 or consent of instructor. PE-177-5-0835
PE 178. Crew. (1) PE-178-5-0835
PE 179. Cross Country Skiing. (1) PE-179-5-0835
PE 180. Downhill Skiing. (1) PE-180-5-0835
PE 181. English Horsemanship I. (1) PE-181-5-0835
PE 182. English Horsemanship II. (1) Pr.: PE 181 or consent of instructor. PE-182-5-0835
PE 183. Western Horsemanship I. (1) PE-183-5-0835

- PE 184. Western Horsemanship II.** (1) Pr.: PE 183 or consent of instructor. PE-184-5-0835
PE 185. Orienteering. (1) PE-185-5-0835
PE 186. Recreational Games. (1) PE-186-5-0835
PE 187. Roller Skating. (1) PE-187-5-0835
PE 188. Sailing I. (1) Pr.: PE 105 or equiv. PE-188-5-0835
PE 189. Sailing II. (1) Pr.: PE 188 or consent of instructor. PE-189-5-0835
PE 190. Table Tennis. (1) PE-190-5-0835
PE 191. Trap Shooting. (1) PE-191-5-0835
PE 192. Water Skiing. (1) Pr.: PE 105 or equiv. PE-192-5-0835
PE 193. Wind Surfing. (1) Pr.: PE 105 or equiv. PE-193-5-0835

The following courses may be taken by students majoring in physical education or other students meeting prerequisite requirements.

- PE 200. Concepts of Adult Physical Fitness.** (2) A study of the facts about the effects of regular exercise on physical fitness and health. PE-200-0-0835
PE 202. Physiological Foundations of Coaching. (2) I. The human organism under both resting and exercise conditions, including the effect of training and conditioning, heat balance, nutrition, drugs, and exercise metabolism on athletic performance. Special attention to applications for coaches. Not for PE majors. PE-202-0-0835
PE 203. Kinesiological Foundations of Coaching. (2) II. The structure and function of the musculoskeletal system and the mechanical principles underlying sports performance with special attention to applications for coaches. The ability to analyze sports performance to determine the muscles involved, joint movements, and mechanical details with the unaided eye and with the use of film and videotape analysis will be developed. Not for PE majors. PE-203-0-0835
PE 204. Psychological Foundations of Coaching. (2) II. Principles of learning and performing sports skills with special attention to applications for coaches. Specific areas of study include motivation, methods of teaching, and general factors affecting the learning and performing of sports skills. Pr.: PSYCH 110. Not for PE majors. PE-204-0-0835
PE 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. PE-205-0-0835

- PE 206. Professional Orientation.** (1) I. Orientation to the fields of physical education, recreation, and dance; the University; and the department. PE-206-0-0835

- PE 298. Coaching and Officiating Wrestling.** (2) On sufficient demand. Study of rules, theory, and practices; methods of coaching. Pr.: PE 202, 203, 204. PE-298-1-2-0835

- PE 299. Coaching and Officiating Swimming.** (2) II, in even years. Study of rules, theory, and practices; methods of coaching. Pr.: PE 202, 203, 204. PE-299-2-0835

- PE 300. Coaching and Officiating Volleyball.** (2) I. Study of rules, theory, and practices; methods of coaching. Pr.: PE 202, 203, or 204. PE-300-2-0835

- PE 301. Coaching and Judging Gymnastics.** (2) On demand. Study of rules, theory, and practices; methods of coaching. Pr.: PE 202, 203, or 204. PE-301-2-0835

- PE 302. Coaching and Officiating Basketball.** (2) II. Study of rules, theory, and practices; methods of coaching. Pr.: PE 202, 203, or 204. PE-302-2-0835

- PE 303. Coaching and Umpiring Baseball.** (2) I, in even years. Study of rules, theory, and practices; methods of coaching. Pr.: PE 202, 203, or 204. PE-303-2-0835

- PE 304. Coaching and Officiating Track and Field.** (2) II, in odd years. Study of rules, theory, and practices; methods of coaching. Pr.: PE 202, 203, or 204. PE-304-2-0835

- PE 305. Coaching and Officiating Football.** (2) I. Study of rules, theory, and practices; methods of coaching. Pr.: PE 202, 203, or 204. PE-305-2-0835

- PE 309. Coaching and Officiating Tennis and Golf.** (2) I, in odd years. Study of rules, theory, and practices; methods of coaching. Pr.: PE 202, 203, or 204. PE-309-2-0835

- PE 315. Treatment of Athletic Injuries.** (3) I, II. Principles and practices of treatment, taping, and care of minor athletic injuries. Pr.: PE 203 or BIOL 240 or conc. enrollment in BIOL 240. PE-315-0-0835

- PE 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. PE-320-0-0835

- PE 325. History and Philosophy of Physical Education.** (3) I, II. Historical and philosophical foundations of physical education and the principles of physical education. Pr.: PE 206. PE-325-0-0835

- PE 330. Kinesiology.** (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. PE-330-0-0835

PE 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. PE-335-0-0835

PE 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. PE-340-0-0835

PE 359. Administration of Physical Education, Athletic, and Intramural Programs. (3) II. 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. PE-359-0-0835

PE 375. First Aid—Multimedia and CPR. (1) I, II. Provides fundamental principles and skills in first aid. The course includes filmed demonstrations, instructor-led practice sessions, and programmed workbooks. CPR training teaches correct techniques for both adult and infant victims of cardiac arrest. Red Cross certifications on successful completion of course. Students cannot receive credit for both PE 375 and 376. PE-375-1-0835

PE 376. First Aid—Standard and CPR. (1) I, II. Provides fundamental principles and skills in first aid. Taught by lecture-discussion, workbooks, and practice sessions. CPR training teaches correct techniques for both adult and infant victims of cardiac arrest. Red Cross certifications on successful completion of the course. Students cannot receive credit for both PE 375 and 376. PE-376-1-0835

PE 377. First Aid—Multimedia and CPR Instructor. (1) I, II. Methods for teaching first aid multimedia and CPR courses. Red Cross certifications on successful completion of the course. Pr.: Current first aid—multimedia or standard certificate and a current certificate in the full length CPR course (PE 375 or 376). PE-377-1-0835

PE 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. PE-379-7-0835

PE 399. Sophomore Honors Seminar. (1-3) I. Selected topics in physical education, dance, and leisure studies. Open to non-majors in the honors program. PE-399-4-4900

PE 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.: PE 300 and PE 335. PE-405-2-0835

PE 410. Gymnastics 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.: PE 320, 330, and 335 (or any two and conc. enrollment in the third). PE-410-0-2-0835

PE 415. Team Sports for Secondary Schools. (3) II. Application of scientific principles to the teaching of team sports. Emphasis upon sports selected from the following list: basketball, field hockey, flag football, soccer, softball, speedaway, speedball, team handball, and volleyball. One hour lec. and four hours lab a week. Pr.: PE 320, 330, and 335 (or any two and conc. enrollment in the third). PE-415-1-2-0835

PE 420. 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.: PE 320, 330, and 335 (or any two and conc. enrollment in the third). PE-420-1-2-0835

PE 425. Individual and Dual Sports for Secondary Schools. (3) I. Application of scientific principles to the teaching of individual and dual sports. Emphasis upon sports selected from the following lists: archery, badminton, bowling, fencing, golf, handball, racquetball, tennis, and wrestling. One hour lec. and four hours lab a week. Pr.: PE 320, 330, and 335 (or any two and conc. enrollment in the third). PE-425-1-2-0835

PE 430. Practicum Physical Education. (2) I, II. Supervised students assist in lifetime sports classes. Four hours lab a week. Pr.: Junior standing. PE-430-1-2-0835

PE 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 SOCIO 435. Pr.: SOCIO 211. PE-435-0-0835

PE 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.: PE 320, 330, and 335 (or any two and conc. enrollment in the third). PE-445-1-2-0835

PE 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.: PE 320, 330, and 335 (or any two and conc. enrollment in the third). PE-455-1-2-0835

PE 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. PE-461-5-0835

PE 463. Laboratory Practicum in Physical Education. (1-2) I, II, S. Supervised students assist in laboratory. Four hours lab a week. Pr.: Junior standing and appropriate background for problem undertaken. PE-463-2-0835

PE 498. Honors Tutorial in Physical Education. (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. PE-498-4-0835

Undergraduate and graduate credit in minor field

PE 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. See HIST 515. PE-515-0-2205

PE 550. Rehabilitation, Conditioning, and Modalities. (3) II, in odd years. A study of specific rehabilitation and conditioning techniques used by the athletic trainer with emphasis on tissue healing via use of therapeutic heat, cold, and the physiologi-

cal effect of modalities. Pr.: PE 315 and BIOL 240. PE-550-0-0835

PE 551. Evaluation and Emergency Management. (3) II, in even years. An in-depth study of evaluation techniques for athletic injuries used by the athletic trainer with emphasis on analysis of pathomechanics and emergency management. Pr.: PE 315 and BIOL 240. PE-551-0-0835

PE 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.: PE 330. PE-561-0-0835

PE 585. Internship in Athletic Training. (1-4) I, II. Supervised clinical application of practical skills in athletic training. Pr.: PE 315. May be repeated for a total of eight credit hours with additional prerequisite of PE 330 and PE 335 required for last four semesters. PE-585-2-0835

PE 598. Topics in Physical Education. (1-3) PE-598-3-0835

PE 599. Independent Studies in Physical Education. (1-3) Selected topics in physical education. Maximum of three hours applicable toward a degree. Pr.: Consent of department head. PE-599-3-0835

PE 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.: PE 335 and FN 132 or FN 502. Cross-listed with foods and nutrition; see FN 635. PE-635-0-0835

Undergraduate and graduate credit

PE 700. Principles and Philosophy of Physical Education. (3) II. Study of historical and philosophical foundations of physical education and an analysis of the principles of physical education. PE-700-0-0835

PE 702. PELS Workshop. (1-3) I, II, S. Intensified study of new and innovative techniques used in physical education, dance, and leisure studies. Practical considerations of skill development, learning, and techniques of selected activities. May be counted for degree credit no more than once by any student. Pr.: Senior standing and consent of instructor. PE-702-0-0835

PE 703. Minority Groups in Sports. (3) The contributions by, problems of, and discrimination against minority groups in sports. Pr.: SOCIO 211, PE 340, PSYCH 435, or HIST 539. PE-703-0-0835

PE 710. Measurement and Evaluation in Physical Education. (3) I, II. Techniques of measuring and evaluating, including the application of statistics to skill and written

test theory, construction and critique of tests. Pr.: STAT 320 and all other physical education core classes. PE-710-0-0835

PE 718. Film Analysis of Sport. (3) On sufficient demand. The analysis of human movement using film, tape, and other related aids. Pr.: PE 330. PE-718-0-0835

PE 731. The Physical Education Curriculum. (3) II, in even years. Principles of curriculum development for physical education in grades K-12. Pr.: EDCI 476 or EDCI 469. PE-731-0-0835

PE 735. Physical Education for the Atypical. (3) Techniques for assessing the needs and functioning level of exceptional people of all ages and for developing and evaluating programs. Two hours lec. and two hours lab. Pr.: PE 561 or EDAF 622. PE-735-1-3-0835

PE 755. Adult Exercise Programs. (3) 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.: PE 335. PE-755-0-0835

PE 759. Exercise Testing and Prescription. (3) Extensive coverage of laboratory exercise evaluations (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.: PE 335. PE-759-1-5-0835

PE 775. Seminar in Physical Education. (Var.) Recent trends and problems in physical education. Pr.: Senior standing and consent of instructor. PE-775-0-0835

PE 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.: PE 759. PE-792-2-0835

PE 796. Topics in Physical Education. (1-4) PE-796-3-0835

PE 799. Problems in Physical Education. (Var.) Pr.: Background of courses needed for problem undertaken. PE-799-3-0835

Graduate credit

PE 800. Advanced Physiology of Exercise. (3) II. An in-depth study of the physiological responses of the human body during exercise, the adaptations that occur with exercise training, and the laboratory techniques to assess these responses and adaptations. Pr.: PE 335. PE-800-1-8-0835

PE 802. The Athletic Directorship. (3) On sufficient demand. The administration of the intercollegiate or interscholastic athletic program with focus on the problems facing the chief administrator of the programs. Areas of study include association rules and regulations, implications of legislation, crowd control and management, scheduling, and budget. Pr.: PE 359 or EDAF 611. PE-802-0-0835

PE 805. Sport and Human Behavior. (3) On sufficient demand. A study of the state of the sport performer and the effects of sport on human behavior. Pr.: PE 340 or nine hours of graduate credit in psychology (500 level or above). PE-805-0-0935

PE 806. Motor Development. (3) On sufficient demand. A study of psychomotor development. The focus is on the growth years, though developmental considerations for all age groups are considered. Implications for sport, exercise, and physical activity are discussed. Pr.: PE 320. PE-806-0-0835

PE 807. Motor Learning and Control. (3) On sufficient demand. Application of learning principles to skill acquisition in sport and human domain; and practical applications. Pr.: PE 320 or nine hours of graduate credit in psychology (500 level or above). PE-807-0-0835

PE 808. Advanced Issues in Sport Sociology. (3) On sufficient demand. An in-depth analysis of the sociology of sport literature with special interest in critiquing the theoretical frameworks and methodologies employed. Pr.: PE 340 or SOCIO 435. PE-808-9-0835

PE 810. Evaluation in Physical Education. (3) On sufficient demand. A study of basic techniques used to evaluate objectives, conduct research, and conduct laboratory experiments in physical education. Pr.: PE 710. PE-810-0-0835

PE 815. Research Methods in Physical Education and Leisure Studies. (3) I. A study of techniques of research including the design of experiments and the use of appropriate statistics. PE-815-0-0835

PE 825. Mechanical Analysis of Human Movement. (3) I. A study of mechanical principles applied to analysis of human movement including cinematographical analysis of sports activities. Pr.: PE 330. PE-825-0-0835

PE 830. The Child in Sport. (3) On sufficient demand. Factors prompting children's entry into sports and the consequences of participation in organized sports for children. Pr.: PE 320 or EDAF 215. PE-830-0-0835

PE 897. Research in Physical Education. (Var.) Pr.: Sufficient training to carry on the line of research undertaken. PE-897-4-0835

PE 898. Master's Report. (1-4) PE-898-4-0835

PE 899. Master's Thesis. (1-6) PE-899-3-0835

PE 905. Sport and Human Behavior II. (3) On sufficient demand. Analysis and discussion of experimental results of research in sport and human behavior including a study of theoretical models for conducting research. Pr.: PE 805. PE-905-0-0835

PE 906. Advanced Motor Development. (3) On sufficient demand. Analysis and discussion of experimental results of motor development research including a study of theoretical models for conducting research. Pr.: PE 806. PE-906-6-0835

PE 907. Advanced Motor Learning and Control. (3) On sufficient demand. Neurological and physiological factors involved in movement accuracy and related underlying variables. In-depth investigation of the various theories that attempt to explain skilled motor learning and performance. Pr.: PE 807. PE-907-0-0835

PE 996. Advanced Topics in Motor Behavior. (1-3) On sufficient demand. Selected advanced topics in motor behavior. May be repeated with consent of supervisory committee. PE-996-0-0835

PE 997. Motor Behavior Seminar. (1-3) On sufficient demand. Intensive discussion of an area of current interest in motor behavior based on the class's study of pertinent original research. PE-997-0-0835

PE 999. Research in Motor Behavior. (Var.) I, II, S. Doctoral level research. PE-999-4-0835

Leisure studies

Undergraduate credit

LS 210. Leisure in Society. (3) I. Influence of leisure in today's culture. Examination of the relationships between leisure, work, leisure-related resources, and the individual. An overview of the leisure service profession. LS-210-0-2103

LS 320. Recreational Leadership. (3) I. Principles and methods of organizing communities for leisure activities. LS-320-0-2103

LS 390. Principles and Philosophy of Recreation. (3) II. A study of the basic principles of recreation, including a survey

of past and current trends in the recreation movement. LS-390-0-2103

LS 481. Participation in Recreation. (2) II. Directed beginning experience in recreation/leisure service agencies. An evaluation and reports on experiences within the agencies will be done. Pr.: LS 320. LS-481-2-2103

LS 487. Recreation Facility Management. (3) II. Study of planning, operations, and management of public, private, voluntary, and commercial recreation facilities. Facilities examined include community centers, swimming pools, craft centers, roller and ice rinks, court areas, and game fields. Two hours lec. and two hours lab. Pr.: LS 320. LS-487-1-5-2103

LS 488. Recreation for Special Populations. (3) I. Study of recreation programs for special populations. Characteristics of the disabled, disadvantaged, mentally ill, retarded, aged, physically handicapped, etc. Pr.: LS 320 and consent of instructor. LS-488-0-2103

LS 489. Recreation Program. (3) I, II. A study of the program forms and structures related to public, voluntary, military, private, and commercial agencies. Pr.: LS 480. LS-489-0-2103

LS 490. Recreation Administration I. (3) I. Development and evaluation of recreation patterns, programs, and structures. Pr.: LS 480. LS-490-0-2103

LS 491. Seminar in Recreation. (2) I, II. The study of current trends and issues in recreation. Pr.: LS 481. LS-491-0-2103

LS 492. Internship in Leisure Service Agencies. (15) I, II, S. Intensive practical experience over a 15-week, 600-hour period in an approved recreation/leisure service agency. Pr.: LS 491. LS-492-2-2103

LS 493. Therapeutic Recreation Service. (3) II. The development of competencies in servicing special populations in public and institutional settings. Examination of medical and nonmedical models of implementation service. Pr.: LS 488 or consent of instructor. LS-493-0-2103

LS 494. Internship in Therapeutic Recreation Agencies. (15) I, II, S. Intensive practical experience over a 15-week, 600-hour period in an approved therapeutic recreation site. Pr.: LS 491. LS-494-2-2103

LS 497. Topics in Leisure Studies. (1-3) I, II, S. Selected topics dealing with leisure theory, development or application of principles of leisure programs. LS-497-0-2103

LS 498. Honors Tutorial in Leisure Studies. (1-3) I, II. Individually directed research/creation endeavor leisure studies, 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. LS-498-0-2103

LS 499. Senior Honors Thesis. Open only to seniors in the arts and sciences honors program. LS-499-0-2103

LS 501. Therapeutic Recreation Processes in Rehabilitation Agencies. (3) II. A study of the standard treatment processes in therapeutic recreation. Focus is on group implementation, assessment, evaluation, and documentation within a team concept in rehabilitation/institutional agencies where clientele are developmentally disabled, mentally ill, physically handicapped, offenders, aged, or disadvantaged. Pr.: LS 488 or EDAF 622. LS-501-0-2103

LS 520. Leisure Studies Research Methods. (3) I. A study of basic research techniques. The application of these methods to recreation assessments, evaluation, and analyses. Pr.: STAT 320 or 330. LS-520-0-2103

LS 599. Independent Studies in Leisure Studies. (1-3) Selected topics in recreation. Maximum of three hours applicable toward a degree. Pr.: Consent of instructor. LS-599-3-2103

Undergraduate and graduate credit

LS 705. Recreation Theory and Policy. (3) I, II. On sufficient demand. Development of theory and resulting recreational policies for public, community, institutional, and private agencies. Pr.: LS 489. LS-705-0-2103

LS 715. Recreation Program, Finance, and Budget. (3) I, II, S. On sufficient demand. Development of recreation programs and programmatic budgets for a recreation/leisure services agency. Study of sources for financing recreational programs of all types and a study of money management systems for recreation agencies. Pr.: LS 489 or LS 705. LS-715-0-2103

LS 720. Organization and Administration of Intramural Programs. (3) II. Policies and procedures in organizing and administering an intramural program. LS-720-0-2103

LS 725. Recreation Administration II. (3) I. Development of administrative procedures as applied to programs, personnel, and facilities. Design administrative models and apply theories to the recreation/leisure field. Pr.: LS 490. LS-725-0-2103

LS 791. Seminar in Recreation. (1-3) I. For recreation specialists. Discussion of current research and innovations. Evaluation of recreational/leisure programs. Small group interaction. May be taken with Internship in Recreation. LS-791-0-2103

LS 792. Internship in Recreation. (3-8) Supervised experiences with recreation services, such as city recreation, govern-

ment agencies, and other leisure service agencies. May be completed in one of the following two ways, as directed by the student's advisor: (a) summer assignment in an approved agency with concurrent enrollment in the summer school course designation; (b) half-time assignment during a full semester, or full-time assignment during a semester in an approved or supervised recreation/leisure service job, both with concurrent enrollment in the course designation. May be repeated once. Pr.: LS 791 (may be taken conc.) and consent of instructor. LS-792-2-2103

LS 799. Problems in Recreation. (Var.) Pr.: Background of courses needed for problem undertaken. LS-799-3-2103

Graduate credit

LS 862. Leisure Counseling. (3) II. On sufficient demand. The development of leisure counseling models for use in community and institutional recreation programs and skills and competencies in assessing, interviewing, and counseling individuals and groups in the use of leisure experiences. Pr.: LS 725 or EDAF 858. LS-862-0-2103

LS 896. Topics in Recreation. (1-4) LS-896-3-2103

LS 897. Research in Recreation. (Var.) Pr.: Sufficient training to carry on the line of research undertaken. LS-897-4-2103

LS 898. Master's Report. (1-4) LS-898-4-2103

LS 899. Master's Thesis. (1-6) LS-899-3-2103

Physics

James C. Legg,* Head

Professors Bark,* Bhalla,* Cocke,* Curnutte,* Dale,* Dragsdorf,* Folland,* Gray,* Legg,* Lin,* Manney,* McGuire,* Richard,* Sorensen,* Weaver,* and Zollman,* Associate Professors Hadjipanayis,* Hagmann,* and Rahman,* Assistant Professors DePaola,* O'Shea,* and Panoff,* Temporary Assistant Professors Aktas, Lien, and Wheeler; Research Associates Amaya-Tapia, Ben-Itzhak, Carnes, Deb, Hadjistamoulou, Jain, Kamber, Karim, Needham, Regehr, Stockli, Strzeszewski, and Zouros; Emeriti: Professors Cardwell,* 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.

Undergraduate study

A major in physics equips a liberal arts student with a broad education which 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 the more analytically inclined.

A student of physics 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 nine 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, computer science, geology, mathematics, physics, statistics, the Division of Biology, the College of Engineering, and other departments as appropriate to the 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, or nuclear engineering or

business administration. Interested students should inquire about these programs with the Department of Physics.

Graduate study

The Department of Physics offers work leading to the degrees master of science and doctor of philosophy. Students planning a career in research or teaching physics in a college or university should plan a program leading to an advanced degree. Students planning a career in teaching physics at high school or junior college level should consult with the College of Education for information on programs in physics and physical science teaching.

For admission with full graduate standing into an advanced degree program in physics, a student must have completed undergraduate courses equivalent to those in the undergraduate physics core described above. Prospective graduate students whose undergraduate training does not meet these requirements may be admitted on a provisional basis. Such students are required to remedy deficiencies in undergraduate preparation by completing the undergraduate courses without receiving graduate credit.

Information on the undergraduate and graduate programs, the supporting facilities, financial support, and the research activities in physics may be obtained from the head of the Department of Physics. Some of the major items of scientific equipment are described under the heading Research Resources earlier in this catalog.

Courses in physics

PHYS 017. Colloquium in Physics. (0) I, II. Weekly lectures on topics of current interest in physics by faculty and visiting scientists. PHYS-017-0-1902

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 KSU, and selected developments illustrating the methodology of physics. PHYS-100-2-1902

PHYS 101. The Physical World I. (3) I, II, S. The courses The Physical World I and II are designed to present a nonmathematical 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; no complex equipment is used. 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-101-0-1901

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-102-0-1901

PHYS 103. The Physical World I Laboratory. (1) I, II, S. Two hours lab a week. Pr. or conc.: PHYS 101. PHYS-103-1-1901

PHYS 104. The Physical World II Laboratory. (1) II. Two hours lab a week. Pr. or conc.: PHYS 102. PHYS-104-1-1901

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-106-1-1901

PHYS 107. Physical Science Colloquium. (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-107-0-1901

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-113-1-1902

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-114-1-1902

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-115-1-1902

PHYS 125. Physics for Musicians. (3) II. Selected topics applied to the physics of music and musical instruments. PHYS-125-0-1902

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-191-0-1911

PHYS 193. Descriptive Meteorology. (3) Nontechnical treatment of the fundamentals of modern meteorology and associated physical processes. PHYS-193-0-1913

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-213-1-1902

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-214-1-1902

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-300-3-4900

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-301-0-1902

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 six hours. Pr.: Junior standing and consent of instructor. PHYS-400-3-1902

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-451-0-1902

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-452-0-1902

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-460-0-1902

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. PHYS-495-1-1911

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-506-2-1902

PHYS 515. Physics for Science Teachers. (2-3) 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 six hours credit. One year of college physics. PHYS-515-0-1902

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-522-0-1902

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-523-0-1902

PHYS 525. Physics of Sound. (3) I. Topics covered include the properties of sound waves, the harmonic structure of sound, sound perception, room acoustics, the acoustical, mechanical, and electrical factors influencing sound reproduction, and factors involved in speaker enclosure design. Pr.: PHYS 114 or 214. PHYS-525-0-1901

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-532-0-1902

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-551-0-1902

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. PHYS-553-0-1902

PHYS 561. Geophysics. (3) II, in alternate years. Principles and methods of exploration geology by physical methods. Pr.: PHYS 214; MATH 221. PHYS-561-0-1916

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-611-0-1902

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-616-0-1902

PHYS 621. Mechanics II. (3) II. Continuation of PHYS 522. Pr.: PHYS 522. PHYS-621-0-1902

PHYS 631. Electricity and Magnetism II. (3) I. Continuation of PHYS 532. Pr.: PHYS 532. PHYS-631-0-1902

PHYS 635. Plasma Physics. (3) I, in alternate years. 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. See NE 635. Pr.: PHYS 532; or EECE 557 and PHYS 621. PHYS-635-0-1902

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-636-1-1902

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-651-0-1902

PHYS 652. Electron Microscopy. (3) Introduction to the theory and practice of electron microscopy and electron diffraction; basic and high resolution techniques, amplitude and phase imaging, and dynamical theory of diffraction. Two hours lec., two hours lab a week. Pr.: PHYS 214, MATH 240. PHYS-652-0-1902

PHYS 671. Thermodynamics and Statistical Physics. (3) II, in alternate years. Pr.: PHYS 522; MATH 240. PHYS-671-0-1902

PHYS 681. The Physics of Semiconductors and Magnetic Materials. (3) I, in alternate years. Introduction to the properties of semiconducting materials; electron and hole transport; models of semiconducting devices; magnetic ordering and hysteresis; survey of magnetic materials and magnetic storage devices. Pr.: PHYS 532 or EECE 557. PHYS-681-0-1902

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-691-0-1912

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-707-3-1902

PHYS 742. Nuclear Physics. (3) II, in alternate years. Modern theories of nuclear physics. Pr.: PHYS 611. PHYS-742-0-1904

PHYS 781. X-Ray and Crystal Physics. (3) II, in alternate years. Pr.: PHYS 532. PHYS-781-0-1902

PHYS 786. X-Ray Laboratory. (1) II, in alternate years. Three hours lab a week. Pr. or conc.: PHYS 781. PHYS-786-1-1902

Graduate credit

PHYS 800. Problems in Physics I. (1) II. Independent study of the solution of advanced problems in physics at a level appropriate to the M.S. degree. Pr.: Graduate standing and consent of instructor. PHYS-800-3-1902

PHYS 801. Mathematical Methods of Physics. (3) I. Mathematical techniques for the solution of physical problems. Mathematical topics employed include vector and tensor analysis, matrices, group theory,

complex variable theory, differential equations, Sturm-Liouville theory, orthogonal functions, special functions, Fourier series, integral transforms, and the calculus of variations. Pr.: PHYS 621. PHYS-801-0-1901

PHYS 802. Computational Methods in Physics. (4) II. Methods of solving physical problems using digital computers including numerical differentiation and integration, error analysis and curve fitting, interpolation, ordinary and partial differential equations, matrix operations, eigenvalues, special functions of mathematical physics, Monte Carlo simulations, and stability of solutions; a practicum is an integral part of the course. Two hours lec. each week, practicum self-paced. Pr.: CMPSC 580, CMPSC 675, or MATH 655, PHYS 801, and a working knowledge of FORTRAN. PHYS-802-2-1902

PHYS 806. Journal Club. (Var.) I. Seminar in current topics in physics. Pr.: Graduate standing in physics. PHYS-806-2-1902

PHYS 808. Advanced Problems. (Var.) I, II, S. Independent study in a special problem in physics at the graduate level chosen with the advice of a faculty mentor. Pr.: Graduate standing and consent of instructor. PHYS-808-3-1902

PHYS 811. Quantum Mechanics I. (3) II. Pr.: PHYS 611, 711. PHYS-811-0-1902

PHYS 821. Advanced Dynamics. (3) II. Pr.: PHYS 711. PHYS-821-0-1902

PHYS 831. Electrodynamics I. (3) I, in alternate years. Pr.: PHYS 631. PHYS-831-0-1902

PHYS 841. Lasers and Quantum Optics. (3) The theory of lasers and laser-matter interactions: rate equations, line broadening, mode structure, Q-switching, three and four wave mixing, linear and stimulated light scattering. Pr.: PHYS 611 or equiv. PHYS-841-0-1902

PHYS 850. Theory of Atomic Structure and Atomic Interactions. (3) I, in alternate years. The quantum mechanics of atomic structure and spectra: one and two electron atoms, many electron atoms, molecular structure and spectra, atomic collision theory for electron-atom and ion-atom collisions. Pr.: PHYS 611. PHYS-850-0-1902

PHYS 852. Molecular Spectra. (3) Molecular energy levels and the origin of spectra. Pr.: PHYS 611. PHYS-852-0-1903

PHYS 860. Electron and Ion Impact Phenomena. (3) II, in alternate years. Atomic collision phenomena; experimental techniques in accelerator-based atomic physics; charged particle and photon spectroscopy; elastic, inelastic, and rearrangement collisions; and applications. Pr.: PHYS 611. PHYS-860-0-1902

PHYS 881. Introduction to Solid State Physics. (3) I, in alternate years. Introduction to the physics of condensed matter: crystal lattices; lattice dynamics; electron energy bands; fermi surfaces; optical, magnetic, and transport properties of insulators, semiconductors, and metals. Pr.: PHYS 611 or conc. enrollment. PHYS-881-0-1902

PHYS 882. Solid State Physics. (3) II, in alternate years. Continuation of PHYS 782. Quantized lattice vibrations, methods of band structure calculations, effective mass formulations, applications to optical absorption, excitons, magnetism, and superconductivity. Pr.: PHYS 782, 611. PHYS-882-0-1902

PHYS 899. Research in Physics. (Var.) I, II, S. Master's level research. Pr.: Consent of instructor. PHYS-899-4-1902

PHYS 910. Problems in Physics II. (1) Independent study of the solution of advanced problems in physics at a level appropriate to the Ph.D. degree. Pr.: PHYS 800 and consent of instructor. PHYS-910-3-1902

PHYS 911. Quantum Mechanics II. (3) I. Pr.: PHYS 811. PHYS-911-0-1902

PHYS 912. Advanced Quantum Mechanics. (3) Relativistic quantum mechanics; scattering theory; second quantization and the many-body problem; introduction to quantum electrodynamics. Pr.: PHYS 911. PHYS-912-0-1902

PHYS 913. Advanced Topics in Mathematical Physics. (3) Critical studies of selected advanced topics. May be repeated once for credit. Pr.: PHYS 711. PHYS-913-0-1902

PHYS 914. Quantum Field Theory. (3) On sufficient demand. Pr.: PHYS 811. PHYS-914-0-1902

PHYS 931. Electrodynamics II. (3) II. Pr.: PHYS 731. PHYS-931-0-1902

PHYS 941. Advanced Nuclear Physics. (3) Pr.: PHYS 641, 811. PHYS-941-0-1904

PHYS 943. Advanced Topics in Nuclear Physics. (3) Critical studies of selected advanced topics. May be repeated once for credit. Pr.: PHYS 641. PHYS-943-0-1904

PHYS 951. Advanced Topics in Molecular Spectroscopy. (3) Critical studies of selected advanced topics. May be repeated once for credit. Pr.: PHYS 752. PHYS-951-0-1903

PHYS 952. Advanced Topics in Optics. (3) Critical studies of selected advanced topics. May be repeated once for credit. Pr.: PHYS 651. PHYS-952-0-1902

PHYS 953. Advanced Topics in Atomic Interactions. (Var.) Critical studies of advanced topics in atomic interactions. Pr.: PHYS 611. PHYS-953-3-1904

PHYS 971. Statistical Mechanics. (3) I. Pr.: PHYS 611, 671, 821. PHYS-971-0-1902

PHYS 981. Solid State Physics. (3) Pr.: PHYS 782, 971, 911, or conc. enrollment. PHYS-981-0-1902

PHYS 982. Advanced Topics in Solid State Physics. (3) Critical studies of selected advanced topics. May be repeated once for credit. Pr.: PHYS 782. PHYS-982-0-1902

PHYS 999. Research in Physics. (Var.) I, II, S. Doctoral level research. Pr.: Consent of instructor. PHYS-999-4-1902

Political Science

William L. Richter,* Head

Professors Hajda,* W. Richter,* Suleiman,* and Williams;* Associate Professors Gustafson,* Linford,* Michie,* L. Richter,* and Unekis;* Assistant Professors Ambrosius,* and Franke.*

Undergraduate study

The major in political science acquaints the student with the political aspects of society and encourages the student to develop a critical and imaginative spirit with which to look at public issues. Since political issues reflect the broader contemporary situation, the program in political science also provides the foundation for a liberal education on which to build a continuing, responsible interest in political activity and public affairs. At the same time, scientific training in the analysis of political problems equips the student with the skills necessary to choose among a wide variety of careers in public service, business, teaching, research, and administration. Qualified students should be stimulated to seek advanced training in political science at the graduate level.

A political science major should complete a broad liberal arts program which 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

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. An especially qualified 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.

Public administration option

The public administration option within the political science major acquaints the student with the place of administration in the United States and abroad, the role of the administrator in the political process, and the use of analytical and quantitative techniques in meeting management problems in the public sector. Interested students should see the M.P.A. director or other M.P.A. faculty.

Specialized curricula

The department takes part in several interdepartmental programs whereby students coordinate work around a specific set of phenomena.

South Asian studies. The department participates in the University-wide South Asian studies program (see detailed information under South Asian Studies, in this catalog). For information, see Professor Aruna Michie, 219A Kedzie Hall.

Latin American studies. Courses on Latin America are offered in several departments, including language studies in both Spanish and Portuguese. A secondary major in Latin American studies is also available. For information, see Professor Joseph Hajda, 220A Kedzie 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 University-wide international trade studies (see detailed information under Graduate School in this catalog). 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 the chair of the International Trade Studies Committee, Professor Joseph Hajda, 220A Kedzie Hall.

Gerontology. The Kansas State University 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, 206A Kedzie Hall.

Requirements for the major

A major consists of a minimum of 30 credit hours in political science distributed as follows: three courses from among POLSC 301, Introduction to Political Thought, POLSC 325, United States Politics, POLSC 333, World Politics, and POLSC 344, Introduction to Comparative Politics. Also, majors are required to take 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 three hours of the major are allowed to be readings, problems, internships, or similar courses that do not involve scheduled meetings of the class.

Students taking the public administration option are required to complete a minimum of 33 hours and must meet all requirements for the major. The core courses required of all students taking the public administration option are: POLSC 377, Introduction to Public Policy, POLSC 507, Introduction to Public Administration, POLSC 608, Public Personnel Administration, POLSC 637, Public Budgeting Techniques. The program has a general administration concentration with enough flexibility to permit students to take electives in supporting areas such as business, social work, corrections, regional and community planning, health, physical education, and recreation. The choice of electives is made with the advice and supervision of the public administration advisor.

Information for dual majors and nonmajors

The political science program is often advantageously combined with another major area. Those seeking dual majors should coordinate their program in consultation with advisors in each area. To encourage the widest possible undergraduate involvement in systematic political analysis, many political science courses numbered 100 through 799 are open to nonmajors meeting the necessary prerequisites.

Graduate study

The Department of Political Science offers work leading to the master of arts and master of public administration degrees.

Master of arts (30 hours)

The master of arts program meets the educational needs of three groups of students: (1) those planning to become high school teachers or instructors in two-year colleges; (2) working professionals and other adults desiring to improve their qualifications or seeking a greater understanding of political life; and (3) students wishing to prepare for Ph.D. or other advanced study. The degree requirements are structured, therefore, to provide students with an education which prepares them for a mature grasp of politics, a respect for intellectual integrity, and an ability to communicate effectively. Graduate work in political science is offered in American government and politics, comparative government and politics, international relations, and political thought. All candidates for the master of arts degree are required to take the following:

POLSC 700	Research Methods in Political Science	3
At least three seminars from:		
POLSC 805	Seminar: American Government Problems	3
POLSC 821	Seminar: Political Thought	3
POLSC 811	Seminar: International Politics	3
POLSC 841	Seminar: Comparative Politics	3

No more than three hours of "nonclass" seminars or courses (e.g., readings, problems, internships) are allowed to count toward the 30 hours required for the M.A.

Written comprehensive examinations.

An oral defense of the thesis (Option A), report (Option B), or seminar papers (Option C).

Students may choose, in consultation with their advisors, one of three programs leading to the master of arts degree:

Option A requires 30 hours of graduate credit including six hours of credit for a thesis. Of the remaining 24 hours, at least 18 hours must be in political science.

Option B requires 30 hours of graduate credit including two hours of credit for a written research report. Of the remaining 28 hours, at least 19 hours must be in political science.

Option C requires 30 hours of graduate credit in political science of which at least four courses should be 800 level seminars taken from at least three different professors. In addition, students in this option should write four research seminar papers acceptable to the professors involved.

Master of public administration (42 hours)

The master of public administration (M.P.A.) degree is a flexible professional degree program designed for those who desire a career in public sector administration including opportunities with state, local, or federal government; non-profit organizations; and international agencies.

Through extensive daytime and evening courses, the M.P.A. program endeavors to meet the needs of both pre-career students embarking upon an administrative profession, and mid-career students interested in professional enrichment and advancement. The M.P.A. program requires 36 hours of course work, written and oral comprehensive examinations, and an internship. Students with significant administrative employment experience may qualify for a waiver of the internship requirement. Candidates for the M.P.A. degree are required to meet the following specific requirements.

Public administration and public policy core 15

Required courses

POLSC 700	Research Methods in Political Science	3
POLSC 708	Public Personnel Administration ...	3
POLSC 710	Policy Analysis and Evaluation	3
POLSC 735	Public Organizational Theory	3
POLSC 737	Public Budgeting Techniques	3

Area specialization 12

Students are encouraged to develop an interdisciplinary speciality area in public administration such as labor relations, planning, public finance, personnel, or international administration.

Public administration/political science electives 9

Three courses are required from within the Department of Political Science curriculum, including two at the 800 level.

POLSC 897 M.P.A. Internship 6

Written and oral comprehensive examination

Political science

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-107-0-2207

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-110-0-2207

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-111-0-2207

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-301-0-2207

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-321-0-2207

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-325-0-2207

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-333-0-2207

POLSC 344. Introduction to Comparative Politics. (3) 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-344-0-2207

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-350-0-2207

POLSC 355. Contemporary Issues. (3) Study and analysis of selected political topics of immediate relevancy and concern. May be repeated once. POLSC-355-0-2207

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-366-0-2207

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-377-0-2207

POLSC 399. Honors Seminar in Political Science. (1-3) POLSC-399-0-4900

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-400-0-2207

POLSC 401. Topics in Politics. (1-3) Different subjects in politics are selected for intensive study. May be repeated for a total of six hours with advisor's approval. POLSC-401-0-2207

POLSC 499. Senior Honors Thesis. (2) I, II, S. Open only to seniors in the arts and sciences honors program. POLSC-499-4-2207

American government and politics Undergraduate and graduate credit

POLSC 501. Political Behavior. (3) An examination and explanation of the basic terms and distinctions necessary for the study of politics, government, and political behavior emphasizing the dimensions of political behavior, including politicization, identification, ideology, participation, socialization, class, structure, and situations. Pr.: POLSC 110 or 325, or sophomore standing. POLSC-501-0-2207

POLSC 502. Television and Public Policy. (3) II. 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 POLSC 325, and sophomore standing, or appropriate vocational experience with consent of instructor. POLSC-502-0-2207

POLSC 507. Introduction to Public Administration. (3) 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-507-0-2207

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-508-0-2207

POLSC 519. National Security Policy and Process. (3) 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-519-0-2207

POLSC 520. State and Local Government. (3) 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-520-0-2207

POLSC 603. Political Parties and Elections. (3) 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, POLSC 325, or junior standing. POLSC-603-0-2207

POLSC 604. Interest Groups and Public Opinion. (3) 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 POLSC 325 or junior standing. POLSC-604-0-2207

POLSC 605. The American Presidency. (3) The presidency as an institution, its evolution, congressional relationships, executive organization. Pr.: POLSC 110, POLSC 325, or junior standing. POLSC-605-0-2207

POLSC 606. Sex and Politics. (3) 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, or junior standing. POLSC-606-0-2207

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-607-0-2207

POLSC 611. The Legislative Process. (3) 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, POLSC 325, or junior standing. POLSC-611-0-2207

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-613-0-2207

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-614-0-2207

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-615-0-2207

POLSC 616. Discrimination and the Law. (3) I. 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-616-0-2207

POLSC 618. Urban Politics. (3) Fundamental problems of political power and decision-making in urban-suburban governmental settings. Pr.: POLSC 110, POLSC 325, or junior standing. POLSC-618-0-2207

POLSC 619. Agricultural Politics and Policy. (3) Introduction to the political-cultural problems of rural, including small-town, America as well as to the public policies designed for meeting these problems. Emphasis will be upon the nature of politics shaping the present and future of rural and small town Kansas. Pr.: POLSC 110 or 325 or junior standing. POLSC-619-0-2207

POLSC 708. Public Personnel Administration. (3) II. 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-708-0-2207

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-709-0-2207

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-710-0-2207

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-717-0-2207

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-735-0-2207

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. POLSC-737-0-2207

Comparative government and politics 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-504-0-2207

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-505-0-2207

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-506-0-2207

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-511-0-2207

POLSC 545. The Politics of Developing Nations. (3) 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-545-0-2207

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 POLSC 507 or junior standing. POLSC-602-0-2207

POLSC 621. European Politics. (3) Comparative analysis of British democracy, totalitarianism, and contemporary continental European political systems. Pr.: POLSC 110 or POLSC 344 or junior standing. POLSC-621-0-2207

POLSC 622. Latin American Politics. (3) 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 POLSC 344 or junior standing. POLSC-622-0-2207

POLSC 623. South Asian Politics. (3) Analysis of selected political systems of South Asia. Pr.: POLSC 344, POLSC 505, or junior standing. POLSC-623-0-2207

POLSC 624. Middle Eastern Politics. (3) Comparative analysis of selected political systems in the Middle East including nationalism and the conflict of differing ideologies. Validity and usefulness of various theories of political development are tested. Pr.: POLSC 110, POLSC 344, or junior standing. POLSC-624-0-2207

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, POLSC 344, or junior standing. POLSC-625-0-2207

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, POLSC 344, or junior standing. POLSC-626-0-2207

POLSC 627. Soviet-Style Regimes. (3) Analysis of the political systems of the Soviet Union and the countries of eastern Europe. Pr.: POLSC 110, POLSC 344, or junior standing. POLSC-627-0-2207

POLSC 628. Comparative Security Establishments. (3) Politics of conceiving, organizing, using, and reconciling military and related security forces as societal functions in the United States, selected other polities, and international organiza-

tions. Pr.: POLSC 333, 344, 541, or junior standing. POLSC-628-0-2207

POLSC 629. Administration in Developing Nations. (3) Administrative problems of developing nations of Asia, Africa, and Latin America; principal models for study of comparative public administration; programs in development administration. Pr.: POLSC 110, 344, 377, 507, or junior standing. POLSC-629-0-2207

International relations

Undergraduate and graduate credit

POLSC 541. International Relations. (3) Analysis of the nature of international relations with emphasis on contemporary theories explaining the international behavior of states. Pr.: POLSC 333. POLSC-541-0-2207

POLSC 543. American Foreign Policy. (3) 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-543-0-2207

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-642-0-2207

POLSC 645. International Politics of Europe. (3) 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-645-0-2207

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-647-0-2207

POLSC 649. International Defense Strategies. (3) 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-649-0-2207

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-651-0-2207

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-652-0-2207

POLSC 653. International Politics of the Middle East. 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-653-0-2207

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. POLSC-754-0-2207

Political thought

Undergraduate and graduate credit

POLSC 661. Political Thought: Classical to Sixteenth Century. (3) 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-661-0-2207

POLSC 663. Political Thought: Since the Sixteenth Century. (3) Study of the development of Western political thought from the sixteenth century to the twentieth century. Pr.: POLSC 110, 301, or 325. POLSC-663-0-2207

POLSC 667. American Political Thought. (3) 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-667-0-2207

POLSC 671. Modern Political Thought. (3) Study of contemporary political ideas and social thought. Pr.: POLSC 110, 301, or junior standing. POLSC-671-0-2207

POLSC 675. Religion and Politics. (3) 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-675-0-2207

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-676-0-2207

Methods, seminars, readings, and problems

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-555-0-2207

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.; CMPSC 110 or equiv.; and, POLSC 301, or POLSC 325, or POLSC 333, or POLSC 344, or POLSC 400. POLSC-601-0-2207

POLSC 700. Research Methods in Political Science. (3) Principles of research design, measurement of political phenomena, methods for collecting and analyzing political data. Pr.: POLSC 301, 325, 333, or 344. POLSC-700-0-2207

POLSC 784. Internship in Government, Public Administration, and Politics. (1-3) 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-784-3-2207

POLSC 785. Readings in Political Science. (1-3) Students will undertake directed reading and discussion of a selected topic in political science. POLSC-785-3-2207

POLSC 790. Problems in Political Science. (1-3) Students will complete a research project and prepare an original paper under the supervision of a faculty member. Pr.: Consent of the instructor. POLSC-790-3-2207

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 six 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-791-0-2207

POLSC 799. Pro-Seminar in Political Science. (3) 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. POLSC-799-0-2207

Graduate credit

POLSC 800. Seminar: Scope and Methodology of Political Science. (3) Exploration of theoretical foundations of political science, and critique of various analytical models in

the study of political phenomena; construction and application of research designs and techniques. POLSC-800-0-2207

POLSC 805. Seminar: American Government Problems. (3) I. POLSC-805-0-2207

POLSC 811. Seminar: International Politics. (3) I. POLSC-811-0-2207

POLSC 821. Seminar: Political Thought. (3) II. POLSC-821-0-2207

POLSC 831. Seminar: Public Administration. (3) POLSC-831-0-2207

POLSC 841. Seminar: Comparative Politics. (3) II. POLSC-841-0-2207

POLSC 842. Seminar: Comparative Ideologies. (3) POLSC-842-0-2207

POLSC 897. M.P.A. Internship. (6) I, II, S. Directed off-campus employment experience. POLSC-897-2-2207

POLSC 898. Master's Report. (2) POLSC-898-4-2207

POLSC 899. Master's Thesis. (6) POLSC-899-4-2207

POLSC 899. Master's Thesis. (6) POLSC-899-4-2207

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Psychology

E. Jerry Phares,* Head

Professors Barnett,* Cowan,* Downey,* Frieman,* Griffith,* Harris,* Mitchell,* Phares,* Rappoport,* Saal,* Samelson,* Shanteau,* Thompson,* and Uhlarik;* Associate Professors Kiefer* and Knight;* Assistant Professors Fullagar* and Lowman;* Emeriti: Professors Langford, Perkins, and Rohles.

Undergraduate study

The undergraduate program at Kansas State University is a versatile program composed of a common core for all students. Beyond this common core, however, students may choose among several paths depending upon their more specific interests and goals.

The psychology curriculum is arranged with several functions in mind: to give the student, 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 a variety of professions and jobs, 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.

The core

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	4

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

PSYCH 605	Foundations of Social Behavior	3
or		
PSYCH 620	Psychology of Personality	3

Psychology electives (chosen with advisor consultation)	12
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*Although not required, this course is strongly recommended for first-semester freshmen.

The general education option

For students interested mainly in a liberal education, the above core program will be sufficient. In consultation with the advisor, they 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 work in the 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.

Therefore, 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
CMPSC 200	Fundamentals of Computer Programming	2
CMPSC 201	FORTTRAN Language Laboratory ..	2
PSYCH 110	General Psychology	3
PSYCH 350	Experimental Methods in Psychology	4
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 585, 616, 575, or others. Students oriented toward physiological psychology will want to ensure 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.

The 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 settings. The academic requirements and, in particular, the field experience requirements will provide a background in human relations that a variety of employers in business, industry, and government, should find attractive.

Since 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 emphasis. In addition, for the clinical emphasis the following courses are required:

PSYCH 440	Psychology of Individual Differences	3
or		
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.

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 emphasis 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, agency, research laboratory, other).

Graduate study

Professional training in psychology is obtained in graduate programs of study leading to the M.S. and Ph.D. degrees.

At KSU, doctoral programs are offered in several broad areas. These are: animal learning-physiological psychology (with concentration in animal learning and behavior or physiological psychology); information processing (with concentration in human learning and memory, psycholinguistics, human judgment, or perception-sensation); social-personality (with concentration in social psychology, personality, or developmental psychology); industrial/organizational psychology.

At the master's level, students may specialize in most of the traditional areas of psychology. Although primary emphasis is on work leading to the doctoral degree, a structured, terminal degree is offered in industrial/organizational psychology.

Students who complete the doctoral program are eligible for a variety of positions, including teaching and research positions in colleges and universities, governmental agencies, and industry.

For most students, the master's program requires two years beyond the bachelor's level, and the doctorate, two more years. Prerequisites to admission into the graduate program are a superior academic record and background work essentially equivalent to the undergraduate psychology degree at KSU, especially courses in experimental psychology and statistics. In some cases, deficiencies in preparation may be made up after admission to the program.

A detailed description of the graduate programs, as well as information about financial support, may be obtained by writing to the director of graduate studies in the department.

Courses in psychology

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-100-0-2001

PSYCH 110. General Psychology. (3) I, II, S. An introductory survey of the general content areas of psychology, including methods, data, and principles. PSYCH-110-0-2001

PSYCH 115. General Psychology (Honors). (4) I, II. An introductory survey of the general content areas of psychology, including methods, data, and principles. PSYCH-115-0-2001

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-200-0-2001

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-202-0-2001

PSYCH 280. Psychology of Childhood and Adolescence. (3) I, II. Survey of behavioral development from birth through adolescence. Pr.: PSYCH 110. PSYCH-280-0-1009

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-290-2-2001

PSYCH 350. Experimental Methods in Psychology. (4) I, II. Laboratory investigation of learning, motivation, social-personality processes, and perception and sensation. Includes two hours rec. and four hours lab a week. Pr.: PSYCH 110. PSYCH-350-1-2002

PSYCH 399. Honors Seminar in Psychology. (3) II. Selected topics. Open to non-majors in the honors program. PSYCH-399-0-4900

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-400-2-2001

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-425-0-2099

PSYCH 440. Psychology of Individual Differences. (3) II. Introduction to principles and methods of psychological testing; discussion of problems and findings in the study of individual and group differences in behavior; role of biological and social factors. Pr.: PSYCH 110. PSYCH-440-0-2006

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-450-0-2002

PSYCH 460. Cognitive Psychology. (3) 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-460-0-2002

PSYCH 470. Psychobiology. (3) 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-470-0-2010

PSYCH 475. Principles of Learning. (3) Introduction to the principles of learning and their relevance to the understanding of the behavior of animals and humans. Pr.: PSYCH 350. PSYCH-475-0-2002

PSYCH 480. Fundamentals of Perception and Sensation. (3) Empirical and theoretical approaches to phenomena of sensation and perception. Pr.: PSYCH 350. PSYCH-480-0-2002

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 three hours. Pr.: Sophomore standing, membership in the honors program of the College of Arts and Sciences, and permission of instructor. PSYCH-490-3-2000

PSYCH 499. Senior Honors Thesis. (2) I, II, S. Open only to seniors in the arts and sciences honors program. PSYCH-499-4-2000

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-505-0-2099

PSYCH 510. Introduction to Behavior Modification. (3) 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-510-0-2003

PSYCH 515. Children's Play and Make-Believe. Intersession. Theories and research concerning the role of play and make-believe in various aspects of the child's psychological development. Pr.: PSYCH 110. PSYCH-515-0-2009

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-518-0-2003

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-520-0-2009

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-530-0-2005

PSYCH 535. Social Psychology. (3) 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-535-0-2099

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-540-0-2099

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-543-0-2099

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-545-0-2008

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-550-0-2005

PSYCH 558. Varieties of Consciousness. (3) I. 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-558-0-2099

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-559-0-2006

PSYCH 560. Industrial Psychology. (3) I. 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-560-0-2008

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-561-1-2008

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-562-1-2008

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-563-0-2008

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-564-0-2008

PSYCH 565. Psychology of Aesthetics. (3) An approach to aesthetics which deals with the contributions of psychology to the study of aesthetic judgment and the formation of values. Pr.: Sophomore standing, PSYCH 110. PSYCH-565-0-2001

PSYCH 575. Environmental Psychology. (3) Introduction to the study of one's behavior in relation to physical setting. Definitions of person-environment system, behavior settings, methods of environmental research; assessment of behavior in residential, school, hospital, office, and leisure environments; decision making, planning, and design. Pr.: PSYCH 110 and six additional hours of psychology. PSYCH-575-0-2008

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-580-0-2005

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 three additional hours of psychology. PSYCH-585-0-2003

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-586-1-2003

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 and 561 and consent of psychological technician training committee. PSYCH-587-2-2003

PSYCH 595. Personality-Social Seminar. (2-3) Intensive discussion of selected topics. May be repeated. Pr.: Either PSYCH 605 or 620. PSYCH-595-0-2003

PSYCH 599. Problems in Psychology. (Var.) I, II, S. Investigation of selected problems. Pr.: PSYCH 110 and consent of instructor. PSYCH-599-3-2001

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-605-0-2005

PSYCH 616. Comparative Psychology. (3) Behavior at different phylogenetic levels as an aid to the clarification of behavioral principles. Pr.: Consent of instructor. PSYCH-616-0-2010

PSYCH 620. Psychology of Personality. (3) Discussion of different approaches to the study of personality. Pr.: PSYCH 350. PSYCH-620-0-2099

PSYCH 625. Engineering Psychology. (3) The role of behavioral factors in the design and operation of machines and equipment. Pr.: PSYCH 110, STAT 330, or 707. PSYCH-625-0-2008

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-630-0-2010

PSYCH 650. Psychology of Language. (3) 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-650-0-2002

PSYCH 710. Methods and Theory in Psychohistory. (3) Reviews the origins of psychohistory in works by Freud and neo-Freudians such as Erikson and Lifton. Major focus is on the emerging methods and theories as they are being elaborated in such problem areas as psychobiography, history of childhood, and larger group process studies. Primarily for graduate students in psychology and history and for selected advanced undergraduates. Pr.: Consent of instructor. PSYCH-710-0-2005

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-715-0-2009

PSYCH 775. History of Current Trends. (3) 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 nine additional hours of psychology; senior standing. PSYCH-775-0-2001

PSYCH 790. Topics in Psychology. (Var.) I, II, S. Pr.: PSYCH 110 and consent of instructor. PSYCH-790-3-2001

PSYCH 799. Problems in Psychology. (Var.) I, II, S. Pr.: PSYCH 110 and consent of instructor. PSYCH-799-3-2001

Graduate credit

PSYCH 801. Logic and Methods of Psychology. (3) Methods of psychological research including general scientific and theoretical problems. Emphasis on methods of empirical investigation in such representative areas as learning, motivation, perception, and personality-social. Pr.: PSYCH 350 or equiv. PSYCH-801-0-2002

PSYCH 802. Quantitative Methods in Psychology. (3) Examination of the nature of statistical inference in psychological research: hypothesis testing and statistical estimation, including a survey of nonparametric methods; consideration of correlational techniques useful with different kinds of psychological data. Pr.: STAT 330 or equiv. PSYCH-802-0-2007

PSYCH 803. Physiological Psychology. (3) An advanced survey of basic technique, theory, and research in the field of behavioral neuroscience, including memory and learning, sensory and motor processes, motivation, and sexual behavior. Pr.: BIOL 198 and PSYCH 110. PSYCH-803-0-2010

PSYCH 805. Experimental Design in Psychology. (3) Introduction to techniques of research planning and experimental design, including critical evaluation of selected experiments. Pr.: PSYCH 802. PSYCH-805-0-2007

PSYCH 806. Psychological Measurement. (3) The logic and methodology underlying the construction of psychological measuring instruments from the psychophysical estimate of threshold to the scaling of complex psychological variables. Pr.: PSYCH 110 and STAT 330. PSYCH-806-0-2006

PSYCH 810. Learning. (3) In-depth study of empirical and theoretical research on basic learning principles and their effects on behavior. Pr.: PSYCH 350 or equiv. PSYCH-810-0-2002

PSYCH 812. Perception. (3) Various systematic approaches to perception, with emphasis on experimental and quantitative data. The role of perception in affectivity, motivation, and personality theory is stressed. Pr.: PSYCH 350 or equiv. PSYCH-812-0-2002

PSYCH 814. Advanced Cognitive Psychology. (3) Study of contemporary trends and research in cognition, including memory, language, problem solving, decision making, and human learning. Pr.: PSYCH 350 or equiv. PSYCH-814-0-2002

PSYCH 820. Personality Theory and Research. (3) A comparative examination of contemporary theories of personality as well as research findings relevant to such theories. Pr.: PSYCH 620 or equiv. PSYCH-820-0-2099

PSYCH 825. Judgmental Processes. (3) Examination of empirical findings and theoretical approaches to decision making and judgment with emphasis on higher cognitive processes. Pr.: PSYCH 350 and 802. PSYCH-825-0-2002

PSYCH 830. Pro-Seminar in Social Psychology. (3) Discussion of empirical findings and theoretical approaches to selected problem areas, such as attitude change, personality and social structure, person perception, small group processes. Pr.: PSYCH 535. PSYCH-830-0-2005

PSYCH 860. Practicum in Psychology. (Var.) Supervised practical experience in applied psychology. Pr.: Consent of instructor. PSYCH-860-2-2004

PSYCH 870. Practicum in Teaching Psychology. (1-4) Supervised experience regularly teaching a college psychology course. Pr.: Consent of instructor. PSYCH-870-2-2099

PSYCH 875. Industrial Psychology: Personnel Training. (3) II. An examination of the training of personnel in an organization. Topics include: determination of an organization's training needs, selection and motivation of trainees, design and evaluation of training programs, and examination of several specific strategies for accomplishing the training function. Pr.: PSYCH 560 or equiv. PSYCH-875-0-2008

PSYCH 876. Industrial Psychology: Work Motivation. (3) II. An examination of empirical findings and theoretical approaches to understanding the relationship between worker motivation and job outcomes. Pr.: PSYCH 560 or GENBA 520. PSYCH-876-0-2008

PSYCH 877. Industrial Psychology: Leadership. (3) II. Examination of current leadership theories, research, and practice in the work setting, focusing on situational approaches to leadership, leadership styles, and interactions between personal characteristics and organizational factors. Pr.: PSYCH 560 or equiv. PSYCH-877-0-2008

PSYCH 878. Industrial Psychology: Personnel Selection. (3) I. Examination of theoretical and practical issues in staffing industrial organizations, including recruitment, test validation and other equal employment opportunity issues (test fairness, adverse impact, etc.). Pr.: PSYCH 560 or equiv. PSYCH-878-0-2008

PSYCH 879. Organizational Psychology. (3) II. An examination of the individual's role in industrial organizations and the effects of organizational variables on the individual worker. Topics include organizational communication, employee socialization, psychological climates of organizations, psychological stress in organizations, group processes and employee performance, and organizational change. Pr.: PSYCH 560. PSYCH-879-0-2008

PSYCH 880. Industrial Psychology: Performance Appraisal. (3) II. Examination of data sources, rating procedures, psychometric criteria for evaluating performance appraisal systems, and models/theories of the performance evaluation process. Pr.: PSYCH 560 or equiv. PSYCH-880-0-2008

PSYCH 899. Master's Research in Psychology. (Var.) Pr.: Consent of supervisory committee. PSYCH-899-4-2001

PSYCH 921. Experimental Study of Personality. (3) Analysis and discussion of experimental results in personality research, particularly as they relate to theories of personality. Empirical work in such areas as anxiety, defense mechanisms, perception, needs, and development will be covered. Pr.: PSYCH 820. PSYCH-921-0-2099

PSYCH 922. Psychopathology. (3) A systematic review of behavior disorders, their etiology and treatment. Pr.: PSYCH 505 and 620. PSYCH-922-0-2099

PSYCH 925. Psychological Development of Children. (3) Analysis of theoretical and empirical approaches to the study of psychological child development. Includes representative approaches such as cognitive-developmental, S-R, and psychoanalytic. Pr.: PSYCH 280 or equiv. PSYCH-925-0-2009

PSYCH 931. Advanced Social Psychology. (3) Intensive examination of the social determinants of behavior, with empha-

sis upon problems of current professional interest. May be repeated. Pr.: PSYCH 830. PSYCH-931-0-2005

PSYCH 951. Seminar in Physiological Psychology. (1-3) Selected topics in physiological psychology. May be repeated with consent of supervisory committee. Pr.: Consent of instructor. PSYCH-951-0-2010

PSYCH 952. Seminar in Sensory Processes. (1-3) Selected topics in sensory psychology. May be repeated with consent of supervisory committee. Pr.: Consent of instructor. PSYCH-952-0-2002

PSYCH 953. Seminar in Personality. (1-3) Intensive discussion of current problems of theoretical and empirical interest in the field of personality. May be repeated with consent of supervisory committee. Pr.: Consent of instructor. PSYCH-953-0-2099

PSYCH 954. Seminar in Experimental Psychology. (Var.) Intensive discussion of a problem of current interest based on the class's study of the pertinent original literature. May be repeated with consent of supervisory committee. Pr.: PSYCH 810 or consent of instructor. PSYCH-954-0-2002

PSYCH 956. Seminar in Psychological Measurement. (Var.) Intensive discussion of a problem of current interest, based on the class's study of the pertinent original literature. May be repeated with consent of supervisory committee. Pr.: Consent of instructor. PSYCH-956-0-2006

PSYCH 957. Seminar in Cognitive Processes. (1-3) Selected topics in the study of human thinking and cognition. May be repeated with consent of supervisory committee. Pr.: Consent of instructor. PSYCH-957-0-2002

PSYCH 958. Seminar in Mathematical Models of Behavior. (1-3) Selected topics in mathematical psychology, and applications of mathematical models to behavior. May be repeated with consent of supervisory committee. Pr.: MATH 501 and consent of instructor. PSYCH-958-2-2001

PSYCH 959. Seminar in Social Psychology. (1-3) Emphasis on discussion of advanced topics of current interest in social psychology. May be repeated with consent of supervisory committee. Pr.: Consent of instructor. PSYCH-959-0-2005

PSYCH 960. Seminar in Industrial Psychology. (3) I. Intensive examination of current empirical and theoretical issues in industrial and organizational psychology. May be repeated with consent of supervisory committee. Pr.: PSYCH 560 or equiv. PSYCH-960-0-2008

PSYCH 968. Seminar in Professional Problems. (1-3) Intensive study and discussion of current professional problems

in psychology. May be repeated with consent of supervisory committee. Pr.: Consent of instructor. PSYCH-968-0-2001

PSYCH 990. Internship in Psychology. (Var.) Pr.: Consent of the supervisory committee. PSYCH-990-2-2001

PSYCH 999. Ph.D. Research in Psychology. (Var.) Pr.: Consent of supervisory committee. PSYCH-999-4-2001

Sociology, Anthropology, and Social Work

Marvin A. Kaiser,* Head

Professors C. Flora,* J. Flora,* Friedmann,* Peters,* Rohrer,* and Schnur;* Associate Professors Adamchak,* Camp,* Dushkin,* Kaiser,* Orbach,* and Roncek;* Assistant Professors Bozich, Brede,* Frey,* Gibbons, Miley,* and Ward.

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. Graduate-level work is offered in sociology only. The department offers an M.A. in general sociology and a Ph.D. emphasizing in rural development.

Anthropology is listed alphabetically with the College of Arts and Sciences.

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 of the social sciences.

Undergraduate study

Students who desire to 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. The student interested in sociology who desires to teach in secondary schools should prepare for teacher certification with a major

in sociology (see College of Education section).

Students enrolled in sociology will be required to complete six 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 (6 hours)

CMPSC 110	Introduction to Personal Computing (or demonstration of equivalent competencies)	3
STAT 330	Elementary Statistics for the Social Sciences	3

Sociology core requirements (16 hours)

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 (15 hours)

Sociology electives at the 500 level or above	15
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Graduate study

The graduate programs in sociology provide the student with the opportunity to develop specific skills and interests while obtaining a solid grounding in basic substantive areas of sociology. They offer a high level of student-faculty interaction and the opportunity to participate in supervised research.

The general master's program offers a range of sociological specialties and a broad sociological background. The master's program offers two options: thesis and nonthesis. This gives the student the opportunity to develop a program of study to meet career goals. Students who wish to pursue a Ph.D. and a career in an academic environment are encouraged to pursue the thesis option. Those interested in applied research careers have the option of pursuing the nonthesis program.

The Ph.D. program offers specialized training in community and rural organization, societal change and development, demography and human ecology, social organization, and gerontology. In addition, students are required to take course work in the core areas of sociological theory and research methodology.

Sociology students may draw upon related graduate programs in computer science, statistics, and various social and behavioral sciences in designing programs of study. Special University programs in the economics of development, regional and community studies, South Asia studies, and women's studies may be relevant for specific objectives. A National Advanced System 6130 and a computing center with a full range of facilities and services are available to graduate students. Research facilities in the Department of Sociology, Anthropology, and Social Work include a population research laboratory, a micro-computer laboratory, and a departmental library.

Society and criminal justice

The society and criminal justice option is a liberal arts program of study that provides students with a broad knowledge of the workings of all agencies and organizations that make up the criminal justice system. The option is intended 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. In addition, 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 wish to 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 18 hours of tool and related courses, 34 hours of core sociology courses, and 12 hours of supervised internship and professional seminar courses.

Tool and related courses (18 hours)

STAT 330	Elementary Statistics for the Social Sciences	3
PSYCH 110	General Psychology	3
POLSC 325	U.S. Politics	3
SOCWK 560	Skills and Techniques in the Practice of Social Work I	3
*Psychology elective		3
*Political science elective		3

Major courses (34 hours)

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 532	Community Organization and Leadership	3
SOCIO 550	Introduction to Social Interaction ..	3
SOCIO 560	Juvenile Delinquency	3
SOCIO 561	Criminology	3
SOCIO 663	The Prison and Other Correctional Institutions	3
SOCIO 664	Community Corrections	3

Professional field experience (Required—12 hours)

SOCIO 568	Society and Criminal Justice Internship	9
SOCIO 569	Society and Criminal Justice Professional Seminar	3

Courses in sociology

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-211-0-2208

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-214-0-2208

SOCIO 301. Topics in Sociology. (3) I, II, S. Supervised independent and/or interdisciplinary study projects. Pr.: SOCIO 211 and consent of instructor. SOCIO-301-0-2208

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-360-0-2208

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-361-0-2208

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-362-0-2208

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-399-3-4900

SOCIO 499. Senior Honors Thesis. (2) On sufficient demand. Open only to seniors in the arts and sciences honors program. SOCIO-499-4-2208

Undergraduate and graduate credit in minor field

SOCIO 500. Sociological Perspectives on Contemporary Issues. (3) I, II. 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-500-0-2208

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-501-0-2208

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-504-0-2208

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.
Pr.: SOCIO 211. SOCIO-505-0-2208

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.
Pr.: SOCIO 211. SOCIO-506-0-2208

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-510-0-2208

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-511-0-2208

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 one credit hour of lab and field research experience. SOCIO-520-1-2208

SOCIO 530. Population and Human Ecology. (3) II. Theories, policies, growth, composition, spatial aspects, movements, and world population trends. Pr.: SOCIO 211. SOCIO-530-0-2208

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-531-0-2208

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. SOCIO-532-0-2208

SOCIO 533. Sociology of Agricultural Organization in the U.S. (3) I, in even years. Social impact of agricultural change in U.S.; emphasis on land tenure, farmers; social movements; role of agricultural technology; and relationship of agriculture to rest of society. Pr.: SOCIO 211. SOCIO-533-0-2208

SOCIO 540. Social Organization. (3) I, 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-540-0-2208

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-541-0-2208

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-542-0-2208

SOCIO 545. The Sociology of Women. (3) I. 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-545-0-2208

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-546-0-2208

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, main-

tenance, and change. Pr.: SOCIO 211. SOCIO-550-0-2208

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-560-0-2209

SOCIO 561. Criminology. (3) I, II. Nature, extent, and causes of crime; programs for prevention and treatment. Pr.: SOCIO 211. SOCIO-561-0-2209

SOCIO 562. Introduction to Corrections. (3) I. Introduction to the sociology of prisons, probations, and parole, including corrections theory, the development of corrections practice, and contemporary alternatives to imprisonment. Pr.: SOCIO 211. SOCIO-562-0-2105

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-565-0-2104

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.: SOCWK 560. Society and criminal justice option students only. SOCIO-568-2-2105

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.: SOCWK 560. Society and criminal justice option students only. SOCIO-569-0-2105

SOCIO 570. Race and Ethnic Relations in the U.S.A. (3) I. 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. SOCIO-570-0-2208

Undergraduate and graduate credit
SOCIO 618. Religion in Culture. (3) II. The nature of religion and its manifestations in different cultural systems. Same as ANTH 618. Pr.: ANTH 200 or SOCIO 211. SOCIO-618-0-2208

SOCIO 633. Gender, Power, and International Development. (3) II, in odd 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 three additional hours in sociology or cultural anthropology. Same as ANTH 633. SOCIO-633-0-2208

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-640-0-2208

SOCIO 643. Sociology of Religion. (3) I. 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-643-0-2208

SOCIO 663. The Prison and Other Correctional Institutions. (3) I. Correctional confinement facilities for offenders of all ages. Includes management of offenders for classification, training, and treatment, and for security, custody, and discipline. Pr.: SOCIO 211. SOCIO-663-0-2105

SOCIO 664. Community Corrections. (3) II. Alternatives to prison such as fines, restitution, nonresidential treatment centers, community correction centers, probation, residential treatment, halfway houses, correctional field service, parole, furloughs, and work release. Pr.: SOCIO 211. SOCIO-664-0-2105

SOCIO 668. Critical Issues in Corrections. (3) II. Selected issues in corrections, including appropriate use of institutional personnel, inmate rights, determinate vs. indeterminate sentencing, modification of probation-parole systems, and evaluation of corrections programs. Pr.: SOCIO 562. SOCIO-668-0-2105

Undergraduate and graduate credit
SOCIO 701. Problems in Sociology. (Var.) I, II, S. Pr.: SOCIO 211 and junior standing. SOCIO-701-3-2208

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-709-0-2208

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-710-0-2208

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-724-2-2208

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-725-1-2208

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-730-1-2208

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-732-0-2208

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-734-0-2208

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-735-0-2208

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-736-0-2208

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-737-0-2208

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-740-0-2208

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-741-0-2208

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-742-0-2208

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-744-0-2208

SOCIO 745. Sociology of Sport. (3) II. A critical analysis of sport and leisure activity in contemporary American society focusing on such issues as sport participation and social mobility, race and sports, women and sports, and audience involvement. Pr.: SOCIO 211 or consent of instructor. Same as PE 745. SOCIO-745-0-2208

SOCIO 747. 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-747-0-2208

SOCIO 750. Social Control. (3) II, in odd years. 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-750-0-2208

SOCIO 751. Social Change. (3) I, in even 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-751-0-2208

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-752-0-2208

SOCIO 767. Social Reactions to Deviance. (3) II. 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 411 and consent of instructor. SOCIO-767-0-2208

Graduate credit

SOCIO 808. Advanced Issues in Sport Sociology. (3) On sufficient demand. An in-depth analysis of the sociology of sport literature with special interest in critiquing the theoretical frameworks and methodologies employed. Pr.: PE 745 or SOCIO 745. SOCIO-808-0-2208

SOCIO 810. Contemporary Sociological Theory. (3) II. Comparative analysis of contemporary schools of sociological thought showing their development, current status, and possible future trends. Emphasis on structural functionalism, Marxism and neo-Marxism, symbolic interactionism, phenomenology and ethnomethodology, and exchange theory. A working knowledge of classical sociological theory is assumed. Pr.: SOCIO 710 or equiv. SOCIO-810-0-2208

SOCIO 898. Master's Report Research. (Var.) I, II, S. SOCIO-898-4-2208

SOCIO 899. Master's Thesis Research. (Var.) I, II, S. SOCIO-899-4-2208

SOCIO 911. Seminar in Sociological Theory. (3) II. Selected topics in sociological theory. May be repeated with consent of supervisory committee. Pr.: SOCIO 710 and 810. SOCIO-911-0-2208

SOCIO 912. Seminar: Theory Construction in Sociology. (3) II, in odd years. An examination of alternative logical strategies in theory construction with emphasis on theory construction as a research tool. Pr.: SOCIO 511 and consent of instructor. SOCIO-912-0-2208

SOCIO 920. Seminar in Sociological Research. (3) II, in even years. Application of scientific techniques in the design and execution of research. Pr.: SOCIO 724 or 725. SOCIO-920-0-2208

SOCIO 922. Specialized Techniques of Social Research. (3) On sufficient demand. Intensive examination of the problems and techniques of design, data collection, analysis, and interpretation which accompany a particular strategy of basic or applied research. Topics announced for the semester in which the course is offered. May be repeated with consent of department. Pr.: SOCIO 211 or equiv. SOCIO-922-0-2208

SOCIO 923. Methods of Social Policy Research. (3) Examination of principles, techniques, and design of retrospective and prospective social policy research. Pr.: SOCIO 725 or equiv. SOCIO-923-0-2208

SOCIO 931. Seminar in Demographic Methods. (3) II, in odd years. Demographic processes such as fertility, mortality, and migration, with emphasis on measurements, methods, and analytical techniques. Includes the construction of life tables and population estimates and projections. Pr.: SOCIO 725 and 730. SOCIO-931-0-2208

SOCIO 932. Seminar in Rural Sociology. (3) I, in even years. A sociological survey of research and empirical data on rural life and modes of management or control of agricultural organization for world geographic regions or individual nations. Pr.: SOCIO 732 or 736 or equiv. SOCIO-932-0-2208

SOCIO 940. Seminar in Social Organization. (3) II, in even years. Consideration of selected approaches to the study of societal organization, organizational theory, and analysis. Pr.: Consent of instructor. SOCIO-940-0-2208

SOCIO 943. Research in Family Organization. (3) On sufficient demand. Selected research topics in the analysis of contemporary family structures; the relations of the family to other societal systems; comparative perspectives and the use of cross-national data in family research. Pr.: Consent of instructor. SOCIO-943-0-2208

SOCIO 944. Seminar in the Sociology of Aging. (3) II, in even years. Consideration of selected topics and issues in the sociology of aging such as retirement and institutional change, societal reactions to aging, population structure and socioeconomic consequences of aging populations, the social organization of leisure, the impact on social organization of services for older people, the structural and organizational consequences of widowhood, age-grading and stratification in aging populations, analysis of the impact on community structure, and organization of special institutions for older people. Pr.: SOCIO 744. SOCIO-944-0-2208

SOCIO 950. Seminar in Social Interaction. (3) I, in odd years. Examination of current theoretical, methodological, and research issues and topics. Pr.: SOCIO 550, 752, or equiv. SOCIO-950-0-2208

SOCIO 951. Seminar in Societal and Institutional Dynamics. (3) II, in even years. Analyses of change of societies and institutions; consideration of rates, degree, and direction of change, and of means employed to plan change in modern or emerging nations. Pr.: SOCIO 751 or equiv. SOCIO-951-0-2208

SOCIO 962. Seminar in Deviant Behavior and Social Disorganization. (3) I, in odd years. Analysis in detail and depth of selected forms of deviant behavior and their relevance to social disorganization. Pr.: Consent of instructor. SOCIO-962-0-2208

SOCIO 999. Ph.D. Dissertation Research. (Var.) SOCIO-999-4-2208

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 which 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 undergraduate major is of particular value to those students who intend to pursue a professional career in social welfare 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. Furthermore, students who wish to pursue graduate studies in social welfare

will be eligible for advanced standing in many masters 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 on-the-job experience in a professional setting.

The student wishing to declare a major in social work may enroll directly in curriculum SOCWK. This is a provisional admission to the social work program. Formal evaluation occurs prior to admission to SOCWK 560, Social Work Practice I, taken during the junior year. At that time the student completes a personal statement, and undergoes a formal interview and review of academic and classroom performance by the program admissions committee. The student must have a 2.5 overall GPA, and a 3.0 GPA in the core courses. A student successfully passing this review may enter the first course in the practice sequence, SOCWK 560. Before completing SOCWK 560 the student completes an interviewing skill demonstration which is reviewed by the program admissions committee to determine preparedness to complete the major. 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 the student must meet the standards of the program to complete the major. For complete details on the admissions procedure, see the program admissions policy in the student handbook. Appeals of program faculty decisions may be made through established departmental procedures.

A student completing a B.A. or B.S. in social work must complete 120 hours including Orientation to the Social Work Major, SOCWK 010; Introduction to Social Work, SOCWK 260; 43 hours of major courses; and 22 hours of tool and related courses.

Human behavior and the social environment content (25 hours)

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
POLSC 301	Introduction to Political Thought ..	3

ECON 110	Economics I	3
BIOL 198	Principles of Biology	4
Social work practice content (8 hours)		
SOCWK 560	Social Work Practice I	3
SOCWK 561	Social Work Practice II	3
SOCWK 568	Social Work Practice III	2
Research content (8 hours)		
STAT 330	Elementary Statistics for the Social Sciences	3
SOCIO 520	Methods of Social Research I	4
SOCIO 550	Field Practicum Research Preparation	1
Social policy content (6 hours)		
SOCWK 510	Social Welfare as a Social Institution	3
SOCWK 565	Program and Policy Formulation and Analysis	3
Field practicum (12 hours)		
SOCWK 562	Field Experience	12
Professional social work seminar (3 hours)		
SOCWK 564	Social Work Professional Seminar ..	3

Courses in social work

Undergraduate credit

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. SOCWK-010-0-2104

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-260-0-2104

SOCWK 310. Topics in Social Work. (1-3) I, II. Supervised independent study projects. Pr.: Consent of the instructor. SOCWK-310-0-2104

SOCWK 499. Senior Honors Thesis. (2) On sufficient demand. Open only to seniors in the arts and sciences honors program. SOCWK-499-4-2204

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-501-0-2104

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-510-0-2104

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-543-0-2104

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 520 and senior standing. Social work majors only. SOCWK-550-0-2104

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-560-0-2104

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-561-0-2104

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-562-2-2104

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-563-0-2104

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-564-0-2104

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-565-0-2104

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-566-0-2104

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-567-0-2104

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. SOCWK-568-0-2104

Undergraduate and graduate credit

SOCWK 610. Topics in Social Work. (1-3) Supervised independent study projects. Pr.: SOCWK 260 plus six hours of behavioral science foundation courses and consent of instructor. SOCWK-610-3-2104

Speech

Harold J. Nichols,* Head

Professors Fedder,* Flanagan,* and Nichols;* Associate Professors Anderson, Armagost,* Aseneta, Bedrosian,* Hinrichs,* Kahlich, Rainbolt,* Schenck-Hamlin,* Shelton,* and Uthoff; Assistant Professors Griffin,* Hoag, Sheffield,* and Smit;* Instructors Goulden, Grupas, MacFarland, Molineux, Nelson, Null-Stevenson, Procter, Quirk, Ross, Salva, Schiappa, and Wade.

Undergraduate study

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 nine hours in other areas within the department. See speech secondary education requirements, College of Education, for teacher certification.

Graduate study

In the Department of Speech major work is offered leading to the degree master of arts in the following fields: rhetoric/communication, speech pathology-audiology, and theatre.

A student majoring in any of the above areas may select a minor field either outside the department or within the department. Only certain areas are approved for minor work within the department when the major is also within the department.

Prerequisite to major graduate work in these fields is the completion of the four-year undergraduate program substantially equivalent to that required of general arts and sciences students, the curriculum to include sufficient elementary work in the appropriate area of speech to prepare the student for the advanced field chosen.

The master of arts degree may be pursued by students in the department under one of the following plans: plan A: a minimum of 30 semester hours of graduate credit including a master's thesis of six to eight semester hours; plan B: a minimum of 30 semester hours of graduate credit including a written report of two semester hours either of research or of problem work on a topic in the major field; plan C: a minimum of 30 semester hours of graduate

credit in course work only, but including a project which discloses evidence of creative ability.

Students in theatre may, with graduate faculty approval, elect any one of plans A, B, or C.

Students in rhetoric/communication may, with graduate faculty approval, elect plan A or B. Students in speech pathology-audiology may, with graduate faculty approval, elect plan A or C.

Written and oral examinations will be required in all areas.

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 which 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. Undergraduate students in rhetoric/communication are required to take at least 21 credit hours of course work in rhetoric/communication and nine credit hours in other divisions of the department. The 21 credits in rhetoric/communication must be distributed as follows:

1. Rhetorical and communication theory (6 credits)

SPCH 320 Theories of Human Communication (3 credits)

SPCH 330 The Rhetoric of Western Thought (3 credits)

2. Communication in applied settings (3 credits)

One of the following:

SPCH 210 Forensics Participation (minimum of three semesters)

SPCH 321 Public Speaking II (3 credits)

SPCH 325 Argumentation and Debate (3 credits)

SPCH 326 Small Group Discussion Methods (3 credits)

3. Major electives: Of the additional 12 credit hours, all must be 300-level or

above with at least six credit hours at the 500-level or above.

Graduate. Graduate students become eligible for a master of arts degree in rhetoric/communication by completing at least 30 credit hours of graduate work. Prerequisite to admission into the graduate program in rhetoric/communication are a superior academic record and background work essentially equivalent to our undergraduate major. In some cases, students are admitted on a provisional basis to make up deficiencies in undergraduate preparation. Students may select either plan A or B as described above. For those selecting plan A, at least 21 credit hours must be in rhetoric/communication courses, including six credit hours of thesis. A master's thesis identifies an original research problem, implements an appropriate methodology, and reports and interprets its findings. The student must pass an oral examination which shall include a defense of the thesis.

For those students selecting plan B, at least 21 credit hours must be in rhetoric/communication course work. They are required to submit and defend an acceptable research report for two credit hours (SPCH 899) and pass a written general examination of their course work. A research report is an academic essay that reviews and analyzes research literature within the discipline.

Both the master's thesis and research report require prospectus approval by the student's graduate committee and adherence to graduate school and departmental guidelines. All graduate students in rhetoric/communication will take SPCH 720, 730, 821, and 822.

Quiz-out

A student may earn three 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.

Courses in rhetoric and communication

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-035-0-1508

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-040-0-1508

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-050-0-1508

SPCH 065. Spoken English for International Students. (3) I, II. Intensive practice in spoken American English for increased fluency and overall comprehensibility. SPCH-065-1-1506

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-070-0-1508

SPCH 080. Speech Seminar. (0) Special topics and lectures for speech majors. Required of all majors each semester. SPCH-080-0-1506

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. SPCH-090-0-1506

Undergraduate credit

SPCH 105. Public Speaking 1A. (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 two-credit hour course. Credit not granted for both SPCH 105 and 106. SPCH-105-0-1506

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-106-0-1506

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-107-1-1506

SPCH 109. Public Speaking 1A, Honors. (3) Honors speech preparation and delivery; a survey of topics basic to rhetoric,

communication, and linguistics. For arts and sciences honors students. SPCH-109-0-1506

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-210-2-1506

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-311-0-1506

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-320-0-1506

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-321-0-1506

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-322-0-1506

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-323-0-1506

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-325-0-1506

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-326-0-1506

SPCH 327. Employment Interviewing. (3) Examination of principles of interviewing with emphasis on developing the communication skills essential for an effective job interview. SPCH-327-1-1506

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-328-1-1506

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-330-0-1506

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-335-0-1506

SPCH 398. Sophomore Honors Seminar. (3) II. Open only to qualified students in the arts and sciences honors program. SPCH-398-0-4900

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-421-0-1506

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-426-0-1506

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-430-0-1506

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-432-0-1506

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 three hours. Pr.: Sophomore standing, membership in the honors program of the College of Arts and Sciences, and permission of the instructor. SPCH-498-0-1506

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-520-0-1506

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-525-0-1506

SPCH 526. Persuasion. (3) II. The study of communication as persuasion; examination of contemporary approaches to persuasion. SPCH-526-0-1506

SPCH 527. Group Discussion Methods. (3) I, II. Examination of research, techniques, and principles regarding the activities of face-to-face groups; emphasis upon achieving creative group endeavor through discussion. Pr.: SPCH 105 or SPCH 106 or SPCH 125 or SPCH 127. SPCH-527-0-1506

Undergraduate and graduate credit

SPCH 621. Language and Social Interaction. (3) II. The spoken word in the on-going process of communication. Topics will include analysis of symbolic expression; evaluation of speech style; and conversation. Pr.: SPCH 320 or LING 280; junior standing. SPCH-621-0-1506

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-630-0-1506

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-720-0-1506

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-725-0-1506

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-726-0-1506

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-730-0-1506

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-732-0-1506

SPCH 733. Rhetorical Criticism. (3) II. Study of traditional and contemporary approaches to the analysis of public discourse. Pr.: SPCH 330. SPCH-733-0-1506

SPCH 799. Problems in Speech. (Var.) Open to students in any speech area. Pr.: Junior standing and consent of instructor. SPCH-799-3-1506

Graduate credit

SPCH 810. Research Writing in Rhetoric/Communication. (1) A study of the problems in writing and rewriting the results of scholarly investigations in rhetoric/communication. Pr.: Graduate standing in rhetoric/communication. SPCH-810-0-1506

SPCH 820. Seminar in Speech. (3) Selected topics in speech research. May be repeated for credit with change in topic. SPCH-820-3-1506

SPCH 821. Communication Research Methods I. (3) I. Descriptive and experimental methodologies pertinent to investigations in rhetoric/communication. Topics will include such techniques as content analysis, attitude scaling, and stylistic analysis. Pr.: SPCH 520 or equiv. SPCH-821-0-1506

SPCH 822. Communication Research Methods II. (3) II. Historical and critical methodologies pertinent to investigations in rhetoric/communication. Topics will include participant observation, unstructured interviewing, historical research, and discourse analysis. Pr.: SPCH 330 or equiv. SPCH-822-0-1506

SPCH 823. Competitive Forensic Theory. (3) Theory and study of current research in competitive debate and individual events. Pr.: SPCH 125 and SPCH 426. SPCH-823-0-1506

SPCH 899. Research in Speech. (Var.) Pr.: Sufficient training to carry on the line of research undertaken and consent of instructor. SPCH-899-4-1506

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.

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-280-0-1505

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-600-0-1505

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-601-1-1505

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-602-0-1505

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-603-0-1505

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-783-0-1505

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-785-0-1505

LING 792. Field Methods in Linguistics. (3) On sufficient demand. An introduction to techniques of collecting and analyzing linguistic data in the field. Work with non-Western informants in class. Pr.: Consent of the instructor. Same as SOCIO 792. LING-792-0-1505

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. LING-796-0-1505

Speech pathology-audiology

The goal of the speech pathology-audiology program is to train professional personnel who are competent to help children and adults with communicative problems of speech, hearing, and language. The program at Kansas State University has been designed to meet the current requirements for certification of clinical competence of the American Speech-Language and Hearing Association and the state of Kansas Department of Education requirements for speech clinicians and school audiologists.

Evidence of meeting professional competency requires a minimum of 60 semester hours of academic credit. Twelve of these 60 semester hours must be obtained in courses which provide information that pertains to normal development and use of speech, language, and hearing. Thirty of these 60 semester hours must be in courses which provide: information relative to communication disorders, and information about the management of speech, language, and hearing disorders. At least 24 of these 30 semester hours must be in courses in the professional area (speech pathology or audiology) for which the certificate is requested and no less than six semester hours may be in audiology for the certificate in speech pathology or in speech pathology for the certificate in audiology. No more than six semester hours may be in courses which provide credit for clinical practice obtained during academic training.

Credit for study of information pertaining to related fields that augment the work of the clinical practitioner of speech pathology and/or audiology may also apply toward the total 60 semester hours.

Thirty of the total 60 semester hours which are required for a certificate must be in courses that are acceptable toward a grad-

uate degree. Moreover, 21 of the 30 semester hours must be within the 24 semester hours required in the professional area (speech pathology or audiology) for which the certificate is requested or within the six semester hours required in the other area. 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.

In addition, the master's degree candidate must have completed a minimum of 300 clock hours of 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.

Courses in speech pathology-audiology Undergraduate credit

SPPAT 140. Improving Vocal Communication Skills. (2) Understanding of the vocal mechanism and its relation to the production of speech; laboratory period for the study and practice of speaking skills. Intended for students who desire to improve deficiencies in their speaking ability. May be repeated for a maximum of four hours credit. SPPAT-140-1-1220

SPPAT 200. Exploring the Professional World of Speech-Language Pathology and Audiology. (1) An introduction to the professions of speech-language pathology and audiology. Students will embark on an academic tour of related topics, work settings, and professional issues confronting today's specialists in communication disorders. SPPAT-200-0-1220

SPPAT 240. Elements of English Phonetics. (3) Analysis of sounds which make up English speech and consideration of how sounds vary phonetically and physiologically; acquisition of skill in the transcription of speech into the symbols of the International Phonetic Alphabet. SPPAT-240-0-1220

SPPAT 243. Introduction to Speech Pathology. (3) A survey of communication disorders, and an introduction to the fields of speech pathology and audiology which are responsible for the clinical management of these disorders. SPPAT-243-0-1220

SPPAT 250. Experimental Analysis of Vocal Behavior. (3) Study of behavior modification 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-250-0-1220

SPPAT 340. Hearing Problems and Hearing Tests. (4) I. Survey of the etiology and classification of hearing disorders. Introduction to hearing tests and measurements. SPPAT-340-1-1220

SPPAT 342. Developmental Psycholinguistics. (3) Review of research and theory of early development of language comprehension and production, involving vocalization, phonology, morphology, syntax, semantics, and pragmatics. Discussion of the relationship between cognition and language as well as other variables influencing language acquisition. SPPAT-342-0-1220

SPPAT 345. Clinical Procedures in Speech Pathology and Audiology. (3) 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.: Sophomore and junior standing majors only. SPPAT-345-0-1220

SPPAT 350. Structure and Function of the Speech Mechanism. (3) Anatomy and physiology of normal and abnormal speech mechanisms, including respiration, phonation, resonance, and articulation. SPPAT-350-0-1220

SPPAT 351. Fundamentals of Hearing. (3) Study of the ear and the mechanics of hearing. SPPAT-351-0-1220

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-400-0-1220

SPPAT 443. Language Assessment and Intervention. (3) The nature of language disorders as well as general principles of language assessment and intervention are presented. Specific language assessment and intervention methodology for individuals functioning in various stages of cognitive development are reviewed. Language disorders related to the mentally or physically handicapped, emotionally disturbed, and learning disabled are examined. Pr.: SPPAT 342. SPPAT-443-0-1220

SPPAT 446. Articulation/Phonology I. (3) Research, theories, and principles concerning normal acquisition, phonological processes, diagnosis, and management of articulation disorders. Pr.: SPPAT 240. SPPAT-446-0-1220

SPPAT 450. Undergraduate Laboratory in Speech-Language Pathology. (1-3) I, II, S. Supervised practice in the use of the materials and methods of speech-language pathology for the undergraduate student. Pr.: SPPAT 345; conc. or previous enrollment in SPPAT 443 and 446. SPPAT-450-2-1220

SPPAT 456. Principles of Professional Practice. (3) Procedures for establishing program services in varied employment settings (i.e. screening, assessment, caseload selection, scheduling, service models, IEPs, record keeping, budget and fee schedules, and management protocols). Use of resource personnel and interprofessional relationships are discussed. Pr.: Senior standing. SPPAT-456-0-1220

SPPAT 457. Practicum in Public School Speech and Hearing Services. (5-8) II. Observation and participation in the management of speech and hearing impaired children under the supervision of selected public school speech and hearing clinicians. Pr.: Admission to student teaching. SPPAT-457-2-1220

SPPAT 460. Undergraduate Laboratory in Audiology. (1-3) I, II, S. Supervised practice in the use of the materials and methods of audiology for the undergraduate student. Pr.: SPPAT 340 and 351. SPPAT-460-2-1220

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 six hours with a change in topic. Pr.: Consent of instructor. SPPAT-489-0-1220

SPPAT 541. Fluency Disorders. (3) I. Research and theory concerning etiology characteristics, assessment, and treatment of individuals with disfluency problems. Pr.: SPPAT 250. SPPAT-541-0-1220

SPPAT 544. Aural Rehabilitation I. (3) I. Study of and techniques for the habilitation or rehabilitation of speech and language problems of the hearing impaired. Pr.: SPPAT 340. SPPAT-544-0-1220

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 EDCI 300. SPPAT-555-0-1220

Undergraduate and graduate credit

SPPAT 600. Manual Communication II. (3) Instruction in an additional 400 to 500 signs in the SEE system. Introduction to elementary ASL techniques. Discussion of other augmentative communication systems. Research will be conducted into 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-600-0-1220

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-605-0-1220

SPPAT 642. Laryngeal Disorders. (3) Research and theory concerning etiologies, assessment, and clinical measurement of laryngeal pathologies. Pr.: SPPAT 350. SPPAT-642-0-1220

SPPAT 740. Hearing Conservation. (3) II or on sufficient demand. Effects of noise on hearing. Development, management, and control of community hearing conservation programs. Pr.: SPPAT 340. SPPAT-740-1-1220

SPPAT 750. Orofacial Anomalies. (2) Research and theory concerning etiology, characteristics, assessment, and clinical management of individuals with orofacial anomalies. Cleft lip and/or palate is emphasized. Pr.: SPPAT 350. SPPAT-750-0-1220

Graduate credit

SPPAT 800. Research Methods in Speech-Language Pathology/Audiology. (3) Introduction to techniques of research planning and experimental design with emphasis on those used most frequently in speech-language pathology/audiology; critical evaluation of selected experiments; and development of technical writing skills. Pr.: Graduate standing. SPPAT-800-0-1220

SPPAT 805. Graduate Laboratory in Speech-Language Pathology. (1-3) Supervised practice in the use of the methods and materials of speech-language pathology. Pr.: SPPAT 345. SPPAT-805-2-1220

SPPAT 806. Graduate Laboratory in Audiology. (1-3) Supervised practice in the use of the equipment, materials, and methods of audiology. Pr.: SPPAT 340 and 351. SPPAT-806-2-1220

SPPAT 810. Articulation/Phonology II. (3) Recent research in specific areas of phonology and articulation development, assessment, and management. Pr.: SPPAT 446. SPPAT-810-0-1220

SPPAT 820. 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-820-0-1220

SPPAT 821. Audiology I Laboratory. (1) Student must be concurrently enrolled in Audiology I. Two hours of lab a week. Pr.: SPPAT 351. SPPAT-821-0-1220

SPPAT 830. Aphasia. (3) Research and theory concerning the nature, etiologies, evaluation, and treatment of aphasia. Pr.: SPPAT 350. SPPAT-830-0-1220

SPPAT 840. Neuropathologies of Speech and Language. (3) Research and theory concerning nature, etiologies, evaluation, and principles of neuropathologies. Pr.: SPPAT 350. SPPAT-840-0-1220

SPPAT 843. Amplification in Hearing Rehabilitation. (3) II. Analysis of electro-acoustic characteristics of hearing aids. Earmold acoustics. Selection and use of amplification. Pr.: SPPAT 745 and consent of instructor. SPPAT-843-1-1220

SPPAT 845. Theoretical Foundations of Audiology. (3) Study of the auditory mechanism, with emphasis on critical evaluation of current methods employed in clinical audiology. Pr.: SPPAT 745. SPPAT-845-0-1220

SPPAT 846. Seminar in Stuttering. (3) Current research concerned with stuttering behavior, etiology, developmental aspects, evaluation, and remediation. Pr.: SPPAT 641. SPPAT-846-0-1220

SPPAT 847. Practicum in Audiology and Speech Pathology. (3-6) Audiology: supervised clinical procedures in screening and diagnostic hearing examinations as related to rehabilitative and medical orientations. Management procedures for the hard of hearing. Hearing aid selection. Speech pathology: supervised clinical methods in speech pathology; experience in diagnosis, organization, and administration of treatment programs. May be repeated for a maximum of 15 credit hours. Pr.: Graduate standing in audiology or speech pathology. SPPAT-847-2-1220

SPPAT 849. Topics in Speech-Language Pathology or Audiology. (1-3) Critical review of recent research related to measurement and modification of speech, hearing, or language deficits. May be repeated for a maximum of nine hours with change in topic. Pr.: Graduate standing. SPPAT-849-0-1220

SPPAT 850. Audiology II. (3) 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 820. SPPAT-850-0-1220

SPPAT 855. Seminar in Language Assessment and Intervention. (3) Review of research and theory of current topics in language and cognition. Assessment and intervention methodology will be discussed. Pr.: SPPAT 443. SPPAT-855-0-1220

SPPAT 865. Seminar in Audiology. (3) I. Study of selected areas of audiology. May be repeated for a maximum of six credit hours with change in subject matter. Pr.: SPPAT 755 and SPPAT 843. SPPAT-865-0-1220

SPPAT 868. Aural Rehabilitation II. (3) Principles and methods of maximizing receptive communication skills of the hearing impaired. Pr.: SPPAT 544. SPPAT-868-0-1220

SPPAT 882. Experimental Phonetics. (3) Introduction to experimental phonetics. Study of the physiologic, acoustic, and perceptual characteristics of speech. Pr.: SPPAT 350 and 351. SPPAT-882-0-1220

Theatre and dance

The undergraduate major in theatre emphasizes the education of students for professional career goals or for cultural enrichment as an avocation. The goal of the theatre program 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; a pre-professional training; and the basic theatre skills for the bachelor's candidate. Kansas State University is an accredited institutional member of the National Association of Schools of Theater.

A major consists of 37 hours in theatre and nine 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 nine hours.) The 37 hours in theatre must be distributed as follows:

A theatre core of 21 hours:

THTRE 261	Fundamentals of Acting	3
THTRE 267	Fundamentals of Stage Costuming and Makeup	3
or		
THTRE 367	Stage Costuming	3
THTRE 368	Fundamentals of Technical Production	3
THTRE 370	Dramatic Structure	3
THTRE 565	Principles of Directing	3
THTRE 572	History of Theatre 1	3
THTRE 573	History of Theatre II	3

Twelve additional hours in theatre courses numbered 500 or above (excluding THTRE 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 367, Stage Costuming, or THTRE 267, Fundamentals of Stage Costuming and Makeup. Two hours in THTRE 710, Practicum in Theatre. There will be an oral evaluation of all production work required for the major at the end of each semester.

An option in music theatre consists of 74 credit hours distributed as follows:

A. 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

B. Theatre courses (37 credits)

THTRE 260	Stage Movement	3
THTRE 261	Fundamentals of Acting	3
THTRE 368	Fundamentals of Technical Production with	3
THTRE 211	Drama Participation	1
THTRE 267	Fundamentals of Stage Costuming and Makeup with	3
THTRE 211	Drama Participation	1
THTRE 370	Dramatic Structure	3
THTRE 161	Fundamentals of Improvisation	3
or		
THTRE 361	Intermediate Acting	3
or		
THTRE 761	Advanced Acting	3
THTRE 560	Advanced Stage Movement	3
THTRE 561	Vocal Expression	3
THTRE 570	Lyric Theatre	3
THTRE 571	The Opera	3
THTRE 572	History of Theatre 1	3
THTRE 710	Practicum	2

C. 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

D. Dance courses (5 credits)

Any sequence/combination of ballet, jazz, or modern.

A concentration in dance requires the following:

Core

DANCE 205	Dance as an Art Form	3
DANCE 222	Movement Improvisation 1	1
DANCE 295	Dance Composition 1	3
DANCE 321	Variations and Partnering	1
DANCE 322	Movement Improvisation II	1
DANCE 380	Musical Stage Dance	2
DANCE 495	Dance Composition II	3
DANCE 502	Dance Production (minimum of 4 semesters)	1-2
DANCE 504	Dance Aesthetics, Philosophy, and Criticism	3
DANCE 505	Methods and Materials of Teaching Dance	2
DANCE 506	Dance Education Fieldwork	1
DANCE 510	Senior Project	2
DANCE 525	Senior Seminar	1
PE 203	Kinesiological Foundations	2
or		
PE 330	Kinesiology	3
PE 376	First Aid and CPR	1
MUSIC 250	Introduction to Music	3
THTRE 261	Fundamentals of Acting	3
THTRE 211	Drama Participation (with THTRE 267 and 368)	2
THTRE 267	Fundamentals of Stage Costuming and Make-Up	3
THTRE 368	Fundamentals of Technical Production	3

Elective: (Choose one)

ART 195	Survey of Art History 1	3
ART 196	Survey of Art History II	3
HIST 459	History of Dance in Its Cultural Setting	3
PE 455	Movement Exploration and Creative Dance for Children	3

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.

Graduate study

Courses are available leading to the degree of master of arts. Prerequisites to admission into the graduate program in theatre are a superior academic record and background work essentially equivalent to our undergraduate major. In some cases, students are admitted on a provisional basis so they may make up deficiencies in undergraduate preparation. Graduate students in theatre may elect any one of the plans A, B, or C, as described earlier in this department section. There are three fields of concentration within the theatre area: history, literature, and criticism of theatre; technical production, design, and lighting; and acting, directing, and playwriting. All graduate students are required to take nine hours of graduate credit in history, literature, and criticism courses. In addition, all graduate students must take a minimum of six hours of graduate credit in one of the other two fields and a minimum of three hours of graduate credit in the remaining field. An additional 12 hours of graduate credit is required of each student. A total program of study is decided upon through regular consultation with the student's graduate committee. Further information about opportunities for financial support, and copies of the preparatory reading list for the written and oral examinations may be obtained by writing the director of graduate studies in theatre in the department.

In neither the undergraduate nor the graduate program in theatre may the following courses be used to discharge group requirements (they may be used only to discharge elective requirements in the major): THTRE 160, 165, 235, 560, 563, 664, 710, 712, 763, 779.

Courses in theatre

Undergraduate credit

THTRE 160. Introduction to Theatre. (3) Consideration of the basic elements of theatre: aesthetics, dramatic literature, theatre technology, and producing organizations. THTRE-160-0-1007

THTRE 161. Fundamentals of Improvisation. (3) Introduction to the techniques of improvisation with the emphasis upon practical participation. THTRE-161-0-1007

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-165-0-1007

THTRE 211. Drama Participation. (1-2) I, II. Work in theatrical productions. Four hours maximum credit. Pr.: Consent of director of activity. THTRE-211-2-1007

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-235-0-1506

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-260-1-1007

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 six hours credit with consent of instructor. THTRE-261-1-1007

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-263-0-1007

THTRE 267. Fundamentals of Stage Costuming and Makeup. (3) I, II. Basic techniques of stage costume construction and theatrical makeup. THTRE-267-1-1007

THTRE 268. Techniques of Makeup. (3) Techniques of makeup for stage, movies, and television. THTRE-268-1-1007

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-269-0-1007

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 six hours credit. Pr.: Consent of instructor. THTRE-275-2-1007

THTRE 361. Intermediate Acting. (3) Emphasis upon expanding the actor's capabilities through more advanced scene work and character study. Pr.: THTRE 261 and consent of instructor. THTRE-361-0-1007

THTRE 366. Theatrical Drafting Techniques. (3) II. Fundamentals of drafting for theatrical ground plans, working drawings, and perspective drawings. THTRE-366-13-1007

THTRE 367. Stage Costuming. (3) II. A lec.-lab surveying the principles of costuming for the theatre, television, and film. Conc. enrollment in at least one hour of THTRE 211 required. THTRE-367-0-1007

THTRE 368. Fundamentals of Technical Production. (3) I. Materials and techniques used in scenery construction and theatre lighting. Conc. enrollment in at least one hour of THTRE 211 is required. THTRE-368-0-1007

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-370-0-1007

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. THTRE-475-0-0-1007

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 nine hours credit by qualified students. Pr.: THTRE 260 and one semester of ballet or modern dance. THTRE-560-1-1007

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 nine hours credit by qualified students. Pr.: Consent of instructor. THTRE-561-1-1007

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-562-0-1007

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-563-0-1007

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-565-1-1007

THTRE 566. Rehearsal Techniques. (0-3) I, II. A laboratory course for students enrolled in performance and production classes. May be repeated for six hours. Pr.: Conc. enrollment in THTRE 765 or 783 or 779. THTRE-566-2-1007

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-568-0-1007

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-570-0-1007

THTRE 572. History of Theatre I. (3) I. A survey of the development of the theatre from ancient times to 1700. Pr.: Junior standing and consent of instructor. THTRE-572-0-1007

THTRE 573. History of Theatre II. (3) II. A survey of the development of the theatre from 1700 to the present. Pr.: Junior standing or consent of instructor. THTRE-573-0-1007

Undergraduate and graduate credit

THTRE 660. Professional Theatre Tour. (2-3) Intercession, 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-660-2-1007

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-661-1-1007

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-664-1-1007

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-665-0-1007

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 266. THTRE-666-0-1007

THTRE 667. History of Costume for the Theatre. (3) I. A study of Western dress from antiquity to the present as it pertains to theatrical costumes. Emphasis on practical aspects for historical reproduction of clothing. Pr.: Junior standing or consent of instructor. THTRE-667-0-1007

THTRE 670. Religion and Theatre. (3) II. Drama and stagecraft of theatre expressing the religious heritage of Judaism and Christianity; the role of theatre in religious education and worship. Pr.: Junior standing. THTRE-670-0-1007

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-671-0-1007

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 THTRE 261 or THTRE 368; junior standing; consent of supervising faculty member and approval of faculty members are required. THTRE-710-2-1007

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-711-0-1007

THTRE 712. Theatre Management. (3) Theatre management, promotion, finance, organization; emphasis on contract negotiations and use of facilities. THTRE-712-0-1007

THTRE 761. Advanced Acting. (3) Studies in style, technique, and characterization. May be repeated once. Pr.: THTRE 361 and consent of instructor. THTRE-761-1-1007

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 nine hours credit by qualified students. Pr.: Consent of instructor. Same as ENGL 762. THTRE-762-0-1007

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 six hours credit by qualified students. Pr.: Consent of instructor. THTRE-763-1-1007

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-764-0-1007

THTRE 765. Practice in Directing. (3) A lec.-lab course with emphasis on directing dramatic productions under performance conditions. May be repeated for a total of nine hours credit by qualified students. Pr.: Consent of instructor. THTRE-765-1-1007

THTRE 766. Advanced Technical Production. (3) A lec.-lab course in advanced technical theatre problems of organization, planning, and execution of scenery, costumes, and lighting. May be repeated for a total of nine hours credit by qualified students. Pr.: Consent of instructor. THTRE-766-1-1007

THTRE 767. Theatre Costume Design. (3) II. Studies in theory and practice of costume design for the theatre. May be repeated for a total of six hours credit by qualified students. Pr.: THTRE 367 or consent of instructor. THTRE-767-1-1007

THTRE 768. Scene Design. (3) Principles and styles of design for the stage, using sketches, diagrams, plates, and models. May be repeated for a total of six hours credit by qualified students. Pr.: Consent of instructor. THTRE-768-0-1007

THTRE 769. Stage Lighting. (3) I, II. Theory and practice of production lighting design, control systems, projection equipment, and lighting consulting. May be repeated for a total of six hours credit by qualified students. Pr.: THTRE 368 or THTRE 269. THTRE-769-1-1007

THTRE 770. Greek Theatre. (3) Studies in the drama and stagecraft of the Greek period. THTRE-770-0-1007

THTRE 771. Roman, Medieval, and Baroque Theatre. (3) Studies in the drama and stagecraft of the Roman, medieval, and baroque periods. THTRE-771-0-1007

THTRE 772. Romantic Theatre. (3) Studies in the drama and stagecraft of the Romantic era. THTRE-772-0-1007

THTRE 773. Modern European Theatre. (3) Studies in the European drama and stagecraft of the period from 1876 to the end of World War II. THTRE-773-0-1007

THTRE 774. Avant-Garde Theatre. (3) Studies in avant-garde drama and stagecraft since World War II. THTRE-774-0-1007

THTRE 776. Slavic Theatre. (3) Studies in the drama and stagecraft of the Slavic countries from 1800 to the present. Pr.: Junior standing. THTRE-776-0-1007

THTRE 777. Aesthetics of the Theatre. (3) Principal emphasis on theoretical problems of dramatic art. THTRE-777-0-1007

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-778-0-1007

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-779-2-1007

THTRE 780. Theatre Technical Direction. (3) II, in alternate years. Lec.-lab course providing study of theatrical engineering systems. Pr.: THTRE 368 and consent of instructor. THTRE-780-0-1007

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-782-0-1007

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. THTRE-783-1-1007

Graduate credit

THTRE 862. Workshop in Playwriting. (3) Advanced writing of drama. May be repeated once for credit. Same as ENGL 862. Pr.: THTRE 762 (or ENGL 762) or proof of equiv. proficiency. THTRE-862-0-1007

THTRE 870. Seminar in Theatre. (3) Selected topics in theatre research. May be repeated for credit with change of topic. THTRE-870-0-1007

Courses in dance

Undergraduate credit

DANCE 120. Modern Dance I. (1) DANCE-120-5-1008

DANCE 165. Ballet I. (1) DANCE-165-5-1008

DANCE 171. Jazz Dance I. (1) 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-171-5-1008

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-205-0-1008

DANCE 222. Movement Improvisation I. (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-222-1-0-1008

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-250-1-0-1008

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-295-1-1-1008

DANCE 321. Variations and Partnering. (1) On sufficient demand. Alternating years of modern and ballet incorporating pointe and classical variations and pas de deux. Introduction to the principles of repertoire performance using various styles and forms of choreography. Directed study in partnering. Pr.: Consent of instructor. DANCE-321-1-0-1008

DANCE 322. Movement Improvisation II. (1) On sufficient demand. Continues exploration of principles of movement improvisation. Experience with props, architectural spaces, and improvisation as a tool for choreography and performance. Pr.: DANCE 222. DANCE-322-1-0-1008

DANCE 323. Modern Dance II. (2) I, II. May be repeated for a total of eight hours. Only two of these hours may be applied toward humanities requirements. Pr.: DANCE 120 and consent of instructor. DANCE-323-1-0-1008

DANCE 324. Modern Dance III. (2) I, II. May be repeated for a total of eight hours. Only two of these hours may be applied toward humanities requirements. Pr.: DANCE 323 and consent of instructor. DANCE-324-1-0-1008

DANCE 325. Ballet II. (2) I, II. May be repeated for a total of eight hours. Only two of these hours may be applied toward humanities requirements. Pr.: DANCE 165 and consent of instructor. DANCE-325-1-0-1008

DANCE 326. Ballet III. (2) I, II. May be repeated for a total of eight hours. Only two of these hours may be applied toward

humanities requirements. Pr.: DANCE 325 and consent of instructor. DANCE-326-1-0-1008

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 eight hours. Only two of these hours may be applied toward humanities requirements. Pr.: DANCE 171. DANCE-371-1-0-1008

DANCE 372. Jazz Dance III. (2) On sufficient demand. May be repeated for a total of eight hours. Only two of the hours may be applied toward humanities requirements. Pr.: DANCE 371 or consent of instructor. DANCE-372-1-0-1008

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-388-1-0-1008

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-459-0-1008

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-495-1-1-1008

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 three hours. Pr.: Sophomore standing, membership in the honors program of the College of Arts and Sciences, and permission of instructor. DANCE-498-0-1008

DANCE 499. Senior Honors Thesis. Open only to seniors in the arts and sciences honors program. DANCE-499-0-1008

Undergraduate and graduate credit in minor field

DANCE 502. Dance 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-502-1-0-1008

DANCE 504. Dance Aesthetics, Philosophy, and Criticism. (3) On sufficient demand. Examination of dance in relation to the visual and performing arts. Analysis of form and content in aesthetic judgment. Practical experience in observation, and written and oral critiques of dance performances. Pr.: DANCE 205, DANCE 460. DANCE-504-0-1008

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 and 322, 324 or 372. DANCE-505-1-5-1008

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-506-2-1008

DANCE 510. Senior Project. (2) On sufficient demand. Culminating project which entails research, creative process, or a documented fieldwork experience; concept through public presentation. Pr.: Senior standing and consent of instructor. DANCE-525-4-1008

DANCE 525. Senior Seminar. (1) On sufficient demand. Presentation, study, and practical work in professional literature, organizations, audition/interview process, job markets, and resume designs. Pr.: Senior standing. DANCE-525-0-1008

DANCE 599. Independent Studies in Dance. (1-3) Selected topics in dance. Maximum of three hours applicable toward degree. Pr.: Consent of department head. DANCE-599-3-1008

DANCE 690. Senior Honors Thesis. Open only to seniors in the arts and sciences honors program. DANCE-690-4-0835

Statistics

George A. Milliken,* Head

Professors Feyerherm,* Grosh,* Higgins,* Johnson,* Kemp,* Milliken,* Nassar,* Perng,* Associate Professors Boyer* and Yang,* Assistant Professors M. McNulty, S. McNulty, Neill, and Schwenke; Emeritus: Professor Fryer.

Undergraduate study

Statistics is a combination of classical mathematics, the theory of probability, and some new concepts related to inductive

reasoning which have developed during the past three-quarters of a century.

Almost all activities of plants and animals (including man) depend to some degree on chance events, and most decisions made by mankind 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.

A person wishing to 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 541	Applied Matrix Theory	3
CMPSC 200	Fundamentals of Computer Programming	2
CMPSC 207	PASCAL Language Laboratory	2
CMPSC 300	Algorithmic Processes	3
CMPSC 460	Data Structures	3
CMPSC 561	Introduction to Data Management Systems	3
STAT 410	Probabilistic Systems Modelling ...	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 416	Written Communication for the Sciences	3

Graduate study

The Department of Statistics offers graduate studies leading to the master of science and doctor of philosophy degrees in probability and statistics.

Many graduate majors in statistics have majored in some other area as undergraduates. If the student has had mathematics through the calculus and 12 additional credits in mathematics and/or statistics, the master's degree in statistics can be earned in the normal time.

Persons who have earned the master's degree in statistics may study toward the doctor's degree, enter industry or governmental service, or join organizations which do scientific research. Holders of the master's degree also may be teachers in some colleges and universities, but it is preferable to plan to obtain the doctorate if the student wishes to enter the teaching profession at the college or university level.

A student may work toward a doctor of philosophy degree either in mathematical probability and statistics or in applied probability and statistics. The former includes more of the advanced theory whereas the latter replaces some of the advanced theory with instruction and experience in the uses to which the basic theory can be put.

Teaching and research assistantships are available on a competitive basis. Federal fellowships also are available to excellent students upon application directly to the agency offering such fellowships.

Courses in statistics

Undergraduate credit

STAT 300. Sophomore Honors Seminar in Statistics. (3) I. Selected topics. May not be used to satisfy quantitative requirements for B.S. degree. Open only to students in the honors program. STAT-300-0-1702

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-320-0-1702

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-330-0-1702

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-340-0-1702

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-341-0-1702

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-350-0-1702

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-351-0-1702

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, CMPSC 300, CMPSC 370, or consent of instructor. STAT-410-0-1702

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. STAT-490-0-1702

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 χ^2 ; goodness of fit. Numerous applications. Pr.: MATH 222. STAT-510-0-1702

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-511-0-1702

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. STAT-550-0-702

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 biserial correlations; contingency tables and chi-square tests. Pr.: MATH 100. STAT-702-0-1702

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-703-0-1702

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-704-0-1702

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-705-0-1702

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-707-0-1702

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, STAT 705, or consent of instructor. STAT-708-0-1702

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-710-0-1702

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-716-0-1702

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, STAT 705. STAT-717-0-1702

STAT 718. Survival Data Analysis. (2) II, in odd years. Estimation and comparison of survival functions with identification of prognostic and risk factors using some nonparametric techniques with application to life-testing and survival data. Meets four times a week during second half of semester. Pr.: STAT 704, STAT 705. STAT-718-0-1702

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-720-0-1702

STAT 725. Digital Statistical Analysis. (3) II. Use of FORTRAN to implement algorithms for computing statistical analyses of data including means, standard deviations, correlations, regression, and analysis of variance. Generation of pseudo random numbers, probability distributions, and simulation techniques. Writing SAS procedures in FORTRAN. Use of the calcomp plotter for data display. JCL (Job Control Language) used to create disk and tape files and to create load modules. Pr.: CMPSC 201 and STAT 704 and 705, or conc. enrollment. STAT-725-0-1702

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-730-0-1702

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, STAT 705, STAT 720. STAT-735-0-1702

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, STAT 705. STAT-736-0-1702

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-740-0-1702

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-745-0-1702

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-746-0-1702

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-770-0-1702

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-771-0-1702

STAT 799. Topics in Statistics. (Var.) I, II, S. Pr.: STAT 703 or 770 and consent of instructor. STAT-799-3-1702

Graduate credit

STAT 810. Seminar in Probability and Statistics. (1) I, II. Discussion and lectures on topics in probability and statistics; one seminar talk by each student registered for credit. Pr.: Graduate standing and at least two graduate courses in statistics. STAT-810-0-1702

STAT 816. Nonparametric Theory and Robustness. (3) I, in even years. Hodges-Lehman estimators; L-estimator; M-estimator; distribution-free confidence, prediction, and tolerance intervals; jackknife and bootstrap methods; U-statistics; linear rank statistics; two-sample problems; Pitman's asymptotic relative efficiency; k-sample problems; testing independence; simple regression problem. Pr.: STAT 716 and 771. STAT-816-0-1702

STAT 840. Intermediate Probability and Approximation Theorems. (3) II, in even years. Probability measure, random variables, characteristic functions, modes of convergence, central limit theory, asymptotic properties of maximum likelihood estimators, likelihood ratio tests, sample moments, sample quantiles, order statistics, the empirical distribution function, and transformations of given statistics. Pr.: STAT 771 and MATH 633. STAT-840-0-1702

STAT 850. Stochastic Processes I. (3) II. Generating functions; conditional probability and conditional expectations; normal processes and covariance stationary processes; Poisson processes; renewal processes; Markov chains, discrete time. Pr.: STAT 770. STAT-850-0-1702

STAT 851. Stochastic Processes II. (3) I. Markov chains, discrete time; Markov chains continuous time; birth-death processes; Kolmogorov differential equations; diffusion processes, forward and backward Kolmogorov equations; applications. Pr.: STAT 850. STAT-851-0-1702

STAT 860. Linear Models I. (3) I. Subspaces, projections, and generalized inverses; multivariate normal distribution, distribution of quadratic forms; optimal estimation and hypothesis testing procedures for the general linear model; application to regression models, correlation model. Pr.: STAT 704, 705, 771; course in matrices. STAT-860-0-1702

STAT 861. Linear Models II. (3) II. Continued application of optimal inference procedures for the general linear model to multifactor analysis of variance, experimental design models, analysis of covariance,

split-plot models, repeated measures models, mixed models, and variance component models; multiple comparison procedures. Pr.: STAT 860. STAT-861-0-1702

STAT 870. Analysis of Messy Data. (3) II. Design structures; treatment structures; equal and unequal variances; multiple comparisons; unequal subclass numbers; missing cells; interpretation of interaction; variance components; mixed models; split-plot and repeated measures; analysis of covariance; cross-over designs. Pr.: STAT 720. STAT-870-0-1702

STAT 880. Time Series Analysis. (3) I, in odd years. Autocorrelation function; spectral density; autoregressive integrated moving average processes; seasonal time series; transfer function model; intervention analysis; regression model with time series error. Pr.: STAT 705 and 770. STAT-880-0-1702

STAT 898. Master's Report. (2) I, II, S. Pr.: Consent of instructor. STAT-898-4-1702

STAT 899. Master's Thesis Research. (Var.) I, II, S. Pr.: Consent of instructor. STAT-899-4-1702

STAT 918. Theory of Life-Data Analysis. (3) II, in even years. A study of models and inferential procedures important to life-data analysis. Comparison of estimators (MLE, BLUE, etc.). Pivotal quantities. Design and regression models for non-normal distributions. Analysis of censored data. Pr.: STAT 840 and 861. STAT-918-0-1702

STAT 920. Experimental Design Theory. (3) II, in odd years. Incomplete block designs; theory of the construction and analysis of experimental designs. Pr.: STAT 720 and 861. STAT-920-0-1702

STAT 925. Computational Statistics. (3) I, in odd years. Seminumerical and numerical methods used in computational statistics. Application areas include linear and nonlinear least squares methods, unconstrained and constrained nonlinear function optimization, robust estimation, and classical multivariate analysis. Emphasis on the most recent advances in these and other areas supported by computational statistics. Pr.: STAT 725 and 861. STAT-925-0-1702

STAT 930. Theory of Multivariate Analysis. (3) II, in odd years. The multivariate normal distribution, the Wishart distribution, Jacobians of vector and matrix transformations, Hotelling's T^2 -statistic, the union-intersection principle, tests on mean vectors and covariance matrices, Box's approximations to critical points, the multivariate general linear model, discriminant analysis, and principal component analysis. Pr.: STAT 730 and 861. STAT-930-0-1702

STAT 945. Problems in Statistical Consulting. (Var.) I, II, S. Principles and practices of statistical consulting. Supervised experience in consultation and consequent research concerning applied statistics and probability associated with on-campus investigations. Pr.: STAT 704, 705, and 771. STAT-945-2-1702

STAT 950. Advanced Studies in Probability and Statistics. (Var.) I, II, S. Theoretical studies of advanced topics in probability, decision theory, Markov processes, experimental design, stochastic processes, or advanced topics. May be repeated. Pr.: STAT 771. STAT-950-0-1702

STAT 990. Probability Theory. (3) I, in even years. Probability spaces and random variables; distribution functions; moments and inequalities; characteristic functions; stochastic independence; convergence of a sequence of distribution functions; the four types of convergence; convergence of the sum of independent random variables; laws of large number; central limit theorems; conditional expectations and martingales. Pr.: STAT 840 and MATH 722. STAT-990-0-1702

STAT 995. Advanced Inference I. (3) I. Statistical decision rules; utility, loss, and risk functions; Bayes and minimax analyses; admissibility, complete classes; sufficiency, completeness, unbiased estimation; equivariance, location-scale families; maximum likelihood estimation; information inequality. Pr.: STAT 771, MATH 721. STAT-995-0-1702

STAT 996. Advanced Inference II. (3) II. Neyman-Pearson lemma, monotone likelihood ratio, uniformly most powerful tests; confidence bounds; unbiasedness and invariance for hypothesis testing; sequential probability ratio tests. Pr.: STAT 995. STAT-996-0-1702

STAT 999. Research in Statistics. (Var.) I, II, S. Pr.: Consent of instructor. STAT-999-4-1702

Faculty

ADAMCHAK, DONALD J., Assoc. Prof. of Sociology (1978). BA 1973, Ohio U.; MA 1975, Western Kentucky U.; PhD 1978, Bowling Green St. U. (*)

ADAMS, DAVID L., Assoc. Prof. of Journalism; Dir., Student Publications (1981). BS 1969, Washburn U.; MS 1972, U. of Kansas; EdS 1977, Fort Hays St. U.; PhD 1984, Kansas 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, WILLIAM J., Asst. Prof. of Journalism and Mass Communications (1985). BA 1976, Brigham Young U.; MA 1980, Ball St. U.

AGOSTA, LUCIEN, Assoc. Prof. of English (1977). BA 1970, Louisiana St. U.; MA 1971, PhD 1977, U. of Texas. (*)

AKKINA, KRISHNA RAO, Assoc. Prof. of Economics (1972). BA 1963, U. of Andhra; MA 1965, Delhi School of Economics; PhD 1972, U. of Minnesota. (*)

AKTAS, YILDIRIM, Visiting Asst. Prof. of Physics (1987). PhD 1987, U. of Missouri-Columbia.

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. (*)

ALSOP, INEZ, Assoc. Prof. Emerita of History (1923). BS 1916, Emporia St. U.; MS 1920, U. of Kansas. (*)

AMBROSIUS, MARGERY, Asst. Prof. of Political Science (1986). BA 1964, MA 1967, U. of Illinois; MA 1984, PhD 1986, U. of Nebraska.

ANDERSON, CATHY L., Assoc. Prof. of Speech (1980). BA 1974, Lyndon St. Col.; MFA 1980, U. of Connecticut.

ANDERSON, PHILLIP D., Instr. of Speech (1980). MA 1966, Indiana U.

ANDRUS, LYNDA E., Instr. of Art (1983). MFA 1981, U. of Iowa.

ANSELL, 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. (*)

APLEGATE, ROBERTA G., Assoc. Prof. Emerita of Journalism and Mass Communications (1964). AB 1940, Michigan St. U.; MS 1942, Northwestern U.

ARMAGOST, JAMES L., Assoc. Prof. of Speech; American Ethnic Studies (1973). BA 1963, U. of California, Santa Barbara; MA 1972, PhD 1973, U. of Washington, Seattle. (*)

ASENETA, LYDIA, Assoc. Prof. of Speech (1967). BS 1949, MA 1958, The National Teachers' Col. of the Philippines; MA 1968, Kansas St. U.

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. (*)

BAKER, LYMAN A., JR., Instr. of English (1972). BA 1964, U. of Missouri; MA 1968, Stanford U.

BARAB, JACQUELINE E., Asst. Prof. of Mathematics (1982). BS 1971, Indiana U.; MS 1974, Georgia St. U.; PhD 1982, Indiana U. (*)

BARK, LAURENCE DEAN, Prof. of Physics; Climatologist, Agr. Exp. Sta. (1956). BS 1948, MS 1950, U. of Chicago; PhD 1954, Rutgers U. (*)

BARKER, DIANE, Instr. of English (1986). BA 1974, MA 1986, Kansas St. U.

BARKLEY, THEODORE M., Prof., Division of Biology; Curator of the Herbarium; Taxonomist, Agr. Exp. Sta. (1961). BS 1955, Kansas St. U.; MS 1957, Oregon St. U.; PhD 1960, Columbia U. (*)

BARNETT, MARK A., Prof. of Psychology (1975). BA 1971, PhD 1975, Northwestern U. (*)

BASHAM, EDWIN, Instr., Computing and Information Sciences (1976). BS 1946, U.S. Military Academy; MS 1959, Georgia Inst. of Tech.

BECHTEL, DONALD B., Adjunct Asst. Prof. of Biology; Research Biologist, Grain Marketing Research Center (1983). BS 1971, MS 1974, Iowa St. U.; PhD 1982, Kansas St. U.

BEDROSIAN, JANICE L., Assoc. Prof. of Speech (1982). MA 1976, U. of California at Santa Barbara; PhD 1981, U. of Wisconsin at Madison.

BEESON, MARGARET E., Assoc. Prof. of Modern Languages (1960). AB 1948, Wesleyan Col.; MA 1949, Emory U.; PhD 1954, U. of Texas. (*)

BEN-ITZHAK, ITZHAK, Research Assoc. Temp. (1986). PhD 1986, Technion, Israel.

BENSON, DOUGLAS K., Assoc. Prof. of Modern Languages (1980). BA 1966, New Mexico St. U.; MA 1968, PhD 1973, U. of New Mexico. (*)

BENSON, JANET, Assoc. Prof. of Anthropology; Women's Studies Faculty (1972). BA 1964, Arizona St.; MA 1969, PhD 1974, Brandeis U. (*)

BETTON, MATTHEW T., Teaching Assoc. of Music (1978). BA 1938, Kansas St. U.

BHALLA, CHANDER P., Prof. of Physics (1966). BS 1952, BSc 1954, MS 1955, Punjab U.; PhD 1960, U. of Tennessee. (*)

BIXLER, PHYLLIS, Prof. of English; Women's Studies Faculty (1978). BA 1961, Bluffton Col.; MA 1967, MPhil 1973, PhD 1977, U. of Kansas. (*)

BLEYBERG, MARIA, Asst. Prof. of Computing and Information Sciences (1986). MS 1960, U. of Bucharest; PhD 1982, U. of California, Los Angeles.

BODE, VERNON C., Prof. of Biology (1970). BS 1955, U. of Missouri; PhD 1962, U. of Illinois. (*)

BONSER, CURTIS S., Adjunct Clinical Assoc. (1984). BS 1963, Pennsylvania St. U.; DMD 1967, U. of Pennsylvania.

BONTRAGER, ROBERT D., Assoc. Prof. and Assoc. Head of Journalism and Mass Communications (1970). BA 1945, Taylor U.; STB 1948, New York Theological Seminary; BS 1950, Taylor U.; MA 1950, PhD 1969, Syracuse U. (*)

BOOKER, DOUGLAS M., Captain, U.S. Army, Asst. Prof. of Military Science (1986). BS 1978, Central Missouri St.; MS 1986, Troy St. U.

BOYER, JOHN E., JR., Assoc. Prof. of Statistics; Statistical Consultant, Agr. Exp. Sta. (1981). BS 1969, U. of Nebraska; MS 1972, PhD 1976, Michigan St. U. (*)

BREDE, RICHARD M., Asst. Prof. of Sociology (1971). BA 1962, MS 1964, U. of Oregon; PhD 1971, U. of Illinois. (*)

BRES, DANA B., Captain, U.S. Army, Asst. Prof. of Military Science (1986). BS 1977, U. of Nevada; MS 1986, The George Washington U.; Professional Engineer, 1982.

BROMLEY, KATHRYN M., Temp. Instr. of Speech (1986). BS 1973, U. of Illinois-Champaign; MA 1979, California St. U.-Northridge.

BRONDELL, WILLIAM JOHN, Assoc. Prof. of English (1964). AB 1959, MA 1964, PhD 1964, U. of Missouri. (*)

BROOKHART, CHARLES EDWARD, Prof. of Music and Education (1975). BM 1949, MM 1950, PhD 1960, George Peabody Col. (*)

BRYTTAN, ADRIAN, Asst. Prof. of Music (1985). BM 1971, MM 1973, MM 1974, Manhattan School of Music.

BULLER, LEROY G., Asst. Prof. of Journalism (1983). BS 1975, MS 1976, Kansas St. U.

BURCKEL, GLENNA F., Instr. of Modern Languages (1982). MA 1967, Boston U.

BURCKEL, ROBERT B., Prof. of Mathematics (1971). BS 1961, U. of Notre Dame; MA 1963, PhD 1968, Yale U. (*)

BURKHARD, RAYMOND KENNETH, Prof. of Biochemistry; Biochemist, Agr. Exp. Sta. (1950). AB 1947, Arizona St. Col.; PhD 1950, Northwestern U. (*)

BUSCH, RICHARD M., Asst. Prof. of Geology (1984). BA 1978, Franklin and Marshall Col.; MA 1981, Temple U.; PhD 1984, U. of Pittsburgh. (*)

BUSSING, CHARLES E., Assoc. Prof. of Geography (1964). BA 1959, Colorado St. Col.; MA 1961, U. of Colorado; PhD 1968, U. of Nebraska. (*)

BUSSING, SANDRA I., Instr. of English (1974). BA 1957, U. of Colorado.

CAINE, HOMER DODGE., Asst. Prof. Emeritus of Music (1966). BM 1940, Drake U.; MS 1957, Kansas St. U. (*)

CALHOUN, MYRON AMMON, Assoc. Prof. of Computing and Information Sciences (1971). AA 1961, Graceland Col.; BS 1963, U. of Kansas; MS 1964, Colorado St. U.; PhD 1967, Arizona St. U. (*)

CAMP, HENRY J., Assoc. Prof. of Sociology (1971). BS 1966, Illinois St. U.; MA 1969, PhD 1974, U. of Nebraska. (*)

CAMPBELL, JOSEPH K., Instr. of Computing and Information Sciences (1983). MS 1976, Kansas St. U.

CARDWELL, ALVIN BOYD, Prof. Emeritus of Physics (1936). BS 1925, DSc 1961, U. of Chattanooga; MS 1927, PhD 1930, U. of Wisconsin. (*)

CAREY, JAMES CHARLES, Prof. Emeritus of History (1948). BA 1937, Nebraska St. Teachers Col. (Wayne); MA 1940, PhD 1948, U. of Colorado. (*)

CARNES, KEVIN, Assoc. Research Physicist (1984). PhD 1984, Purdue U.

CARPENTER, WILLIAM E., Assoc. Dean and Prof. of English (1973). BA 1960, Centenary Col.; PhD 1967, U. of Kansas. (*)

CENTER, MELVIN S., Assoc. Prof. of Biology (1970). BS 1962, U. of Georgia; MS 1964, PhD 1967, Medical Col. of Georgia. (*)

CHALMERS, JOHN, Prof. Emeritus of Economics (1963). AB 1938, Middlebury Col.; PhD 1943, Cornell U. (*)

CHANG, YANG-MING, Asst. Prof. of Economics (1984). MA 1978, Nat. Taiwan U., Taipei; PhD 1984, SUNY, Buffalo. (*)

CHAPES, STEPHEN K., Asst. Prof. of Biology; Immunologist, Agr. Exp. Sta. (1984). BS 1975, MS 1978, PhD 1981, U. of Illinois. (*)

CHAPIN, ERNEST KNIGHT, Assoc. Prof. Emeritus of Physics (1923). AB 1918, MS 1923, U. of Michigan. (*)

CHAUDHURI, SAMBHUDAS, Prof. of Geology (1966). BS 1956, Calcutta U., India; MS 1958, Jadavpur U., India; MS 1961, Indiana U.; PhD 1966, Ohio St. U. (*)

CHELIKOWSKY, JOSEPH RUDOLPH, Prof. Emeritus of Geology (1937). BA 1931, MA 1932, PhD 1935, Cornell U. (*)

CHERMAK, ANDREW, Assoc. Prof. of Mathematics (1982). AB 1971, PhD 1975, Rutgers U.

CHRISTIE, DEBORAH, Instr., Physical Education and Leisure Studies (1984). BA 1976, Kansas Wesleyan; MS 1984, Kansas St. U.

CLARK, DOUGLAS F., MAJ, U.S. Army; Asst. Prof. of Military Science (1984). BS 1972, U.S. Military Academy; MS 1979, Clemson U.

CLARK, GEORGE R. II, Prof. of Geology (1977). AB 1961, Cornell U.; MS 1966, PhD 1969, Caltech. (*)

CLARK, JANE C., Instr. of English (1974). BS 1951, Kansas St. U.

CLARK, MARCELLA P., Instr. of English (1985). BA 1982, Union Col.; MA 1985, Kansas St. U.

CLARK, STEPHEN L., Captain, U.S. Army, Asst. Prof. of Military Science (1987). BS 1975, MS 1977, Kansas St. U.

CLEGG, ROBERT E., Prof. Emeritus of Biochemistry (1948). BS 1936, Rhode Island St. Col.; MS 1939, North Carolina St. Col.; PhD 1948, Iowa St. U. (*)

CLELAND, MARJORIE V., Instr.; Asst. to the Dean (1970). BA 1968, MS 1970, Kansas St. U.

CLIFT, GARY W., Instr. of English (1983). MA 1980, Kansas St. U.

CLINTON, WILLIAM D., Asst. Prof. of Political Science (1983). MA 1978, U. of Virginia.

CLORE, ROBERT ALVIN, Asst. Prof. of Art (1970). AA 1966, Casper Col.; BA 1968, MA 1970, U. of Northern Colorado; MFA 1977, U. of Kansas.

COCHRAN, ALFRED W., Asst. Prof. of Music (1979). BME 1972, Memphis St. U.; MM 1975, Catholic U. (*)

COCHRAN, MARY LEE, Asst. Instr. of Music (1984). BME 1977, MM 1979, DMA 1984, Catholic U.

COCHRANE, TODD E., Asst. Prof. of Mathematics (1984). BS 1978, Harvey Mudd Col.; PhD 1984, U. of Michigan. (*)

COCKE, CHARLES L., Prof. of Physics (1969). AB 1962, Haverford Col.; PhD 1967, California Inst. of Tech. (*)

COCKE, ENID O., Dir. of English Language Program (1983). BA 1967, Scripps Col.; MA 1982, Kansas St. U.

COHEN, PETER Z., Assoc. Prof. of English (1961). BS 1953, MA 1961, U. of Wyoming.

COLE, MICHAEL W., Instr. of Computing and Information Sciences (1984). BS 1965, Utah St. U.

COLEMAN, MARGARET, Instr. (1987). BS 1978, U. of Wisconsin at LaCrosse; MS 1981, Eastern Kentucky U.

CONRAD, GARY W., Prof. of Biology (1970). BS 1963, Union Col.; MS 1965, PhD 1968, Yale U. (*)

CONROW, KENNETH, Assoc. Prof. of Computing and Information Sciences; Assoc. Dir. of Computing Activities (1961). BA 1954, Swarthmore Col.; PhD 1957, U. of Illinois. (*)

CONROW, MARGARET E., Assoc. Prof. of English (1964). BA 1954, Swarthmore Col.; MA 1955, PhD 1962, U. of Illinois. (*)

CONSIGLI, RICHARD ALBERT, Dist. Prof. of Biology; Virologist, Agr. Exp. Sta. (1963). BS 1954, Brooklyn Col.; MA 1956, PhD 1960, U. of Kansas. (*)

COOK, GIOVANNA T., Instr. of Modern Languages (1980). BA 1977, MA 1982, Kansas St. U.

COOPER, JEAN, Adjunct Clinical Instr. of Medical Technology (1984). BS 1969, Central Missouri St. U.; MPA 1979, U. of Missouri, K.C.

COPELAND, JAMES L., Prof. and Assoc. Head of Chemistry (1962). BS 1952, U. of Illinois; PhD 1962, Indiana U. (*)

CORUM, ROBERT T., Assoc. Prof. of Modern Languages (1977). BA 1969, Old Dominion Col.; MA 1971, PhD 1975, U. of Virginia. (*)

COWAN, THADDEUS M., Prof. of Psychology (1970). BA 1957, Centre Col. of Kentucky; MS 1959, PhD 1964, U. of Connecticut. (*)

COX, DAVID J., Prof. and Head of Biochemistry; Biochemist, Agr. Exp. Sta. (1973). BA 1956, Wesleyan U.; PhD 1960, U. of Pennsylvania. (*)

CRAMER, CARL, Instr. of Physical Education and Leisure Studies; Head Trainer, Intercollegiate Athletics (1982). BA 1976, Augsburg Col.; MED 1982, U. of Wisconsin-Superior.

CRAWFORD, FRANCIS W., Assoc. Prof. Emeritus of Physics (1960). AB 1924, Phillips U.; MS 1929, U. of Oklahoma. (*)

CRAWFORD, GOLDA M., Assoc. Prof. Emerita of History (1946). BS 1928, MS 1940, Kansas St. U.; PhD 1963, Syracuse U. (*)

CULLERS, ROBERT L., Prof. of Geology (1971). BS 1959, MA in Chemistry 1962, Indiana U.; PhD 1971, U. of Wisconsin. (*)

CULLEY, LOUANN F., Assoc. Prof. of Art; Women's Studies Faculty (1971). BFA 1957, MA 1967, U. of New Mexico; PhD 1975, Stanford U. (*)

CUNNINGHAM, BRYCE A., Assoc. Prof. of Biochemistry (1963). BA 1955, BS 1958, PhD 1963, U. of Minnesota. Adj. appt. (*)

CURNUTTE, BASIL, JR., Prof. and Assoc. Head of Physics (1954). BS 1945, U.S. Naval Academy; PhD 1953, Ohio St. U. (*)

CURTIS, W. D., Prof. of Mathematics (1970). BA 1966, U. of Florida; PhD 1970, U. of Massachusetts. (*)

DAHL, CHARLOTTE L., Instr. of English (1986). BS 1952, Kansas St. U.

DALE, BETTIE M., Advisor; Dean's Office, Arts and Sciences (1964). BS 1946, Baylor; MS 1951, PhD 1954, Ohio St. U.

DALE, E. BROCK, Prof. of Physics (1957). BS 1940, MS 1944, U. of Oklahoma; PhD 1953, Ohio St. U. (*)

DALY, JOHN C. K., Asst. Prof. of History (1987). BA 1973, Northwestern U.; MPhil 1975, PhD 1986, London U.

DALY, ROBERT K., Assoc. Prof. of Journalism and Mass Communications (1973). AB 1967, Marquette U.; MA 1973, Sangamon St. U.

DANIELS, MARK R., Assoc. Prof. of Political Science (1985). BA 1973, Valparaiso U.; MA 1975, So. Illinois U. at Carbondale; PhD 1979, U. of Georgia. (*)

DAVIS, EARLE ROSCO, Prof. Emeritus of English (1949). AB 1927, BM 1929, Monmouth Col.; MA 1928, U. of Illinois; PhD 1935, Princeton U. (*)

DAVIS, LAWRENCE CLARK, Prof. of Biochemistry; Biochemist, Agr. Exp. Sta. (1975). BS 1966, Haverford Col.; PhD 1970, Yeshiva U. (*)

DeCOU, DONALD FRANK, Assoc. Prof. Emeritus of Economics (1947). BS 1929, Pittsburg St. U.; MBA 1934, Northwestern U.; 1966, U. of Wisconsin. (*)

DEES, JEROME STEELE, Prof. of English (1976). BA 1958, Catawaba Col.; MA 1961, Florida St. U.; PhD 1968, U. of Illinois, Urbana. (*)

DEHON, CLAIRE LOUISE, Assoc. Prof. of Modern Languages (1972). BA 1962, Royal Art Inst. of Brussels; MA 1964, MA 1969, MPhil 1971, PhD 1973, U. of Kansas. (*)

DEB, N. C., Research Assoc. Temp. (1986). PhD 1986, Jadavpur U., India.

DE LA PEDRAJA, BEATRIZ, Instr. of Modern Languages (1987). MAT 1975, U. of Chicago.

DELGADO, ALBERTO L., Asst. Prof. of Mathematics (1984). BA 1977, U. of Southern California; PhD 1981, U. of California.

DENELL, ROBIN, Prof. of Biology (1972). BA 1965, U. of California; MA 1968, PhD 1969, U. of Texas. (*)

DENNING, NANCY R., Instr. of English (1984). MA 1979, Kansas St. U.

DePAOLA, BRETT DAVID, Asst. Prof. of Physics (1986). BA 1973, MS 1979, Miami U.; PhD 1984, U. of Texas, Dallas.

DILLON, JANET K., Instr. of English (1986). BSF 1970, Emporia St. U.; MSF 1982, Kansas St. U.

DIXON, LYLE J., Prof. of Mathematics (1963). BS 1948, MS 1950, Oklahoma St. U.; PhD 1963, U. of Kansas. (*)

DOLLAR, DIANE A., Asst. Prof. (1976). BS 1955, MA 1967, Kansas St. U.; MFA 1986, U. of Kansas.

DONAGHY, HENRY J., Prof. of English (1983). AB 1954, Stonehill Col.; MA 1960, Fordham U.; PhD 1966, New York U. (*)

DONNELLY, MICHAEL L., Assoc. Prof. of English (1972). AB 1963, Harvard Col.; PhD 1970, Harvard U. (*)

DONOVAN, ROBERT KENT, Assoc. Prof. of History (1964). BA 1954, Harvard U.; BA 1958, MA 1963, Cambridge U.; PhD 1965, Harvard U. (*)

DOVETON, JOHN D., Adjunct Prof. of Geology (1982). PhD 1970, U. of Edinburgh, Scotland.

DOWNNEY, RONALD G., Prof. of Psychology; Dir., Educational Research, Planning, and Evaluation Services (1975). BA 1966, U. of Texas; MA 1968, PhD 1971, Temple U. (*)

DRAGSDORF, R. DEAN, Prof. of Physics (1948). BS 1944, PhD 1948, Massachusetts Inst. of Tech. (*)

DREESE, LYNN S., Asst. Instr. of Biology (1983). MS 1982, Kansas St. U.

DRESSLER, ROBERT E., Prof. of Mathematics (1970). BA 1965, U. of Rochester; MA 1966, PhD 1969, U. of Oregon. (*)

DRISS, ANN, Instr. of Modern Languages (1967). AB 1952, Washburn U.; MS 1966, Emporia St. U.

DUSHKIN, LELAH, Assoc. Prof. of Sociology (1968). AB 1953, Smith Col.; MA 1957, PhD 1974, U. of Pennsylvania. (*)

DZEWALTOWSKI, DAVID, Asst. Prof. of Physical Education and Leisure Studies (1987). BA 1987, U. of Iowa; MS 1985, West Virginia U.; PhD 1987, U. of Iowa.

EDWARDS, JENNIFER R., Asst. Instr. of Music (1973). BA 1967, Austin St. Col.; MA 1970, U. of Oregon.

EDWARDS, ROBERT L., Prof. of Music (1972). BM 1961, MM 1963, Wichita St.; DMA 1972, U. of Oregon. (*)

EITNER, WALTER H., Prof. of English (1954). AB 1948, U. of Denver; AM 1949, U. of Michigan; PhD 1959, U. of Denver. (*)

ELLSWORTH, LOUIS DANIEL, Prof. Emeritus of Physics (1946). BS 1937, Case Inst. of Tech.; MS 1938, PhD 1941, Ohio St. U. (*)

EMERSON, M. JARVIN, Prof. and Head of Economics; Economist, Agr. Exp. St. (1962). BA 1957, Luther Col.; MA 1960, PhD 1963, U. of Iowa. (*)

EVANS, JOHN D., LTC, U.S. Army; Prof. of Military Science (1985). BS 1976, Kansas St. U.; MS 1983, Florida Inst. of Tech.

EVANS, THOMAS MARION, Prof. Emeritus of Health, Physical Education, and Recreation (1942). BS 1930, Kansas St. U.; MS 1942, U. of Michigan; PDir 1958, Indiana U. (*)

EXDELL, JOHN B., Assoc. Prof. of Philosophy (1972). BA 1967, Dickinson Col.; PhD 1973, U. of Texas at Austin. (*)

FATELEY, WILLIAM G., Prof. of Chemistry (1972). AB 1951, Franklin Col.; PhD 1956, Kansas St. U. (*)

FEDDER, NORMAN J., Prof. of Speech (1970). BA 1955, Brooklyn Col.; MA 1956, Columbia U.; PhD 1962, New York U. (*)

FERGUSON, CLYDE RANDOLPH, Assoc. Prof. of History (1960). BA 1955, U. of Oklahoma; MA 1957, PhD 1960, Duke U. (*)

FEYERHARM, WILLIAM R., Assoc. Dean; Assoc. Prof. (1979). AB 1959, Carleton Col.; MA 1964, PhD 1971, U. of Wisconsin.

FEYERHERM, ARLIN M., Prof. of Statistics; Statistical Consultant, Agr. Exp. Sta. (1953). BS 1946, U. of Minnesota; MS 1948, U. of Iowa; PhD 1952, Iowa St. U. (*)

FINA, LOUIS R., Prof. of Biology; Microbiologist, Agr. Exp. Sta. (1954). AB 1942, MS 1948, PhD 1950, U. of Illinois. (*)

FINCK, STANLEY G., Asst. Prof. of Music (1983). BM 1962, U. of Iowa; MME 1965, U. of Arkansas; MA 1971, North Texas St. U.

FINNEGAN, MICHAEL, Prof. of Anthropology (1973). BA 1967, MA 1970, PhD 1972, U. of Colorado. (*)

FISHER, CARL D., Asst. Prof. of Military Science (1985). BS 1977, U. of Kansas.

FITCH, GREGORY K., Asst. Instr. of Biology (1982). MS 1982, Kansas St. U.

FITZGERALD, DONALD M., Visiting Prof. of Journalism (1984). BA 1942, U. of Kansas.

FLANAGAN, BRUCE, Prof. of Speech (1966). BS 1953, Western Michigan U.; MS 1958, Southern Illinois U.; PhD 1966, U. of Florida. (*)

FLORA, CORNELIA BUTLER, Prof. of Sociology; Rural Sociologist; Women's Studies Faculty (1970). BA 1965, U. of California; MS 1966, PhD 1970, Cornell U. (*)

FLORA, JAN L., Prof. of Sociology; Rural Sociologist, Agr. Exp. Sta.; Women's Studies Faculty (1970). BA 1964, U. of Kansas; MS 1967, PhD 1971, Cornell U. (*)

FLORES, SANDRA A., Instr. of English (1986). BS 1972, MA 1978, Iowa St. U.

FLOUER, JACK, Prof. and Acting Head of Music (1971). BA 1960, Marshall U.; MM 1962, Eastman School of Music; DM 1971, Indiana U. (*)

FOLLAND, NATHAN O., Prof. of Physics (1966). BA 1959, Concordia Col.; PhD 1965, Iowa St. U. (*)

FORTNER, GEORGE W., Asst. Prof. of Biology; Immunologist, Agr. Exp. Sta. (1979). BS 1961, Wayne St. U.; PhD 1973, U. of Tennessee. (*)

FRAHM, ROBERT L., Adjunct Clinical Instr. of Med. Tech. (1976). BM 1958, Bethany Col.

FRANKE, JAMES L., Assoc. Prof. of Political Science (1984). BS 1972, Bradley U.; MA 1974, PhD 1979, N. Illinois U. (*)

FRAZIER, EVELYN M., Instr. of English (1984). MA 1970, Kansas St. U.

FREELAND, GLORIA B., Asst. Prof. of Journalism; Asst. Dir. of Student Publications (1983). BA 1975, MBA 1983, Kansas St. U.

FREY, MARSHA L., Prof. of History (1973). BA and BSc in Educ. 1967, MA 1968, PhD 1971, Ohio St. U. (*)

FREY, R. SCOTT, Assoc. Prof. of Sociology; Agr. Exp. Sta. (1985). BS 1973, NW Missouri St. U.; MA 1976, Drake U.; PhD 1980, Colorado St. U. (*)

FRIEDMANN, EUGENE A., Prof. Emeritus of Sociology (1965). AB 1947, MA 1949, PhD 1953, U. of Chicago. (*)

FRIEMAN, JEROME, Prof. of Psychology (1968). BA 1963, MS 1965, Western Reserve U.; PhD 1969, Kent St. U. (*)

FRY, ROBERT, Assoc. Prof. of Chemistry (1977). BS 1971, U. of Illinois; PhD 1977, U. of Arizona. (*)

FRYER, HOLLY CLAIRE, Prof. Emeritus of Statistics (1940). BS 1931, U. of Oregon; MS 1933, Oregon St. U.; PhD 1940, Iowa St. U. (*)

FULLAGAR, CLIVE J. A., Asst. Prof. of Psychology (1988). BA 1977, MA 1981, PhD 1986, U. of Witwatersrand. (*)

FULLER, LEONARD E., Prof. Emeritus of Mathematics (1952). BA 1941, U. of Wyoming; MS 1947, PhD 1950, U. of Wisconsin. (*)

FUNK, ANNETTE M., Instr. of Music (1984). BA 1982, Tabor Col.; MM 1984, Wichita St. U.

FUNKHOUSER, SARA, Assoc. Prof. of Music (1976). BM 1974, MM 1975, DM 1981, U. of Missouri, Kansas City. (*)

GALLAGHER, TOM L., Dir., Computing Activities; Assoc. Prof. of Computing and Information Sciences (1970). BA 1953, MS 1954, North Texas St. Col.; DSc 1967, Washington U. (*)

GARAVITO, C. LUCIA, Asst. Prof. of Modern Languages (1986). BA 1974, Universidad Pedagogica Nacional, Bogota, Colombia; MA 1979, PhD 1982, U. of Kansas.

GARG, LALIT C., Research Assoc. of Biochemistry (1982). PhD 1980, U. of Jawahara, India.

GARZIO, ANGELO C., Prof. of Art (1957). BA 1949, BS 1949, Syracuse U.; Diploma di Profitto, 1950, U. of Florence, Italy; MA 1954, MFA 1955, St. U. of Iowa. (*)

GEISSLER, WINNIFRED J., Assoc. Prof. of English (1954). B Music Ed 1940, Bethany Col.; MS 1954, PhD 1976, Kansas St. U.

GEYER, KATHERINE, Prof. Emerita of Physical Education, Dance, and Leisure Studies (1927). BS 1927, Ohio St. U.; MA 1934, Columbia U. (*)

GIBBONS, JACQUE E., Asst. Prof. and Dir. of Social Work Program (1982). BA 1968, U. of Kansas; MSW 1973, PhD 1981, Washington U.-St. Louis.

GILLESPIE, VINCENT E., Assoc. Prof. of English (1966). BA 1952, Sterling Col.; MA 1956, PhD 1970, U. of Kansas.

GLENN, ESTHER BEACHEL, Asst. Prof. Emerita of English (1948). AB 1930, Kansas Wesleyan U.; MS 1938, Kansas St. U. (*)

GOODRICH, ARTHUR LEONARD, Prof. Emeritus of Biology (1929). BS 1928, Col. of Idaho; MS 1929, U. of Idaho; PhD 1938, Cornell U. (*)

GORMELY, PATRICK JOSEPH, Assoc. Prof. of Economics (1967). AB 1963, Catholic U. of America; PhD 1967, Duke U. (*)

GOULDEN, NANCY, Instr. of Speech (1985). BS 1957, Kansas Teacher's Col.; MA 1981, Villanova U.

GRAF, JOSEPH L., Assoc. Prof. and Head of Geology (1980). BA 1968, Columbia U.; MPhil 1972, PhD 1975, Yale U. (*)

GRAHAM, ROBIN S., MAJ, U.S. Army; Asst. Prof. of Military Science (1985). BS 1965, Marietta Col.; MS 1967, Emory U.

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GRAY, TOM J., Prof. of Physics (1977). BS 1960, MS 1962, North Texas St. U.; PhD 1967, Florida St. U. (*)

GREECHIE, RICHARD J. Prof. of Mathematics (1967). BS 1962, Boston Col.; PhD 1966, U. of Florida. (*)

GRIFFIN, CHARLES, Asst. Prof. of Speech (1984). BA 1975, Northwestern U.; MA 1980, PhD 1983, U. of Missouri. (*)

GRIFFITT, WILLIAM B., Prof. of Psychology (1968). BA 1964, Kansas St. U.; PhD 1967, U. of Texas. (*)

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HAMMAKER, ROBERT M., Prof. of Chemistry (1961). BS 1956, Trinity Col.; PhD 1960, Northwestern U. (*)

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HAWKINSON, CAROL L., Instr. of Mathematics (1982). BS 1960, MS 1967, Kansas St. U.

HAWLEY, M. DALE, Prof. of Chemistry (1966). BA 1960, MA 1962, U. of Northern Iowa; PhD 1965, U. of Kansas. (*)

HEDGCOTH, CHARLIE, JR., Prof. of Biochemistry; Biochemist, Agr. Exp. Sta. (1965). BS 1961, PhD 1965, U. of Texas. (*)

HEDRICK, DONALD K., Prof. of English (1976). BA 1969, U. of Kansas; MA 1972, PhD 1974, Cornell U. (*)

HELLER, STEVE F., Assoc. Prof. of English (1981). BA 1971, MS 1976, EdD 1978, Oklahoma St. U.; MFA 1981, Bowling Green St. U. (*)

HERMAN, LOUIS M., Assoc. Prof. of Mathematics (1970). BA 1963, MS 1965, U. of Florida; PhD 1970, U. of Massachusetts. (*)

HENRY, DAVID H., Asst. Prof. of Statistics (1983). BS 1979, U. of Pittsburgh; PhD 1983, Stanford U.

HIGGINS, JAMES J., Prof. of Statistics; Consultant, Ag. Exp. Sta. (1980). BS 1965, U. of Illinois; MS 1967, Illinois St. U.; PhD 1970, U. of Missouri-Columbia. (*)

HIGGINSON, FRED H., Prof. Emeritus of English (1950). AB 1942, MA 1947, U. of Wichita; PhD 1953, U. of Minnesota. (*)

HIGHAM, BARBARA C., Instr. in Economics (1974). BA 1948, Mt. Holyoke; MA 1950, Columbia U.

HIGHAM, ROBIN, Prof. of History (1963). AB 1950, Harvard Col.; MA 1953, Claremont Grad. School; PhD 1957, Harvard U. (*)

HILL, OPAL BROWN, Assoc. Prof. Emerita of Art (1944). BS 1944, MS 1950, Kansas St. U. (*)

HILL, RANDALL CONRAD, Prof. Emeritus of Sociology (1929). BS 1924, MS 1927, Kansas St. U.; PhD 1929, U. of Missouri. (*)

HINRICHS, CARL, Assoc. Prof. of Speech (1964). AB 1959, MA 1960, U. of North Carolina. (*)

HIRSCHMANN, DAVID, Assoc. Prof. of Political Science (1984). BA 1967, MA 1969, PhD 1979, U. of Witwatersrand, Johannesburg, S. Africa. (*)

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HOLDEN, JONATHAN, Prof. of English (1978). BA 1963, Oberlin Col.; MA 1970, San Francisco St. Col.; PhD 1974, U. of Colorado. (*)

HOLSTEAD, CAROL E., Instr. of Speech (1984). BA 1980, Kansas St. U.

HOLT, DONALD N., Assoc. Prof. of Journalism and Mass Communications (1974). BA 1950, U. of Colorado; MS 1970, U. of Wisconsin.

HOOK, PATRICIA W., Instr. of Biology (1970). BA 1963, MS 1965, Kansas St. U.; PhD 1970, Oregon St. U.

HOWE, F. VIRGINIA, Prof. Emerita of Journalism (1952). EdD 1958, Boston U.

HUA, DUY, Asst. Prof. of Chemistry (1982). BS 1976, Kyoto U., Japan; PhD 1979, Southern Illinois U. at Carbondale. (*)

HULA, DAVID G., Instr. of Economics (1985). BS 1977, U. of Nebraska; MS 1979, PhD 1982, U. of Wisconsin.

HUNTER, I. ROY, Asst. Prof. (1986). BS 1978, Utah St. U.; MS 1980, U. of Kentucky; PhD 1982, U. of Maryland.

IANDOLO, JOHN J., Prof. of Biology; Microbiologist, Agr. Exp. Sta. (1967). BS 1961, Loyola U., Chicago; MS 1963, PhD 1965, U. of Illinois. (*)

IKEDA, YOSHIRO, Assoc. Prof. of Art (1978). BS 1970, Portland St. U.; Research Art Certificate 1973, Kyota U. of Fine Arts; MFA 1977, U. of California, Santa Barbara. (*)

ISENHOOR, THOMAS L., Dean and Prof. of Chemistry (1987). BS 1961, U. of North Carolina; PhD 1965, Cornell U. (*)

JACKSON, T. HANLEY, Prof. of Music (1968). BA 1965, San Fernando Valley St. Col.; MA 1968, California St. Col. at Long Beach. (*)

JACOBS, DAVID S., Adjunct Clinical Assoc. of Med. Tech. (1976). BS 1953, MD 1956, U. of Michigan.

JAIN, ASHOK, Assoc. Research Physicist (1986). PhD 1983, Queen's U. of Belfast.

JENNINGS, KENNETH W., Adjunct Clinical Instr. of Medical Technology (1980). BS 1966, Fort Hays St. U.; Cert. in Med. Tech. 1966, Lattimore-Fink School of Med. Tech.; MS 1978, Kansas St. U.

JOHNSON, DALLAS E., Prof. of Statistics; Consultant, Agr. Exp. Sta. (1975). BS 1960, Kearney St. Col.; MA 1966, Western Michigan U.; PhD 1970, Colorado St. U. (*)

JOHNSON, GEORGE DANA, Assoc. Prof. Emeritus of Chemistry (1952). AB 1940, MA 1941, Oberlin Col.; PhD 1946, U. of Michigan. (*)

JOHNSON, LUCIA, Adjunct Clinical Instr. of Medical Technology (1985). BS 1974, Kansas St. U.; MA 1984, U. of Missouri.

JOHNSON, ROBERT E., Assoc. Prof. of Physical Education and Leisure Studies (1977). BA 1951, Transylvania U.; MA 1969, Georgetown U.; PhD 1975, Ohio U. (*)

JOHNSON, TERRY C., Prof. and Dir. of Biology; Microbiologist, Agr. Exp. Sta. (1977). BS 1958, Hamline U.; MS 1961, PhD 1964, U. of Minnesota. (*)

JOHNSTON, KENNETH GORDON, Prof. of English (1966). BA 1948, U. of California at Berkeley; MA 1951, U. of California at Los Angeles; PhD 1966, U. of Minnesota. (*)

JONES, DALE VINCENT, Assoc. Prof. Emeritus of English (1946). BS 1931, MS 1941, Kansas St. U. (*)

JONES, KENNETH W., Prof. of History (1965). AB 1958, MA 1959, PhD 1966, U. of California. (*)

KAHLICH, LUKE, Assoc. Prof. of Dance (1980). BA 1971, MA 1975, Texas Tech U.

KAISER, MARVIN, Assoc. Prof. and Head of Sociology, Anthropology, and Social Work (1977). BA 1961, Cardinal Glennon Col.; MA 1963, Kansas St. U.; MSW 1977, U. of Kansas; PhD 1979, U. of Nebraska. (*)

KAMBER, EMANUEL, Research Assoc. Temp. of Physics (1985). PhD 1983, U. College, London.

KARIM, K. R., Research Assoc. of Physics (1985). BS 1982, MS 1984, U. of Oregon.

KAUFMAN, BURTON I., Prof. of History (1973). BA 1962, Brandeis U.; MA 1964, PhD 1966, Rice U. (*)

KAUFMAN, DONALD W., Assoc. Prof. of Biology; Wildlife Ecologist, Agr. Exp. Sta. (1980). BS 1965, MS 1967, Fort Hays St. U.; PhD 1972, U. of Georgia. (*)

KAY, KENNETH G., Prof. of Chemistry (1971). BS 1965, MS 1965, Polytechnic Inst. of Brooklyn; PhD 1970, The Johns Hopkins U. (*)

KEISER, GEORGE R., Prof. of English (1973). BA 1962, MA 1964, PhD 1971, Lehigh U. (*)

KELLSTROM, MARTHA, Instr. (1987). BS 1953, MS 1983, PhD 1985, Kansas St. U.

KEMP, KENNETH E., Prof. of Statistics; Consultant, Agr. Exp. Sta. (1968). BS 1963, MS 1965, PhD 1967, Michigan St. U. (*)

KIEFER, STEPHEN W., Assoc. Prof. of Psychology (1982). BA 1973, Washington U., St. Louis; MA 1975, PhD 1978, Arizona St. U. (*)

KILLIAN, PATRICIA G., Instr. in English (1983). BA 1972, Pittsburg St. U.

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KLABUNDE, KENNETH J., Prof. of Chemistry (1979). BS 1965, Augustana Col.; PhD 1969, U. of Iowa. (*)

KLOPFENSTEIN, WILLIAM E., Prof. of Biochemistry; Biochemist, Agr. Exp. Sta. (1964). BS 1958, MS 1961, PhD 1964, Pennsylvania St. U. (*)

KNAPP, ALAN, Asst. Prof. of Biology (1988). BS 1978, Idaho St. U.; MS 1981, PhD 1985, U. of Wyoming.

KNIGHT, PATRICK A., Assoc. Prof. of Psychology (1980). BS 1976, Michigan St. U.; MS 1979, PhD 1981, Purdue U. (*)

KOCH, PAUL D., Assoc. Prof. of Economics (1981). BA 1977, Wartburg Col.; PhD 1980, Michigan St. U. (*)

KOCH, WILLIAM E., Assoc. Prof. Emeritus of English (1946). BS 1938, North Dakota St. Teachers Col.; MS 1949, Kansas St. U. (*)

KOEPPE, OWEN J., Prof. of Biochemistry (1980). AB 1949, Hope Col.; MS 1951, PhD 1953, U. of Illinois. (*)

KOLONOSKY, PATRICIA A., Instr. of English (1983). MA 1977, Kansas St. U.

KOLONOSKY, WALTER F., Assoc. Prof. of Modern Languages (1973). BA 1963, Lycoming Col.; MA 1965, U. of Pennsylvania; PhD 1972, U. of Kansas. (*)

KRAEMER, ROBERT, Asst. Prof. (1987). BA 1985, MEd 1980, PhD 1985, U. of Arkansas.

KRAMER, CHARLES LAWRENCE, Prof. of Biology; Mycologist, Agr. Exp. Sta.; Adjunct Prof. of Plant Pathology (1958). AB 1950, MA 1953, PhD 1957, U. of Kansas. (*)

KRAMER, KARL J., Prof. of Biochemistry; Research Chemist, Grain Marketing Research Center (1974). BS 1964, Purdue U.; PhD 1971, U. of Arizona Adjunct appt. (*)

KRAMER, VIRGINIA R., Instr. of Modern Languages (1984). PhD 1978, Kansas St. U.

KREN, GEORGE M., Prof. of History (1965). BA 1948, Colby Col.; MA 1949, PhD 1960, U. of Wisconsin. (*)

KREN, MARGO, Asst. Prof. of Art (1971). BS 1966, U. of Wisconsin; MA 1969, Kansas St. U.; MFA 1979, U. of Iowa. (*)

KRISHNAMOORTHY, RAMASWA, Asst. Prof. of Biochemistry; Asst. Biochemist, Agr. Exp. Sta. (1986). BS 1973, MS 1975, U. of Madras; PhD 1983, U. of California, Davis. (*)

KROMM, DAVID E., Prof. of Geography (1967). BS 1960, Eastern Michigan U.; MA 1964, PhD 1967, Michigan St. U. (*)

KRUH, ROBERT F., Dean of Grad. School; Prof. of Chemistry (1967). AB 1948, PhD 1951, Washington U., St. Louis. (*)

KUNDIGER, MARION S., Instr. of Biology (1978). BS 1942, U. of Wisconsin; BS 1964, MS 1970, Kansas St. U.

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LAMBERT, JACK L., Prof. Emeritus of Chemistry (1950). AB 1947, MS 1947, Pittsburg St. U.; PhD 1950, Oklahoma St. U. (*)

LANGENKAMP, JERRY REESE, Prof. of Music (1970). BM 1953, U. of Oklahoma; MM 1958, DMA 1970, U. of Michigan. (*)

LANGFORD, ROY CLINTON, Prof. Emeritus of Psychology (1925). BS 1925, MS 1926, Kansas St. U.; PhD 1934, Leland Stanford Jr. U. (*)

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LARMER, OSCAR VANCE, Prof. of Art (1950). BFA 1949, U. of Kansas; MFA 1955, Wichita U. (*)

LASH, MENDEL ELMER, Prof. Emeritus of Chemistry (1922). AB 1920, MS 1922, PhD 1928, Ohio St. U. (*)

LASHBROOK, RALPH RICHARD, Prof. and Head Emeritus, Department of Journalism (1934). BS 1929, Kansas St. U.; MS 1942, U. of Wisconsin. (*)

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LOCKHART, CHARLES HOWARD, Assoc. Prof. Emeritus of Biology (1940). BS 1934, MS 1938, Kansas St. U. (*)

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McCARTHY, PAUL E., Prof. of English (1967). BA 1948, MFA 1951, St. U. of Iowa; PhD 1962, U. of Texas. (*)

McCONNELL, DAVID A., Asst. Prof. of Geology (1987). BSc 1981, Queen's U., Belfast; MS 1983, Oklahoma St. U.; PhD 1987, Texas A & M.

McCRACKEN, ELIZABETH UNGER, Assoc. Prof. Emerita of Biology (1938). AB 1929, MA 1932, Wellesley Col.; PhD 1937, U. of California. (*)

McCULLOH, JOHN M., Prof. and Head of History (1973). BA 1965, Kansas U.; MA 1966, PhD 1971, U. of California, Berkeley. (*)

McDONALD, RICHARD N., Prof. of Chemistry (1960). BS 1954, MS 1955, Wayne St. U.; PhD 1956, U. of Washington. (*)

McELROY, MARY A., Assoc. Prof. of Physical Education and Leisure Studies; Women's Studies Faculty (1978). BA 1974, Queens Col., New York; MA 1975, Ohio St. U.; PhD 1978, U. of Maryland. (*)

McFARLIN, BILL, Teaching Assoc. of Music (1985). BM 1981, Berklee Col. of Music.

McGHEE, RICHARD D., Prof. of English (1967). BA 1962, U. of Missouri at Kansas City; MA 1964, PhD 1967, U. of Oklahoma. (*)

McGRAW, BETTY R., Assoc. Prof. of Modern Languages (1963). Licence es Lettres CATES 1961, Université de Paris. (*)

McGUIRE, JAMES H., Prof. of Physics (1972). BS 1964, Rensselaer Polytechnic Inst.; MS 1966, PhD 1969, Northeastern U. (*)

McKINNEY, KATHERYN ANN, Assoc. Prof. Emerita of Physical Education and Leisure Studies (1946). BS 1934, Kansas St. U.; MA 1935, George Peabody Col. for Teachers. (*)

McNULTY, MARK S., Asst. Prof. of Statistics (1985). BS 1978, U. of South Dakota; PhD 1985, Iowa St. U. (*)

McNULTY, SALLIE K., Asst. Prof. of Statistics (1985). BA 1977, MA 1979, U. of South Florida; PhD 1983, Iowa St. U. (*)

MEGNA, RICHARD, Asst. Prof. of Economics (1986). BA 1974, MA 1982, PhD 1986, U. of Wisconsin at Milwaukee.

MELOAN, CLIFTON E., Prof. of Chemistry (1959). BS 1953, Iowa St. U.; PhD 1959, Purdue U. (*)

MELTON, SONJA L., Instr. of English (1985). BA 1971, Friends U.; MA 1973, PhD 1980, Kansas St. U.

MELTON, AUSTIN C., Asst. Prof. of Computer Science (1984). BA 1971, Friends U.; MS 1974, PhD 1980, Kansas St. U.

MENDENHALL, BURNEY L., Asst. Prof. of Modern Languages (1965). BA 1950, Washburn U.; MS 1953, Emporia St. U.; PhD 1964, U. of Kansas. (*)

MERRILL, SARAH A., Asst. Prof. of Philosophy (1987). BA 1971, Skidmore Col.; MS (Linguistics) 1973, Georgetown U.; PhD 1987, SUNY at Albany.

METZLER, CHRISTINE I., Research Asst. of Psychology (1983). MA 1979, Villanova U.

MICHIE, ARUNA NAYYAR, Assoc. Prof. of Political Science (1976). AB 1966, Smith Col.; MA 1969, PhD 1975, Michigan St. U. (*)

MILBOURN, MAX W., Assoc. Prof. Emeritus of Journalism and Mass Communications (1949). BA 1938, Wichita St. U.

MILEY, JAMES D., Asst. Prof. of Sociology (1970). BA 1959, Millsaps Col.; MA 1963, Louisiana St. U.; PhD 1970, Tulane U. (*)

MILLER, CAROL LYNN, Asst. Prof. of Modern Languages (1968). BA 1958, MA 1959, Vanderbilt U.; PhD 1963, Washington U. (*)

MILLER, CECIL H., Prof. Emeritus of Philosophy (1945). AB 1930, U. of Kansas; MA 1939, U. of California. (*)

MILLER, FORREST R., Prof. of Mathematics (1968). BS 1962, U. of Oklahoma; MA 1965, PhD 1968, U. of Massachusetts. (*)

MILLER, HELEN J., Instr. of Speech (1982). MA 1978, Kansas St. U.

MILLER, MICHAEL H., Assoc. Dir. of Computing Activities; Asst. Prof. of Computing and Information Sciences (1960). BS 1958, MS 1960, Iowa St. U.

MILLIKEN, GEORGE A., Prof. and Head of Statistics; Dir., Statistical Lab; Statistical Consultant, Agr. Exp. Sta. (1969). BS 1965, MS 1968, PhD 1969, Colorado St. U. (*)

MITCHELL, HOWARD LEE, Prof. Emeritus of Biochemistry (1946). BS 1938, Oklahoma St. U.; PhD 1946, Purdue U. (*)

MITCHELL, JAMES C., Prof. of Psychology (1966). BS 1957, MA 1959, PhD 1962, Ohio St. U. (*)

MITCHELL, LINDA R., Instr.; Advisor, College of Arts and Sciences (1982). MA 1981, Kansas St. U.

MIZUNO, MASAOKI, Asst. Prof. of Computing and Information Sciences (1987). BS 1978, Keio U., Japan; MS 1982, Pennsylvania St. U.; PhD 1987, Iowa St. U.

MOLINEUX, BARRY R., Instr. of Speech (1970). BS 1966, MA 1968, Kansas St. U.

MOORE, FRITZ, Prof. Emeritus of Modern Languages (1934). AB 1927, U. of Akron; MA 1930, PhD 1932, U. of Illinois. (*)

MOORE, HUGH C., Adjunct Clinical Assoc. of Med. Tech. (1979). BS 1955, Texas Christian; MD 1959, U. of Texas.

MORNINGSTAR, WILLIAM S., Instr. of Sociology (1982). MA 1979, West Virginia U.

MOSER, HERBERT CHARLES, Prof. of Chemistry (1957). BA 1952, San Jose St. U.; PhD 1957, Iowa St. U. (*)

MOSES, WILLIAM R., Prof. Emeritus of English (1950). BA 1932, MA 1933, PhD 1939, Vanderbilt U. (*)

MOSHER, ROBIN A., Instr. of English (1983). MA 1983, Kansas St. U.

MOSSMAN, THIRZA ADELIN, Assoc. Prof. Emerita of Mathematics (1922). BA 1916, U. of Nebraska; MA 1922, U. of Chicago. (*)

MROZEK, DONALD J., Prof. of History (1972). BA 1966, Georgetown U.; MA 1968, PhD 1972, Rutgers U. (*)

MUELLER, DELBERT D., Assoc. Prof. of Biochemistry; Assoc. Biochemist, Agr. Exp. Sta. (1968). BS 1962, PhD 1966, U. of Oklahoma. (*)

MUENZENBERGER, THOMAS B., Assoc. Prof. of Mathematics (1973). BS 1965, MS 1967, U. of Florida, PhD 1972, U. of Wyoming. (*)

MUNCE, JAMES C., Assoc. Prof. of Art (1972). BFA 1966, Minneapolis School of Art; MFA 1971, Indiana U. (*)

MUNCE, MONIKA, Instr. of Modern Languages (1987). MA 1987, Kansas St. U.

MURPHY, SANDRA D., Asst. Instr. of Biochemistry (1983). BS 1960, U. of Missouri.

MUTHUKRISHNAN, SUBBARATNAM, Assoc. Prof. of Biochemistry; Assoc. Biochemist, Agr. Exp. Sta. (1980). BSc 1963, MSc 1965, Madras; PhD 1970, Indian Inst. of Sci. (*)

NAFZIGER, ESTEL WAYNE, Prof. of Economics (1966). BA 1960, Goshen Col.; MA 1962, U. of Michigan; PhD 1967, U. of Illinois. (*)

NASSAR, RAJA F., Prof. of Statistics (1966). BS 1958, American U., Beirut, Lebanon; MS 1960, U. of Idaho; PhD 1963, U. of California, Davis. (*)

NEEDHAM, HAROLD V., Research Asst. of Physics (1985). BS 1982, MS 1984, Kansas St. U.

NEILL, JAMES W., Asst. Prof. of Statistics; Statistical Consultant, Agr. Exp. Sta. (1986). BS 1971, Eastern Illinois U.; MS 1973, U. of Missouri-Rolla; PhD 1982, Kansas St. U. (*)

NELLIS, M. DUANE, Assoc. Prof. and Head of Geography (1980). BS 1976, Montana St. U.; MS 1977, PhD 1980, Oregon St. U. (*)

NELSON, BONNIE A., Asst. Prof. of English (1983). BA 1965, City Col. of New York; MAT 1967, City U. of New York; PhD 1981, Pennsylvania St. U. (*)

NELSON, ELIZABETH, Instr. of Modern Languages (1985). BA 1982, MA 1984, Kansas St. U.

NELSON, PAUL I., Assoc. Prof. of Statistics (1983). BS 1963, Queens Col., City U., New York; MS 1965, PhD 1969, Rutgers U. (*)

NELSON, PEGGY B., Instr. of Speech (1984). BA 1974, St. Olaf Col.; MA 1982, Kansas St. U.

NEWCOMB, MARGARET ALICE, Assoc. Prof. Emerita of Biology (1925). BS 1925, MS 1927, Kansas St. U. (*)

NICHOLS, HAROLD J., Prof. and Head of Speech (1971). BS 1967, Iowa St. U.; MA 1969, PhD 1971, Indiana U. (*)

NICHOLS, MARY, Instr. of Speech.

NIEMAN, DONALD G., Assoc. Prof. of History (1974). BA 1970, Drake U.; PhD 1975, Rice U. (*)

NIEMAN, LINDA, Advisor, Arts and Sciences (1977). BA 1971, U. of Houston; MA 1983, Kansas St. U.

NOBLE, M. LARRY, Prof. of Physical Education and Leisure Studies (1972). BS 1966, Eastern Kentucky U.; MS 1968, U. of Maryland; PhD 1970, U. of Texas. (*)

NOBLETT, DUANE P., Asst. Prof. of Art (1973). BFA 1966, Minneapolis Col. of Art and Design; MA 1970, MFA 1972, U. of Iowa. (*)

NOONAN, JOHN P., Assoc. Dean Emeritus of Grad. School; Prof. of English (1947). BS 1947, Rockhurst Col.; MS 1950, Kansas St. U.; PhD 1955, Denver U. (*)

NORDIN, JOHN A., Prof. Emeritus of Economics (1961). BA 1935, MA 1937, PhD 1941, U. of Minnesota. (*)

NORDIN, PHILIP, Prof. Emeritus of Biochemistry (1954). BS 1949, MS 1950, U. of Saskatchewan, Canada; PhD 1953, Iowa St. U. (*)

NULL-STEVENSON, PEGGY M., Instr. of Speech (1982). MA 1973, Kansas St. U.

NYBERG, BENJAMIN M., Prof. of English (1965). BA 1955, U. of Wichita; MA 1958, U. of Arizona; PhD 1965, U. of Colorado. (*)

O'BRIEN, PATRICIA J., Prof. of Anthropology (1967). BA 1962, BMA 1966, PhD 1969, U. of Illinois. (*)

OCHS, RAYMOND S., Asst. Prof. of Biochemistry; Asst. Biochemist, Agr. Exp. Sta. (1985). BS 1974, Purdue U.; PhD 1979, Indiana U. (*)

O'CONNOR, THOMAS A., Prof. of Modern Languages (1980). BA 1965, Iona Col.; MA 1968, PhD 1971, SUNY at Albany. (*)

OGG, ROSELLA A., Instr. of Art (1965). BA 1958, MA 1963, Kansas St. U.

OHNO, MITSUGI, Asst. Instr. of Chemistry (1960).

OLDFATHER, MICHAEL, Assoc. Prof. of Economics (1983). BA 1962, Oberlin Col.; MA 1969, U. of Nebraska-Lincoln; PhD 1980, Ohio U.

OLLINGTON, MARCUS H., Asst. Prof. Emeritus (1969). Diploma 1940, Conservatorium of Music; BA 1964, MA 1967, U. of North Carolina.

OLSON, EDWIN G., Assoc. Prof. of Economics; Economist, Agr. Exp. Sta. (1969). BA 1956, MA 1960, U. of California; PhD 1971, U. of Washington. (*)

O'NEIL, MICHAEL P., Asst. Prof. of Philosophy (1973). BA 1965, MA 1966, Miami U.; PhD 1972, U. of Edinburgh, Scotland.

OPHEIM, ALICIA, Instr. of Modern Languages (1983). PhD 1979, Kansas St. U.

ORBACH, HAROLD L., Assoc. Prof. of Sociology (1969). BS 1951, The City Col. of New York; PhD 1974, The U. of Minnesota. (*)

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O'SHEA, MICHAEL J., Asst. Prof. of Physics (1983). BA 1977, U. of East Anglia, England; PhD 1980, U. of Sussex, England. (*)

OSSAR, MICHAEL, Assoc. Prof. of Modern Languages (1971). AB 1961, Cornell U.; MS 1963, MA 1967, PhD 1973, U. of Pennsylvania. (*)

OTTENHEIMER, HARRIET J., Prof. of Anthropology; Interim Coord., Ethnic Studies (1969). BA 1962, Bennington Col.; PhD 1973, Tulane U. (*)

OTTENHEIMER, MARTIN, Prof. of Anthropology (1969). BS 1962, Rensselaer Polytechnic Inst.; MA 1965, PhD 1971, Tulane U. (*)

OUKROP, CAROL E., Prof. and Head of Journalism and Mass Communications; Women's Studies Faculty (1969). BA 1956, U. of North Dakota; MA 1965, PhD 1969, U. of Iowa. (*)

OVIATT, CHARLES G., Asst. Prof. of Geology (1985). BS 1973, MS 1977, U. of Wyoming; PhD 1984, U. of Utah.

PADY, STUART MCGREGOR, Prof. Emeritus of Biology; Mycologist, Agr. Exp. Sta. (1945). AB 1928, MA 1929, McMaster U.; PhD 1933, U. of Toronto. (*)

PAGE, LEROY EARL, Assoc. Prof. of History (1969). BS 1951, U. of Arkansas; BS 1955, MChemEng 1958, PhD 1963, U. of Oklahoma. (*)

PANOFF, ROBERT M., Asst. Prof. of Physics (1986). BS 1977, U. of Notre Dame; MS 1979, PhD 1985, Washington U.

PARKER, CRAIG B., Asst. Prof. of Music (1983). BM 1973, U. of Georgia; MM 1976, PhD 1981, U. of California-Los Angeles. (*)

PARKER, S. THOMAS, Prof. Emeritus of Mathematics (1947). BA 1931, MA 1934, U. of British Columbia, Canada; PhD 1947, U. of Cincinnati. (*)

PARKER, WILLARD A., Assoc. Prof. of Mathematics (1970). BA 1960, U. of Oregon; MDiv 1964, Fuller Theological Seminary; MA 1966, PhD 1970, U. of Oregon. (*)

PARRISH, DONALD B., Prof. Emeritus of Biochemistry, Agr. Exp. Sta. (1943). BS 1935, MS 1938, PhD 1949, Kansas St. U. (*)

PARSONS, PAUL F., Assoc. Prof. of Journalism and Mass Communications (1985). BA 1974, Baylor U.; MA 1983, U. of Arkansas at Little Rock; PhD 1987, U. of Tennessee.

PAUKSTELIS, JOSEPH V., Prof. of Chemistry (1966). BS 1960, U. of Wisconsin; PhD 1964, U. of Illinois. (*)

PAULSEN, AVELINA Q., Instr. of Biology (1974). BS 1959, MS 1962, U. of Philippines; PhD 1967, U. of Wisconsin.

PEARCE, R. CHARLES, Assoc. Prof. of Journalism and Mass Communications (1986). BFA 1972, MA 1975, U. of Alabama; PhD 1984, U. of Tennessee.

PELTON, MARION HERFORT, Assoc. Prof. Emerita of Music (1928). BM 1927, U. of Wisconsin; BS 1932, Kansas St. U.; MA 1957, Columbia U. (*)

PEPPERD, LYNN P., Major, U.S. Army, Asst. Prof. of Military Science (1987). BS 1971, Mankato State Col.; MS 1978, U. of Oklahoma.

PERCHELLET, JEAN-PIERRE H., Asst. Prof. of Biology (1982). BS 1968, MS 1970, PhD 1974, Faculty and Sciences, U. of Paris VI. (*)

PERKINS, CHARLES C., JR., Prof. Emeritus of Psychology (1969). BA 1941, Harvard; MA 1942, PhD 1946, St. U. of Iowa. (*)

PERNG, SHIAN-KOONG, Prof. of Statistics (1968). BS 1954, Chung-Hsien U., Taiwan; MS 1961, Virginia Poly. Inst.; PhD 1967, Michigan St. U. (*)

PETERS, GEORGE R., Prof. of Sociology; Dir., Center for Aging (1967). BA 1962, MA 1964, PhD 1968, U. of Nebraska. (*)

PETTIS, DOROTHY BRADFORD, Assoc. Prof. Emerita of Modern Languages (1927). BA 1919, MA 1924, U. of Nebraska; 1922, Middlebury Col.; Certificate 1939, U. of Paris. (*)

PHARES, E. JERRY, Prof. and Head of Psychology (1955). BA 1951, U. of Cincinnati; MA 1953, PhD 1955, Ohio St. U. (*)

PIGNO, LOUIS, Prof. and Head of Mathematics (1969). BS 1961, Polytechnic Inst. of Brooklyn; MA 1965, U. of Connecticut; PhD 1969, SUNY at Stony Brook. (*)

PITTENGER, THAD H., Prof. Emeritus of Biology (1959). BS 1947, PhD 1951, U. of Nebraska. (*)

PITTMAN, THOMAS, Asst. Prof. of Computing and Information Sciences (1985). BA 1966, MS 1980, U. of California, Berkeley; PhD 1985, U. of California, Santa Cruz.

POLICH, GERALD, Assoc. Prof. of Music (1966). BME 1961, MME 1966, U. of Colorado.

PRICE, LAURANCE W., JR., Adjunct Clinical Assoc. of Medical Technology (1985). BA 1955, MD 1959, U. of Kansas.

PRINCE, PAUL, Assoc. Prof. of Journalism and Mass Communications (1978). BS 1961, Stanford U.; PhD 1971, U. of Utah. (*)

PROCTER, DAVID E., Instr. of Speech (1987). BS 1977, MA 1980, Kansas St. U.

PUJOL, ELLIOTT, Prof. of Art (1973). BA 1968, MFA 1971, Southern Illinois U. (*)

PURCELL, KEITH F., Prof. of Chemistry (1967). BA 1961, Central Col.; PhD 1965, U. of Illinois. (*)

QUINLEY, PAULA M., Adjunct Clinical Instr. of Med. Tech. (1976). BA 1954, U. of Kansas; MT(ASCP) 1956; MS 1973, Kansas St. U.

QUIRK, JUDITH, Instr. of Dance (1985). BFA 1982, MA 1984, U. of Cincinnati.

RADKE, GARY A., Research Asst. of Biochemistry (1981). BS 1979, Kansas St. U.

RAGAN, JAMES F., JR., Prof. of Economics (1977). BA 1971, Missouri U.; MA 1972, PhD 1975, Washington U. (*)

RAHMAN, TALAT SHAHNAZ, Assoc. Prof. of Physics (1983). BS 1968, MS 1969, Karachi U.; MPhil 1970, Islamabad U.; PhD 1977, U. of Rochester. (*)

RAHMATULLAH, MOHAMMED, Research Assoc. of Biochemistry (1982). PhD 1981, U. of Hong Kong.

RAINBOLT, HARRY R., Assoc. Prof. of Speech (1966). BS 1960, Southern Illinois U.; MS 1962, PhD 1965, U. of Indiana. (*)

RAJCA, ANDRZEJ T., Asst. Prof. of Chemistry (1988). MS 1981, Technical U. of Wroclaw, Poland; PhD 1985, U. of Kentucky. (*)

RAMM, ALEXANDER G., Prof. of Mathematics (1981). MS 1961, Leningrad St. U.; PhD 1964, Moscow St. U.; DSci 1972, Academy of Science, Minski. (*)

RAMSEY, SHIRLEY A., Asst. Prof. of Journalism and Mass Communications (1985). BA 1962, U. of Oklahonnia; MA 1974, PhD 1985, U. of Maryland.

RANSOM, NORA E., Instr. of English (1984). BA 1973, MA 1976, U. of Arkansas.

RAPPOPORT, LEON H., Prof. of Psychology (1964). BA 1953, New York U.; MA 1962, PhD 1963, U. of Colorado. (*)

RATCLIFFE, LAMAR CECIL, Instr. Emeritus of Mathematics (1964). BS 1933, U.S. Military Academy; MAT 1964, Duke U.

REAGAN, CHARLES E., Prof. and Head of Philosophy (1967). AB 1964, Holy Cross Col.; MA 1966, PhD 1967, U. of Kansas. (*)

REALS, WILLIAM J., Adjunct Clinical Assoc. of Med. Tech. (1976). BS 1944, MD 1945, MS (Med) 1949, Creighton U.

REDMON, DAVID L., Instr. of English (1985). BA 1966, MS 1975, Kansas St. U.

REECK, GERALD R., Prof. of Biochemistry; Biochemist, Agr. Exp. Sta. (1974). BA 1967, Seattle Pacific Col.; PhD 1971, U. of Washington. (*)

REES, JOHN O., Prof. of English (1965). BA 1947, Amherst Col.; MFA 1957, PhD 1965, U. of Iowa. (*)

REGEHR, CAROL, Research Assoc. of Physics (1985). BA 1977, Sterling Col.; MS 1985, Kansas St. U.

REICHMAN, JESSICA L., Instr. of Art; Asst. Curator of U. Permanent Collections (1983). BA 1974, U. of Louisville; MS 1977, California St. U.–Fullerton.

REICHMAN, OMER J., Assoc. Prof. of Biology; Animal Ecologist, Agr. Exp. Sta. (1981). BA 1968, MS 1970, Texas Tech. U.; PhD 1974, Northern Arizona U. (*)

REPLOGLE, RENATA J., Instr. of Art (1966). BA 1963, MA 1964, Northern Colorado U.

REPLOGLE, REX, Assoc. Prof. of Art (1966). BFA 1964, MFA 1967, U. of Kansas. (*)

RHODES, JAMES R., Asst. Prof. of Economics (1980). BA 1969, MA 1973, PhD 1981, U. of Washington. (*)

RICHARD, PATRICK, Prof. of Physics and Dir. of J.R. Macdonald Lab. (1972). BS 1961, U. of Southwestern Louisiana; PhD 1964, Florida St. U. (*)

RICHARDSON, L. DOUGLAS, Adjunct Clinical Assoc. of Medical Technology (1985). BS 1969, Mississippi Col.; MD 1973, U. of Mississippi.

RICHTER, LINDA K., Assoc. Prof. of Political Science; Women's Studies Faculty (1982). BA 1964, Willamette U.; MA 1966, U. of Hawaii; PhD 1980, U. of Kansas. (*)

RICHTER, WILLIAM LOUIS, Prof. and Head of Political Science (1966). BA 1961, Willamette U.; MA 1963, PhD 1968, U. of Chicago. (*)

RINEHARDT, KARL, Asst. Prof. (1987). BS 1981, U. of New Mexico; MA 1984, Ohio St. U.; PhD 1985, U. of Arkansas.

RINTOUL, DAVID A., Asst. Prof. of Biology; Molecular Biologist, Agr. Exp. Sta. (1980). BA 1972, U. of Kansas; PhD 1978, Stanford U. (*)

RISEMAN, LOUIS, Asst. Prof. Emeritus of Geology (1946). BS 1934, MS 1936, Tufts U. (*)

ROBEL, ROBERT JOSEPH, Prof. of Biology; Wildlife Conservationist, Agr. Exp. Sta. (1961). BS 1956, Michigan St. U.; BMS 1959, U. of Idaho; PhD 1961, Utah St. U. (*)

ROBINSON, SALLY A., Asst. Instr. of Biology (1983). MS 1979, Kansas St. U.

ROCHAT, ELEANOR S., Instr. Emerita of English (1974). BS 1947, Eastern Illinois U.

ROCHE, THOMAS E., Prof. of Biochemistry; Biochemist, Agr. Exp. Sta. (1974). BS 1966, Regis Col., Denver; PhD 1970, Washington St. U. (*)

ROHLES, FREDERICK H., Prof. Emeritus of Psychology (1963). BS 1942, Roosevelt U.; MA 1950, PhD 1956, U. of Texas. (*)

RONCEK, DENNIS W., Assoc. Prof. of Sociology (1983). BA 1969, MA 1972, U. of Illinois; PhD 1975, U. of Illinois. (*)

ROPER, JAMES E., Instr. of English (1986). BA 1978, BS 1986, Kansas St. U.

ROSCHKE, MARCIA, Instr. of Physical Education and Leisure Studies (1987). BA 1970, Valparaiso U.; MS 1986, Kansas St. U.

ROSE, PETER R., Visiting Dist. Prof. of Geology (1988). BS 1957, MS 1959, PhD 1968, U. of Texas–Austin.

ROSENBERG, JERRY P., Asst. Prof. of Political Science (1984). AB 1970, U. of Illinois–Chicago; AM 1974, U. of Illinois–Urbana; PhD 1977, U. of Illinois. (*)

ROSS, LYNNE S., Instr. of Speech (1978). BS 1968, Nebraska Wesleyan U.; MA 1973, Kansas St. U.

ROUFA, DONALD J., Prof. of Biology; Molecular Biologist, Agr. Exp. Sta. (1975). AB 1965, Amherst Col.; PhD 1970, The Johns Hopkins U. (*)

ROUTSON, ROGER, Asst. Prof. of Art (1978). BFA 1974, Cleveland Inst. of Art; MFA 1978, U. of Illinois. (*)

ROYSTER, PHILIP M., Prof. of English (1981). BA 1965, MA 1967, DePaul U.; PhD 1974, Loyola U. of Chicago. (*)

RULIFFSON, WILLARD S., Prof. Emeritus of Biochemistry (1953). BS 1940, Buena Vista Col.; PhD 1953, U. of Iowa. (*)

RUSHING, STEVEN J., Instr. of Music (1983). BME 1980, Louisiana St. U.; MA 1983, Drake U.

SAAL, FRANK E., Prof. of Psychology; Women's Studies Faculty (1976). BA 1968, U. of Rochester; MS 1973, Rensselaer Poly. Inst.; PhD 1976, Pennsylvania St. U. (*)

SAEKI, SADAHIRO, Prof. of Mathematics (1982). BS 1965, Waseda U.; MS 1967, PhD 1970, Tokyo Met. U., Japan. (*)

SAGESER, ADELBERT BOWER, Prof. Emeritus of History (1938). AB 1925, Nebraska St. Teachers Col., Wayne; MA 1930, PhD 1934, U. of Nebraska. (*)

SALVA, CAROLINE T., Instr. of Speech (1987). BA 1984, Queen's Col.; MA 1986, Kansas St. U.

SAMELSON, FRANZ, Prof. of Psychology (1957). Diploma in Psychology 1952, U. of Munich, Germany; PhD 1956, U. of Michigan. (*)

SAMELSON, PHOEBE, Advisor, Arts and Sciences (1968). BA 1950, Bates; MN 1953, Yale.

SATERN, MIRIAM, Asst. Prof. (1986). BS 1973, Iowa St. U.; MS 1975, U. of Arizona; PhD 1986, U. of North Carolina at Greensboro.

SCHEER, RICHARD K., Assoc. Prof. of Philosophy (1968). AB 1950, U. of Nebraska; MA 1951, U. of Florida; PhD 1958, U. of Nebraska. (*)

SCHENCK-HAMLIN, WILLIAM, Assoc. Prof. of Speech (1976). BS 1969, MA 1971, Kansas St. U.; PhD 1976, U. of Oregon. (*)

SCHIAPPA, EDWARD, Instr. of Speech (1985). BS 1980, Kansas St. U.; MA 1984, Northwestern U.

SCHMIDT, DAVID A., Asst. Prof. of Computing and Information Sciences (1986). BA 1975, Fort Hays St. U.; MS 1977, PhD 1981, Kansas St. U.

SCHMIDT, TERESA TEMPERO, Asst. Prof. of Art (1972). BA 1963, MA 1971, Central Washington St. Col.; MFA 1972, Washington St. U. (*)

SCHNEIDER, HAROLD WILLIAM, Assoc. Prof. of English (1961). BA 1950, U. of Minnesota.

SCHNEIDER, MARY WILLIS, Prof. of English (1964). BA 1949, MA 1952, St. U. of Iowa.; PhD 1964, U. of Minnesota. (*)

SCHOWENGERDT, DANIEL B., Asst. Instr. of Chemistry (1983). MS 1983, Kansas St. U.

SCHRAEDER-NEIDENTHAL, J., Instr. of Speech (1983). MA 1978, Kansas St. U.

SCHRENK, WILLIAM G., Prof. Emeritus of Chemistry (1938). AB 1932, Westmar Col.; MS 1936, PhD 1945, Kansas St. U. (*)

SCHWENKE, JAMES R., Asst. Prof. of Statistics; Statistical Consultant, Agr. Exp. Sta. (1986). BA 1973, MA 1977, U. of S. Florida; PhD 1982, Kansas St. U.

SEASTEDT, TIMOTHY R., Asst. Prof. of Biology (1981). BA 1971, U. of Montana; MS 1976, U. of Alaska–Fairbanks; PhD 1979, U. of Georgia–Athens. (*)

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SELTZER, KATHRYN N., Instr. of English (1983). MA 1981, Kansas St. U.

SETSER, DONALD W., Distinguished Prof. of Chemistry (1963). BS 1956, MS 1958, Kansas St. U.; PhD 1961, U. of Washington. (*)

SEYLER, H. L., Assoc. Prof. of Geography (1970). BA 1963, MA 1967, Kansas St. U.; PhD 1971, Indiana U. (*)

SHANTEAU, JAMES C., Prof. of Psychology (1971). BA 1966, San Jose St. Col.; PhD 1970, U. of California, San Diego. (*)

SHASTRI, KAMINIM, Research Assoc. of Biochemistry (1979). PhD 1969, McGill U., Canada.

SHAW, BRADLEY A., Assoc. Prof. and Head of Modern Languages (1974). BA 1968, Lewis & Clark Col.; MA 1969, Northwestern U.; PhD 1974, U. of New Mexico. (*)

SHEFFIELD, ALFRED, Asst. Prof. of Speech (1985). BFA 1978, Illinois Wesleyan U.; MFA 183, Northwestern U.

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SHERWOOD, PETER M. A., Assoc. Prof. of Chemistry (1985). BSc 1967, St. Andrews U.; MA 1970, PhD 1970, Cambridge U.; CChem 1970; FRSC 1982. (*)

SHOEMAKER, ROBERT M., CPT, U.S. Army; Asst. Prof. of Military Science (1985). BS 1979, Kansas St. U.

SHULL, PAUL, Prof. of Music (1960). BME 1950, MME 1951, U. of Colorado; DMA 1966, Eastman School of Music, U. of Rochester. (*)

SHULT, ERNEST E., Distinguished Regents Prof. of Mathematics (1974). BA 1958, MA 1961, Southern Illinois U.; PhD 1964, U. of Illinois. (*)

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SIDORFSKY, FRANK M., Assoc. Prof. of Music (1965). BME 1952, Emporia St. U.; MM 1957, DMA 1974, Eastman School of Music, U. of Rochester. (*)

SLOAT, FLOYD B., Assoc. Prof. Emeritus of Mathematics (1946). BA 1938, Ouachita Col.; MA 1941, U. of Arkansas.

SLOOP, JEAN C., Prof. of Music (1959). BA 1953, Gettysburg Col.; MA 1956, DMA 1974, Eastman School of Music, U. of Rochester. (*)

SMETHERS, J. STEVEN, Instr. of Journalism (1983). BS 1976, Kansas St. U.

SMIT, ANN B., Asst. Prof. of Speech (1987). BA 1966, Calvin Col.; MA 1969, U. of Iowa; PhD 1980, U. of Maryland.

SMITH, ANN S., Asst. Prof. of Biology (1970). BS 1958, Augustana Col.; MS 1960, U. of Colorado; PhD 1982, Northern Arizona U.

SMITH, CHRISTOPHER C., Prof. of Biology (1970). BA 1960, U. of Colorado; MA 1963, PhD 1965, U. of Washington. (*)

SMITH, OTHELLO D., Adjunct Clinical Assoc. of Med. Tech. (1979). AB 1947, MD 1951, U. of Kansas.

SMITH, ROBIN, Prof. and Head of Philosophy (1974). BA 1968, U. of Tennessee at Chattanooga; PhD 1974, Claremont. (*)

SNYDER, VERYLE E., Asst. Prof. Emeritus of Physical Education, Dance, and Leisure Studies (1954). BS 1942, MS 1950, Kansas St. U. (*)

SOCOLOFSKY, HOMER E., Prof. of History (1946). BS 1944, MS 1947, Kansas St. U.; PhD 1954, U. of Missouri. (*)

SORENSEN, CHRISTOPHER M., Prof. of Physics (1977). BS 1969, U. of Nebraska; MS 1973, PhD 1976, U. of Colorado. (*)

SPOONER, BRIAN S., Prof. of Biology (1971). BS 1963, Quincy Col.; PhD 1969, Temple U. (*)

STAMEY, WILLIAM L., Dean Emeritus; Prof. of Mathematics (1953). AB 1947, U. of North Colorado; MA 1949, PhD 1952, U. of Missouri. (*)

STEINBAUER, ROBERT ANDRUS, Prof. of Music (1970). BM 1950, MM 1951, U. of Michigan; Doc. of Music 1959, Indiana U. (*)

STEVENSON, SIDNEY, Asst. Prof. (1987). BS 1975, Emporia St. U.; MA 1977, U. of Northern Colorado; PhD 1987, Colorado St. U.

STEWART, DONALD C., Prof. of English (1968). BA 1952, MA 1955, U. of Kansas; PhD 1962, U. of Wisconsin. (*)

STEWART, PATRICIA L., Instr. of English (1983). MA 1954, U. of Colorado.

STIVERS, MARK, Adjunct Clinical Assoc. of Medical Technology (1985). BA 1969, Westminster Col.; MD 1973, U. of Missouri.

STOCKLI, MARTIN P., Research Assoc. of Physics (1981). PhD 1978, ETHZ Zurich.

STOVER, STEPHEN L., Assoc. Prof. of Geography (1964). AB 1940, McPherson Col.; MA 1941, U. of Kansas; MS 1955, PhD 1960, U. of Wisconsin. (*)

STRECKER, GEORGE E., Prof. of Mathematics (1972). BS 1961, U. of Colorado; PhD 1966, Tulane U. (*)

STROH, CHARLES, Prof. and Head of Art (1980). BFA 1965, Minnesota School of Art; MS 1971, MFA 1972, U. of Wisconsin-Milwaukee. (*)

STROMBERG, KARL R., Prof. of Mathematics (1968). BA 1953, MA 1954, U. of Oregon; PhD 1958, U. of Washington. (*)

STUMPEHAUSER, LASZLO, Prof. of Physical Education and Leisure Studies (1984). PhD 1969, U. of Toledo.

STUNKEL, EDITH L., Asst. Dir., Center for Aging (1981). MA 1975, U. of California.

STURR, EDWARD R., Assoc. Prof. of Art (1974). BA 1959, St. Ambrose Col.; MS 1964, Illinois Inst. of Tech.; EdD 1973, Illinois St. U. (*)

SULEIMAN, MICHAEL WADIE, Prof. of Political Science; American Ethnic Studies (1965). BA 1960, Bradley U.; MS 1962, PhD 1965, U. of Wisconsin. (*)

SULLIVAN, EUGENIA L., Adjunct Clinical Instr. of Med. Tech. (1976). BA 1959, U. of Kansas; Cert. in Med. Tech. 1970, Lattimore-Fink School of Med. Tech.; MS 1977, U. of Kansas.

SUMMERHILL, R. RICHARD, Assoc. Prof. of Mathematics (1972). BA 1966, Monmouth Col.; MS 1967, PhD 1969, U. of Iowa. (*)

SUNDHEIM, RICHARD A., Asst. Prof. of Statistics (1978). BS 1971, MS 1974, Kansas St. U.; PhD 1978, Purdue U.

SUROWSKI, DAVID B., Assoc. Prof. of Mathematics (1977). BA 1971, California St. U. at Fullerton; MS 1972, PhD 1975, U. of Arizona. (*)

SUTTON, MARY ELLEN, Assoc. Prof. of Music (1974). AA 1960, Graceland Col.; BM 1963, MM 1968, U. of Missouri at Kansas City. DMA 1975, U. of Kansas. (*)

SUTTON, WILLIAM W., Prof. of Biology (1985). BA 1953, Dillard U.-New Orleans; MS 1959, PhD 1965, Howard U., Washington, D.C.

SWEGLE, WILLIAM M., Research Asst. of Biochemistry (1981). BS 1981, Texas Christian U.

SWILER, JAMES P., Asst. Prof. of Art (1970). BSE 1966, Emporia St. U.; MFA 1970, Wichita St. U. (*)

TAKEMOTO, DOLORES, Asst. Prof. of Biochemistry; Asst. Biochemist, Agr. Exp. Sta. (1982). BS 1971, Ball St. U.; MS 1973, Colorado St. U.; PhD 1978, U. of Southern California. (*)

TAKEMOTO, LARRY J., Assoc. Prof. of Biology; Membrane Biologist, Agr. Exp. Sta. (1978). BA 1967, Hartwick Col.; MS 1968, Yale U.; PhD 1974, Colorado St. U., Fort Collins. (*)

TAYLOR, RICHARD J., Adjunct Clinical Assoc. of Med. Tech. (1976). BA 1944, U. of California at Berkeley; MD 1949, Creighton U.

TAYLOR, ROBERT BARTLEY, Assoc. Prof. of Anthropology (1957). BS 1949, Wheaton Col.; MA 1951, PhD 1960, U. of Oregon. (*)

TERRY, RHONDA G., Asst. Instr. of Computing and Information Sciences (1976). BS 1974, Brigham Young U.

THOMAS, LLOYD B., JR., Prof. of Economics (1968). BA 1963, MA 1964, U. of Missouri; PhD 1970, Northwestern U. (*)

THOMPSON, CHARLES P., Prof. of Psychology (1965). BS 1958, Wisconsin St. Col.; MS 1960, PhD 1962, U. of Wisconsin. (*)

TILGHMAN, BENJAMIN R., Prof. of Philosophy (1967). AB 1950, MA 1954, Washington U.; PhD 1959, U. of Washington. (*)

TOMB, A. SPENCER, Assoc. Prof. of Biology; Botanist, Agr. Exp. Sta. (1974). BS 1966, U. of the South; PhD 1970, U. of Texas, Austin. (*)

TREMBLAY, VICTOR J., Asst. Prof. of Economics (1983). BA 1973, U. of California-Los Angeles; MA 1977, California St. U.-Northridge; PhD, Washington St. U. (*)

TRENARY, ROGER C., Instr. of Economics (1983). BA 1968, MA 1972, Wayne St. U.

TUNSTALL, GEORGE C., Assoc. Prof. of Modern Languages (1973). BA 1964, Hamilton Col.; MA 1966, PhD 1968, Princeton U. (*)

TWISS, NANCY, Advisor, Arts and Sciences (1968). BA 1954, Colorado Col.; MS 1974, Kansas St. U.

TWISS, PAGE CHARLES, Prof. of Geology (1953). BS 1950, MS 1955, Kansas St. U.; PhD 1959, U. of Texas, Austin. (*)

UHLARIK, JOHN JEFFERY, Prof. of Psychology (1970). BS 1965, U. of Wisconsin; MS 1967, PhD 1970, U. of Washington. (*)

UNDERWOOD, JAMES R., JR., Prof. of Geology (1977). BS in Naval Sci. 1948, BS in Petrol. Eng. 1949, MA in Geol. 1956, PhD 1962, U. of Texas, Austin. (*)

UNEKIS, JOSEPH K., Assoc. Prof. of Political Science (1977). BS 1963, Eastern Illinois U.; MA 1972, PhD 1977, Indiana U. (*)

UNGER, ELIZABETH A., Prof. of Computing and Information Sciences (1966). BS 1961, MS 1963, Michigan St. U.; PhD 1978, U. of Kansas. (*)

UPTON, STEVE J., Asst. Prof. of Biology; Parasitologist, Agr. Exp. Sta. (1986). BS 1975 Oregon St. U.; MS 1981, U. of New Mexico; PhD 1983, Auburn U. (*)

URBAN, JAMES E., Assoc. Prof. of Biology (1970). BA 1965, PhD 1968, U. of Texas. (*)

UTHOFF, JOHN S., Assoc. Prof. of Speech (1976). BA 1968, MFA 1973, U. of Iowa.

UTHOFF, LINDA HAYNES, Temp. Instr. of Speech (1987). BA 1979, U. of Kansas; MA 1981, Kansas St. U.

VALENTINE, SHERI, Instr. of Modern Languages (1984). BA 1969, U. of Kansas; MA 1971, Kansas St. U.

VAN SWAAY, MAARTEN, Assoc. Prof. of Computing and Information Sciences (1963). BBS 1953, Drs 1956, Leiden U., Netherlands; PhD 1956, Princeton U. (*)

VOGT, JOHN L., Assoc. Prof. of Art (1963). BFA 1960, Kansas City Art Inst.; MFA 1963, U. of Illinois. (*)

WADE, MARY A., Instr. of Speech (1987). BS 1973, MA 1986, Kansas St. U.

WALKER, MARGARET Y., Asst. Prof. Emerita of Music (1971). BM 1970, Kansas St. U., MM 1974, Texas Christian U. (*)

WALKER, RODNEY G., Prof. of Music (1966). BME 1959, U. of Nebraska; MME 1961, Wichita St. U. (*)

WALKER, WARREN VINCENT, Prof. Emeritus of Music (1948). BA 1946, U. of Washington; MM 1948, Cincinnati Conservatory of Music. (*)

WALLENTINE, VIRGIL E., Prof. and Head of Computing and Information Sciences (1972). BS 1965, MS 1970, PhD 1972, Iowa St. U. (*)

WALTERS, CHARLES P., Prof. Emeritus of Geology (1936). BS 1936, MS 1937, Kansas St. U.; PhD 1957, Cornell U. (*)

WARD, JAMES D., Asst. Prof. of Social Work (1978). BA 1967, Marshall U.; MSW 1970, West Virginia U.

WARD, JOANN, Adjunct Clinical Instr. (1979). BS 1974, Central Missouri St.

WARREN, ANN A., Instr. of English (1977). BA 1964, Florida Southern Col.; MA 1968, U. of Georgia.

WARREN, LELAND E., Prof. of English (1976). BA 1966, Emory U.; MA 1968, U. of Georgia; PhD 1976, U. of Illinois. (*)

WAUTHIER, RAYMOND AUGUST, Assoc. Prof. Emeritus of Physical Education, Dance, and Leisure Studies (1949). BS 1945, Albion Col.; MS 1947, Drake U. (*)

WEAVER, OLIVER LAURENCE, Prof. of Physics (1970). BS 1965, California Inst. of Tech.; PhD 1970, Duke U. (*)

WEIS, JERRY S., Assoc. Prof. of Biology (1966). AB 1958, Kansas Wesleyan U.; MA 1960, PhD 1964, U. of Kansas. (*)

WEISKOPH, RONALD W., Asst. Prof. of Military Science (1981). BS 1960, U. of Missouri; MS 1963, Southern Illinois U.

WELTI, RUTH, Asst. Prof. of Biology (1985). BSc 1976, U. of Connecticut; PhD 1982, Washington U. (*)

WEN, LISA, Research Asst. of Biochemistry (1983). PhD 1983, Kansas St. U.

WEST, RONALD R., Prof. of Geology (1969). AA 1955, Centralia Jr. Col.; BS 1958, U. of Missouri at Rolla; MS 1962, U. of Kansas; PhD 1970, U. of Oklahoma. (*)

WEYERTS, ALFRED C., Instr. of Chemistry (1963). BS 1948, Denver U.

WHEATLEY, ALISON E., Instr. of English (1986). AB 1974, Barnard Col.; MA 1980, U. of Virginia.

WHEELER, DONALD, Visiting Asst. Prof. of Physics (1987). PhD 1986, U. of South Carolina.

WHITE, CHAPPELL, Prof. of Music (1974). BA 1940, Emory U.; BM 1947, Westminster Choir Col.; PhD 1957, Princeton U. (*)

WHITE, STEPHEN E., Prof. of Geography (1975). BA 1969, MA 1972, PhD 1974, U. of Kentucky. (*)

WIGGINS, DAVID K., Assoc. Prof. of Physical Education and Leisure Studies (1979). AB 1974, MA 1975, San Diego St. U., PhD 1979, U. of Maryland. (*)

WILCOXON, GEORGE DENT, Prof. Emeritus of History (1946). AB 1936, MA 1938, PhD 1941, U. of California at Los Angeles. (*)

WILLIAMS, CAROL A., Research Asst. of History (1974). BA 1965, U. of Illinois.

WILLIAMS, DUDLEY, Distinguished Regents Prof. Emeritus of Physics (1964). AB 1933, MA 1934, PhD 1936, U. of North Carolina. (*)

WILLIAMS, KATHLEEN, Asst. Prof. of Physical Education and Leisure Studies (1984). BS 1974, U. of North Carolina; MA 1979, PhD 1982, U. of Wisconsin-Madison. (*)

WILLIAMS, LARRY G., Assoc. Prof. of Biology (1970). BS 1961, MS 1963, U. of Nebraska; PhD 1968, California Inst. of Tech. (*)

WILLIAMS, TIMOTHY ALDEN, Prof. of Political Science (1967). AB 1954, Davidson Col.; PhD 1964, U. of North Carolina. (*)

WILLIS, LINDEN G., Asst. Prof. of Mathematics (1984). BS 1978, MS 1980, Kansas St. U.; PhD 1984, U. of Oregon.

WILSON, FRED E., Assoc. Prof. of Biology (1965). AB 1958, MA 1960, U. of Kansas; PhD 1965, Washington St. U. (*)

WINEGARDNER, CARROLL, Asst. Prof. of Art (1966). BFA 1960, Kansas City Art Inst.; MFA 1963, U. of Oklahoma.

WOLDT, GRACE S., Instr. Emerita of Mathematics (1946). AB 1927, Ohio Wesleyan U.

WONG, PETER P., Prof. of Biology; Plant Physiologist, Agr. Exp. Sta. (1976). BS 1966, California St. U.; BA 1967, PhD 1971, Oregon St. U. (*)

WOODWARD, GARY L., Assoc. Prof. of Art (1971). AB 1961, Northern Colorado U.; MA 1964, U. of Iowa; MFA 1969, U. of Washington. (*)

WORTHINGTON, NANCY E., Instr. of Modern Languages (1983). BA 1967, U. of Colorado; MA 1984, Kansas St. U.

YANG, SHIE-SHIEN, Assoc. Prof. of Statistics (1979). BS 1969, MS 1974, PhD 1976, Iowa St. U. (*)

YOUNG, PAUL M., Prof. Emeritus of Mathematics (1970). AB 1937, Miami U.; MA 1939, PhD 1941, Ohio St. U. (*)

ZIMMERMAN, JOHN L., Prof. of Biology (1963). BS 1953, MS 1958, Michigan St. U.; PhD 1963, U. of Illinois. (*)

ZOLLMAN, DEAN ALVIN, Prof. of Physics (1970). BS 1964, MS 1965, Indiana U.; PhD 1970, U. of Maryland. (*)

ZOU, QISU, Asst. Prof. of Mathematics (1987). BS 1966, Peking U.; MSc 1985, PhD 1986, Brown U.

ZOUROS, THEO, Research Assoc. Temp., Physics (1986). PhD 1983, Yale.

ZSCHOCHÉ, SUE, Asst. Prof. of History; Women's Studies Faculty (1983). BA 1970, Emporia St. U.; MA 1974, East Texas St. U.; PhD 1984, U. of Kansas.

Business Administration

Randolph A. Pohlman,* Dean
 Robert D. Hollinger,* Associate Dean
 David M. Andrus,* Assistant 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, at both the undergraduate and graduate levels, are accredited by the American Assembly of Collegiate Schools of Business (AACSB).

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 a graduate 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 a position 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 Kansas State University must enroll in the Business Administration Pre-Professions Program (BAPP). Students with previous academic work (either Kansas State University 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 the student 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 over 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 2.25 or above. The 60 credit hours must include the following courses or their approved equivalents:

ACCTG 211	Financial Accounting	3
ACCTG 221	Managerial Accounting	3
CMPSC 110	Introduction to Personal Computing	3
or		
CMPSC 200	Fundamentals of Computer Programming	2
CMPSC 2--	Computer Language	2
ECON 110	Economics I	3
ECON 120	Economics II	3
ENGL 100	English Composition I	3
ENGL 120	English Composition II	3
HPER 101	Concepts of Physical Education	1
MATH 100	College Algebra	3
MATH 205	General Calculus and Linear Algebra	3
or		
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

Total credit hours of required courses 44-45

Communications electives

three hours selected from:			3
ENGL 200	Intermediate Composition	3	3
ENGL 301	Writing and the Law:		
	Legislative Analysis	3	3
GENBA 391	Administrative Communications	3	3
MKTG 422	Sales Communication	3	3
MLANG ---	All modern language courses	3	3
SPCH 311	Business and Professional Speaking	3	3
SPCH 321	Public Speaking II	3	3
SPCH 325	Argumentation and Debate	3	3
SPCH 526	Persuasion	3	3

Humanities electives

six hours selected from: 6
 All courses in art,* history, modern languages, music,* philosophy, dance,* theatre;* ARCH 301; English: all literature plus four (230, 231, 233, 234) humanities courses.

*All courses from these areas are acceptable; however, one may take a maximum of three credit hours total from these four areas in participation or artistic skill development courses.

Natural science electives

seven hours selected from: 7
 All courses in biochemistry, biology, chemistry, geology, and physics; ANTH 280, 281; DEN 420, 425; GEOG 220, 221. Note: One laboratory course is required.

Total credit hours of elective areas 16

Total credit hours required for BAPP 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 2.25 grade point average on upper-division courses applied toward the degree. See additional residency requirements earlier in this catalog.

Program of study. Students applying to a degree-track major will develop, in consultation with their academic advisors, a program of study for the completion of their degrees. Specific requirements for each major are listed on the following pages.

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, the student should begin the dual degree program in the 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 the dean's office, College of Business Administration, 107 Calvin Hall, Manhattan, Kansas 66506.

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-one 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 Fort Riley Degree Program, Division of Continuing Education, 306 Umberger Hall, Manhattan, Kansas 66506.

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 eight credit hours may be earned. Completion of the College of Business Administration Honors Program requires earning a total of three 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 institutions; 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.

Graduate study

The College of Business Administration provides graduate work leading to a master of business administration (M.B.A.) degree and a master of accountancy (M.Acc.) degree. Applications are welcomed from outstanding students with baccalaureate degrees in any field of study. Admission to these programs is granted to those students showing high promise of success in postgraduate business study. Following appraisal of prior scholastic performance, employment experience, and performance on the Graduate Management Admissions Test, the college's director of graduate studies, in consultation with the graduate studies committee, makes the admission recommendation to the Graduate School for the final review.

Admission with full standing requires that the applicant meet the following requirements of the Graduate School and the College of Business Administration.

1. A bachelor's degree from an approved institution.
2. Adequate undergraduate preparation for the intended major field of study or equivalent evidence of an appropriate background for undertaking an advanced degree. (Provisional admission may be granted to applicants who have subject deficiencies in undergraduate preparation.)
3. An undergraduate grade average of 3.0 or above for the junior and senior years.
4. For international students interested in the M.B.A., a score of at least 570 on the Test of English as a Foreign Language (TOEFL). M.Acc. applicants must have a 570 TOEFL and a score of 220 on the Test of Spoken English (TSE).
5. A satisfactory score on the Graduate Management Test (GMAT). An official record of the GMAT score must be sent by the ETS directly to the College of Business Administration.

6. Three letters of reference from former employers or professors.

7. A one-page statement of your objectives in pursuing the program.

Applications for graduate study should be submitted to the Director of Graduate Studies, College of Business Administration, 110 Calvin Hall, Manhattan, Kansas 66506. Deadlines for completed applications are:

Requested enrollment date	Deadline for completed application
Fall semester	July 15 (June 1 for international students)
Spring semester	December 15 (November 1 for international students)
Summer semester	May 1 (March 15 for international students)

College of Business Administration courses numbered 800 and above may only be taken by students who have been admitted to a Kansas State University graduate program. Special graduate students and seniors who qualify for graduate credit may not enroll in courses numbered 800 and above in the College of Business Administration.

The Graduate School section of this bulletin provides further information on the policies and procedures relating to graduate education at KSU.

Master of business administration

The master of business administration (M.B.A.) program at KSU provides professional managerial education to individuals who wish to pursue administrative careers in both the private and public sectors. The program combines practical and conceptual approaches to business to help students develop important managerial skills and expand their intellectual ability. On a solid foundation of the tools of quantitative analysis, the program builds a management model that emphasizes creative decision making, risk taking, strong interpersonal skills, a global orientation, and good business values.

Before beginning the M.B.A. curriculum, students with an undergraduate degree without prior business education must acquire basic competency in the following areas: accounting, statistics, information systems, finance, management, marketing, and economics. These competencies should be acquired through graduate level common body of knowledge (CBK) course work. The specific number of graduate CBK courses required depends on the applicant's prior academic work but generally should require no more than 27 credit hours. This basic CBK course work may be taken after admission to the M.B.A. program but must be completed prior to enrollment in the 33-hour graduate curriculum.

The M.B.A. curriculum is a 33-hour program of study that may be completed in two regular semesters and a summer session, or in three semesters. Entry into the program may be in the fall, spring, or summer semesters. The 33-hour graduate curriculum is divided into two major sections. The first section comprises 24 hours of core courses. These required eight courses represent study across a broad spectrum of the functional areas of business. In addition, graduate students must take nine hours in an area of concentration. Students must take three hours of 800-level and six hours of 600-level or higher College of Business Administration courses aimed at improving competence for overall management. One three-hour economics course numbered 600 or higher may be taken in the concentration. The courses composing the nine-hour concentration should form a related or cohesive area of study. Exceptions for the CBA concentration course requirement may be made by the supervisory committee and director of graduate studies. The specific courses to be taken for a concentration will be determined by the student and his or her supervisory committee and the director of graduate studies. Students may not take a concentration in accounting. Students interested in accounting should enroll in the master of accountancy program. Concentrations are offered in marketing, finance, management, and international business. See the M.B.A. curriculum listing below.

Possible areas of concentration include marketing, management, finance, and international business. Other possible areas for concentration can be determined by the students' program of study committee and the director of graduate studies.

Many of the 24 hours of core courses are scheduled during several semesters. This allows considerable flexibility so that full-time students may complete the program in as few as two semesters and one summer session, and part-time students may set their own pace to thus meet their individual requirements for graduate business studies, providing requirements are met in a five-year period. Except during the summer semester, two courses are offered during evening hours to better accommodate students.

M.B.A. curriculum

I. Common body of knowledge requirements: 27 hours

STAT 707	Applied Linear Statistical Models
ACCTG 710	Accounting Concepts and Analysis
FINAN 710	Managerial Finance
MKTG 700	Marketing Theory and Practice
MANGT 720	Management of Organizations
MANGT 721	Production and Operations Management
MANGT 766	Introduction to Management Information Systems
MANGT 891	Legal and Social Environment of Business
ECON 520	Intermediate Microeconomics

CBK courses will not be included in any area of the concentration.

II. Core courses: 24 hours

ACCTG 812	Accounting Controls for Business
FINAN 850	Advanced Managerial Finance
MKTG 840	Advanced Marketing Management
MANGT 820	Behavioral Management Theory
MANGT 893	Business Operations Analysis
MANGT 866	Advanced Management Information Systems
MANGT 888	Administrative Strategy
ECON 840	Managerial Economics

Required MBA courses will not be included in any area of the concentration.

III. Area of concentration: 9 hours

Students must take three hours of 800-level and six hours of 600-level or higher College of Business Administration courses aimed at improving competence for overall management. One three-hour economics course numbered 600 or higher may be taken in the concentration. The courses composing the nine-hour concentration should form a related or cohesive area of study. Exceptions for the CBA concentration course requirement may be made by the supervisory committee and director of graduate studies. The specific courses to be taken for a concentration will be determined by the student and his or her supervisory committee and the director of graduate studies. Students may not take a concentration in accounting. Students interested in accounting should enroll in the master of accountancy program. Concentrations are offered in marketing, finance, management, and international business.

Fellowships: Each year several fellowships are available to interested and qualified M.B.A. students through local business firms. In addition to stipends generally equivalent to those for 16-hour-per-week graduate assistantships, fellowship recipients can earn three credit hours while gaining managerial experience solving real business problems doing research and analysis for the sponsoring firm.

Assistantships: Many graduate teaching and research assistantships are available each year. Assistantships vary between 2/10 and 4/10 time, on a 40-hour/week basis for the nine-month academic year. Some assistantships also carry a partial fee waiver and a small number receive partial funding through the college work-study program. A student on a 4/10 time assistantship may not carry more than 12 credit hours per semester. Any applicants interested in obtaining an assistantship should request an application form from: Director of Graduate Studies, College of Business Administration, 110 Calvin Hall, Manhattan, Kansas 66506, (913) 532-7190.

Master of accountancy

The objective of the master of accountancy (M.Acc.) program is to provide candidates with greater breadth and depth in accounting education than is possible in the baccalaureate or master in business administration programs in preparation for careers as professional accountants.

Graduates of the program should be prepared to research various data bases related to troublesome accounting problems and to exercise judgment in making accounting-related decisions by drawing on their integrated and comprehensive body of accounting knowledge.

Common body of knowledge prerequisites.

Advanced study in accounting at KSU builds upon certain basic areas of knowledge that all degree candidates must satisfy. These basic areas constitute the common body of knowledge (CBK). In order to be admitted in full standing, each applicant must satisfy the CBK requirement, ordinarily through undergraduate

course work. The CBK is defined by the following:

(a) A background of the concepts, processes, and institutions in the production and marketing of goods and/or services, and the financing of the business enterprises or other forms of organization.

This portion of the CBK requirement is generally satisfied through a basic undergraduate course in each of three areas: marketing, finance, and production/operations management.

(b) A background of the economic and legal environment as it pertains to profit and/or nonprofit organizations along with ethical considerations and social and political influences as they affect such organizations.

Examples of courses that satisfy these requirements are economics (6 hours are expected), political science, business law, and business, government, and society.

(c) A basic understanding of the concepts and applications of accounting, quantitative methods, and information systems.

This area of the CBK requirement may be met through course work in statistics, calculus, information systems, and accounting course work covering the accumulation of accounting data and the management uses of these data.

(d) A study of organization theory, behavior, and interpersonal communications.

Course work in management, written and oral communication, sociology, and psychology are ordinarily used to satisfy this CBK requirement.

(e) A study of administrative processes under conditions of uncertainty including integrating analysis and policy determination at the overall management level.

A course in business strategy typically satisfies this requirement.

Students with an undergraduate degree who have not done any work in CBK areas should satisfy the CBK foundation course requirements by completing the following courses:

ACCTG 211	Financial Accounting	3
ACCTG 221	Managerial Accounting	3
STAT 707	Applied Linear Statistical Models	3
FINAN 710	Managerial Finance	3
MKTG 700	Marketing Theory and Practice	3
MANGT 720	Management of Organizations	3
MANGT 721	Production and Operations Management	3
MANGT 766	Introduction to Management Information Systems	3
MANGT 891	Legal and Social Environment of Business	3
ECON 520	Intermediate Microeconomics	3
*MANGT 695	Business Strategy	3

*Not required if MANGT 888 is taken in the M.Acc. curriculum.

Accounting foundation courses. In addition to the CBK prerequisites, applicants must complete a minimum of 21 semester credits in the accounting discipline beyond principles of financial and management accounting. The 21 semester credits must include study in each of the following subjects. The KSU undergraduate course or courses which together satisfy each subject requirement are listed following each area. Comparable courses or combinations of courses from other schools may also satisfy the requirement.

Financial accounting and accounting theory		
ACCTG 311	Intermediate Accounting I	3
ACCTG 321	Intermediate Accounting II	3
ACCTG 411	Advanced Accounting	3
Management accounting		
ACCTG 312	Cost Accounting	3
Management information and computer systems		
ACCTG 413	Accounting Information Systems ...	3
Financial and operational auditing		
ACCTG 421	Auditing I	3
Taxation		
ACCTG 422	Taxation I	3
Governmental and not-for-profit accounting		
ACCTG 412	Public and Governmental Accounting	3

Each applicant's undergraduate transcripts (and previous graduate transcripts, if applicable) are analyzed for coverage of the CBK and accounting prerequisites. Provisional admission is granted to applicants who have subject deficiencies, which are then made up by enrolling in specified courses.

Generally, each candidate must complete the following program, including a comprehensive examination required in the final term of the student's program. Any exceptions must be arranged with the director of master accountancy studies.

M.Acc. required courses		
ACCTG 811	Accounting Theory I	3
ACCTG 812	Accounting Controls for Business ..	3
ACCTG 813	Accounting Research	3
FINAN 850	Financial Controls for Business	3
MKTG 840	Advanced Marketing Management .	3
		15

Select one (in consultation with the director of M.Acc. studies):		
MANGT 893	Business Operations Analysis	3
MANGT 820	Behavioral Management Theory ...	3
MANGT 890	Decision Theory	3
MANGT 866	Advanced Management Information Systems	3
MANGT 888	Administrative Strategy	3
		3

Select four (in consultation with the director of M.Acc. studies); two courses must be at the 800 level:		
ACCTG 711	Taxation II	3
ACCTG 722	Advanced Auditing	3
ACCTG 823	Tax Planning and Research	3
ACCTG 824	Accounting Theory II	3
ACCTG 825	Contemporary Accounting	3
		12
Comprehensive examination		0
Minimum hours required for graduation		30

It is recognized that different schools use different names for courses referred to above.

International Trade Institute

The International Trade Institute (ITI) was established at Kansas State University in 1980 as an integral part of the College of Business Administration. It provides special resources to help meet the growing challenges of world trade.

ITI staff members work with students on supervised projects and internships, and counsel those interested in international careers. In addition, the institute has established a Collegiate International Trade Association (CITA) at KSU which provides interaction between students from the U.S. and foreign countries concerning global issues of current importance.

The International Trade Institute is involved in a multistate research effort in applied international marketing to improve information available to decision-makers in business, government, and academia. The primary focus is on the development and evaluation of alternative trade strategies. Yearly conferences, seminars, and symposia are held to communicate the results of research and to promote discussion with recognized experts relevant to current international problems and opportunities.

Additional resources provided by the ITI, including a comprehensive library of international materials and computerized data services, are available to both students and faculty at KSU and to mid-American business executives. The ITI also cosponsors a bimonthly newsletter circulated to 9,500 businesses in the multistate area.

For further information, contact Dr. Raymond Coleman, Director, International Trade Institute, 1627 Anderson Avenue, Manhattan, Kansas 66502, (913) 532-6799.

Accounting

Maurice E. Stark,* Head
 Professors Fox,* Graham,* Laughlin,* and Stark;* Associate Professors Deines, Donnelly,* Thomas,* and Vruwink; Assistant Professors Ainsworth, Harrison, and Ott; Instructors Haycock and Lyle; Emeriti: Professor Clark; Associate Professor Gugler.

Accounting is often called the "language of business" as 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 which accomplish these objectives are specified below.

Requirements for major in accounting		
Business Administration Pre-Professional Program		
(See general section of the College of Business Administration.)		60
Additional required courses:		
STAT 351	Business and Economic Statistics II	3
FINAN 450	Business 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
ACCTG 311	Intermediate Accounting I	3
ACCTG 312	Cost Accounting	3
ACCTG 321	Intermediate Accounting II	3
ACCTG 411	Advanced Accounting	3
ACCTG 412	Public and Government Accounting	3
ACCTG 413	Accounting Information Systems ...	3
ACCTG 421	Auditing I	3
ACCTG 422	Taxation I	3
		49

Economics electives (see note 1 below)	6
Restricted general electives (in addition to those included in BAPP; see note 2 below)	9
Unrestricted electives (see note 3 below)	2
Total credit hours required	126

Note 1. Economics electives for students in accounting must be selected from the courses (numbered above 120) offered by the Department of Economics in the College of Arts and Sciences. ECON 505, Introduction to the Civilization of South Asia I, and ECON 506, Introduction to the Civilization of South Asia II, may not be used to fulfill the economics elective requirements.

Note 2. Restricted general electives may be selected from any or all of the following areas: humanities, natural science, social sciences, and quantitative.

Acceptable humanities and natural science electives are the same as those listed in the BAPP program.

Acceptable social science electives are all courses in anthropology, political science, psychology, sociology, and economics, except those used as BAPP requirements; all courses in geography, except those listed as natural sciences.

Acceptable quantitative electives are: all courses in the computing and information sciences department numbered 300 or above; MATH 221, Analytic Geometry and Calculus II; MATH 222, Analytic Geometry and Calculus III; and all courses in the statistics department numbered 500 or above.

Note 3. Unrestricted electives may be any courses (numbered 100 or above) offered for credit by a department at KSU.

Courses in accounting
Undergraduate credit
ACCTG 211. Financial Accounting. (3) I, II, S. The preparation and use of accounting records for individual, partnership, and corporate business organizations. Pr.: Sophomore standing. ACCTG-211-0-0502

ACCTG 221. Managerial Accounting. (3) I, II, S. Development and use of accounting information for management control. Covers statement analysis, cash and funds flows, cost systems and controls, and budgeting. Pr.: ACCTG 211 and MATH 100. ACCTG-221-0-0502

ACCTG 311. Intermediate Accounting I. (3) I, II, S. An in-depth exposure to the environment of accounting and application of accounting theory to the valuation of balance sheet accounts with emphasis on current assets. Pr.: ACCTG 221 and junior standing. ACCTG-311-0-0502

ACCTG 312. Cost Accounting. (3) I, II, S. Allocation of production costs to determine unit costs of goods manufactured and sold and the use of such data by management. Pr.: ACCTG 221. ACCTG-312-0-0502

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-321-0-0502

ACCTG 411. Advanced Accounting. (3) I, II. Accounting for leases, pensions, consolidations, and liquidation of partnerships. Pr.: ACCTG 321. ACCTG-411-0-0502

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-412-0-0502

ACCTG 413. Accounting Information Systems. (3) I, II. 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, ACCTG 312, and MANGT 466. ACCTG-413-0-0502

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-421-0-0502

ACCTG 422. Taxation I. (3) I, II. 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-422-0-0502

ACCTG 431. Problems in Accounting. (Var.) I, II, S. Pr.: Background of courses needed for the problems undertaken and consent of instructor. ACCTG-431-2-0502

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 ACCTG 312. ACCTG-491-0-0502

ACCTG 492. C.P.A Problems. (3) II. A study of problems in various C.P.A. examinations. Pr.: ACCTG 321 and 312. ACCTG-492-0-0502

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-631-2-0502

ACCTG 710. Accounting Concepts and Analysis. (3) I. The accumulation, presentation, interpretation, and quantitative applications of accounting data for business use. Pr.: MATH 100 and ECON 120 may be taken concurrently. ACCTG-710-0-0502

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-711-0-0502

ACCTG 722. Advanced Auditing. (3) II. 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. ACCTG-722-0-0502

Graduate credit (graduate students only)

ACCTG 811. Accounting Theory I. (3) I. An intensive treatment of problems in corporation accounting and reporting, with emphasis on income determination and balance sheet valuation. Pr.: Twenty-one hours of accounting. ACCTG-811-0-0502

ACCTG 812. Accounting Controls for Business. (3) I, S. The reliability of accounting data for business decisions and the relevance of such data to particular decisions are evaluated within the framework of changing economic conditions. Pr.: ECON 120 and ACCTG 221. ACCTG-812-0-0502

ACCTG 813. Accounting Research. (3) I. Introduction to accounting research methods and current research in financial, managerial, and public sector accounting, and auditing. Pr.: Twenty-one hours of accounting. ACCTG-813-0-0502

ACCTG 823. Tax Planning and Research. (3) II. Intensive examination of specific problems in taxation of partnership and corporate income, gift taxes, and death taxes. Emphasis on research and tax

planning. Pr.: Twenty-one hours of accounting including ACCTG 711. ACCTG-823-0-0502

ACCTG 824. Accounting Theory II. (3) II. A critical examination of accounting literature, with emphasis upon accounting theory and intensive study of current issues in accounting theory. Pr.: Twenty-one hours of accounting. ACCTG-824-0-0502

ACCTG 825. Contemporary Accounting. (3) II. An in-depth exposure to the current literature and pronouncements of accounting, particularly as they impact accounting and reporting practice. Pr.: Twenty-one hours of accounting. ACCTG-825-0-0502

Finance

Robert D. Hollinger,* Head
Professors Hollinger* and Richards;* Associate Professor Fatemi;* Assistant Professor Santiago; Instructor Oldfather.

The curriculum in finance allows for areas of emphasis in commercial banking, investment banking, and financial management of corporate and noncorporate business firms as well as offering courses in real estate and insurance. The finance major should have a broad understanding of business management concepts accompanied by a sound background in accounting, economic theory, management information systems, and quantitative techniques. The nature of their work also requires that financial managers possess effective communication skills and an ability 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
In addition to completing the 60-credit-hour business administration pre-professional program, finance majors must complete the following requirements:

ACCTG 311	Intermediate Accounting I	3
FINAN 450	Business Finance	3
FINAN 550	Financial Institutions and Markets	3
FINAN 551	Introduction to Investments	3
FINAN 650	Capital Budgeting	4
FINAN 651	Financial Management	4
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
Total credit hours of required courses		42
Accounting electives		3
One course selected from the following accounting courses in consultation with the student's academic advisor:		
ACCTG 312	Cost Accounting	3
ACCTG 321	Intermediate Accounting II	3
ACCTG 411	Advanced Accounting	3
ACCTG 421	Auditing I	3
Finance electives		6
Six credit hours selected from the following. At least three credits must be selected from courses numbered 500 or above:		
ACCTG 422	Taxation I	3
FINAN 460	Insurance	3
FINAN 552	Real Estate	3
FINAN 554	International Financial Management	3
FINAN 653	Securities and Portfolio Analysis ...	3
FINAN 655	Commercial Bank Management	3
Economics electives		6
Economics electives must be selected from the Department of Economics (ECON) course offerings numbered 510 or above in consultation with the student's academic advisor. At least one course must be selected from either ECON 510, Intermediate Macroeconomics, or ECON 520, Intermediate Microeconomics.		
Additional economics requirements may not overlap with economics courses used in major field or social science electives.		
Unrestricted electives		13
An unrestricted elective may be any course (numbered 100 or above) offered for credit by any University department.		
Total credit hours of elective areas		28
Total credit hours required (including 60 BAPP) ..		130

Undergraduate credit

FINAN 450. Business 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, CMPSC 200 and lab, and ACCTG 221. FINAN-450-0-0504

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, ECON 120, and junior standing. FINAN-455-0-0504

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-460-0-0504

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. FINAN-498-2-0504

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-550-0-0504

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-551-0-0504

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-552-0-0504

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. FINAN-554-0-0504

Undergraduate and graduate credit

FINAN 650. Capital Budgeting. (4) I, II. Development of a rational and systematic approach to formulating a firm's strategy for investing in productive facilities within an economy characterized by increasing technological change and uncertainty. Pr.: MATH 205, STAT 350, and FINAN 450. FINAN-650-0-0504

FINAN 651. Financial Management. (4) I, II. Analysis of problems in advanced financial planning and control. Pr.: MATH 205, STAT 350, and FINAN 450. FINAN-651-0-0504

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-653-0-0504

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-655-0-0504

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. FINAN-710-0-0504

Graduate credit (graduate students only)

FINAN 820. Advanced International Financial Management. (3) I. A study of the international dimensions of corporate financial management with an applied orientation. Pr.: FINAN 710. FINAN 820-0-0504

FINAN 850. Advanced Managerial Finance. (3) II. A study of the concepts necessary to analyze economic flexibility and risk of investment proposals, cost of capital, and capital structure within the context of a dynamic financial and economic environment. Pr.: FINAN 710. FINAN-850-0-0504

FINAN 890. Seminar in Finance. (3) On sufficient demand. In-depth study of selected contemporary issues in finance. Pr.: FINAN 710. FINAN-890-0-0504

FINAN 898. Advanced Problems in Finance. (Var.) I, II, S. Independent study of selected advanced topic(s) in finance. Pr.: Consent of department head. FINAN-898-0-0504

General Business

The general business major allows the student, in consultation with the academic advisor, to structure a program that fits 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 which stress business applications of quantitative techniques or the behavioral sciences.

Requirements for major in general business

In addition to completing the 60 credit hour business administration pre-professional program, general business majors must complete the following requirements:

FINAN 450	Business 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

Eighteen credit hours 18
to be taken from courses offered by the College of Business Administration and distributed as follows:

Twelve of the 18 hours must be selected from among the required courses in finance, management, or marketing majors representing all three majors.

The remaining six hours must be selected from courses listed as either required or elective for those three majors.

Total required credit hours	43
Unrestricted electives	8
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—All courses in art,* history, modern languages, music,* philosophy, dance,* theatre;* ARCH 301; English: all literature plus four (230, 231, 233, 234) humanities courses.

*All courses from these areas are acceptable; however, one may take a maximum of three credit hours total from these four areas in participation or artistic skill development courses.

Natural science—All courses in biochemistry, biology, chemistry, geology, and physics; ANTH 280, 281; DEN 420, 425; GEOG 220, 221. Note: One laboratory course is required.

Social science—All courses in anthropology, political science, psychology, sociology, and economics, except those used as BAPP requirements; all courses in geography, except those listed as natural sciences; DEN 250, Impact of Engineering Technology on Society; ENVD 510, Places and People; HDFS 230, Introduction to Human Development; HDFS 350, Family Relationships and Sex Roles.

Total elective credit hours	23
Total credit hours (including 60 BAPP)	126

Undergraduate credit

GENBA 101. General Topics in Business.

(1) S. An introduction to the academic challenges and the occupational opportunities in four business areas: management, marketing, finance, and accounting. (Not available to students currently enrolled in business.) Cr/NCr only. GENBA-101-0-0501

GENBA 215. Information Processing. (3) I, II. Application of office automation to letter styles, data tabulation, interoffice memoranda, manuscripts, and composition as applied to business. GENBA-215-0-0514

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-299-0-0501

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-391-0-0501

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-498-2-0501

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-499-0-0501

Graduate credit (graduate students only)

GENBA 894. Seminar in Business Administration. (3) On sufficient demand. Contemporary issues in business administration, including study of current literature and intensive investigation of various problem areas. Pr.: Fifteen hours of business courses at the 600 level or higher. GENBA-894-0-0501

GENBA 898. Advanced Business Problems. Credit arranged. I, II, S. Intensive investigation of special business problems. Pr.: Twenty-one hours of business courses at the 600 level or higher and sufficient training to complete the desired investigation. GENBA-898-3-0501

GENBA 899. Thesis Research. (Var.) I, II, S. Pr.: Sufficient background to pursue line of research undertaken and consent of instructor. GENBA-899-4-0501

Management

Yar M. Ebadi,* Head

Professors Deihl, Ebadi,* and Paul;* Associate Professor Townsend;* Assistant Professors Butler, Elsea, Kim, Park, and Riley;* Instructor Hagmann; Emeriti: Professors Barton-Dobenin and Jones; Associate Professors Eriksen and Thiessen; Assistant Professor Buzenberg.

The undergraduate curriculum in management allows for areas of emphasis in human resource management, management information systems, and production and operations management. In addition to these specific areas, the Department of Management offers courses in general management 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 department also emphasizes small business management, housing the KSU Small Business Development Center, and the L. L. McAninch Chair of Entrepreneurship.

Requirements for major in management

In addition to completing the 60 credit hour Business Administration Pre-Professional Program, management majors must complete the following requirements:

ECON 520	Intermediate Microeconomics	3
	or	
ECON 540	Managerial Economics	3
FINAN 450	Business 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

Management major field emphasis; 12 hours selected from:

Human resources management

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
MANGT 390	Business Law I	3
Management information systems		
MANGT 566	Systems Analysis and Design	3
MANGT 622	Decision Analysis	3
MANGT 666	Application of Data Models in Business	3
MANGT 691	Business Measurements and Forecasting	3
MANGT 696	Computer Applications in Management	3
MANGT 690	International Management	3
MANGT 390	Business Law I	3
Production/operations management		
MANGT 522	Operations Planning and Control ..	3
MANGT 622	Decision Analysis	3
MANGT 625	Materials and Procurement	3
MANGT 691	Business Measurements and Forecasting	3
MANGT 696	Computer Applications in Management	3
MANGT 690	International Management	3
MANGT 530	Industrial and Labor Relations	3

General management

Select three credit hours from each major field emphasis above and three additional credit hours from any of the three fields of emphasis or from the following list:

ACCTG 312	Cost Accounting	3
ACCTG 422	Taxation I	3
FINAN 550	Financial Institutions and Markets	3
FINAN 551	Introduction to Investments	3
FINAN 650	Capital Budgeting	4
FINAN 651	Financial Management	4
MKTG 450	Consumer Behavior	3
MKTG 640	Marketing Research	3
MKTG 690	Marketing Management	3

Humanities electives—All courses in art,* history, modern languages, music,* philosophy, dance,* theatre;* ARCH 301; English: all literature plus four (230, 231, 233, 234) humanities courses.

*All courses from these areas are acceptable; however, one may take a maximum of three credit hours total from these four areas in participation or artistic skill development courses.

Natural science electives—All courses in biochemistry, biology, chemistry, geology, and physics; ANTH 280, 281; DEN 420, 425; GEOG 220, 221. Note: One laboratory course is required.

Social science electives—All courses in anthropology, political science, psychology, sociology, and economics, except those used as BAPP requirements; all courses in geography, except those listed as natural sciences; DEN 250, Impact of Engineering Technology on Society; ENVD 510, Places and People.

Quantitative electives—Select quantitative electives from the following areas: computing and information sciences (300 level and above), statistics (500 level and above), plus:

MATH 221, Analytical Geometry and Calculus II;
MATH 222, Analytical Geometry and Calculus III.

Total elective credit hours	17
Total credit hours (including 60 BAPP)	126

Undergraduate credit

MANGT 202. Small Business Operations. (3) 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-202-0-0506

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-330-0-0516

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-390-0-0501

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-392-0-0501

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-420-0-0506

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-421-0-0506

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.: CMPSC 200 and lab; MANGT 420. MANGT-466-0-0506

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-495-2-0501

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. MANGT-498-2-0506

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-520-0-0506

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.: CMPSC 200 and lab, MANGT 420, MATH 205, and STAT 350. MANGT-521-0-0506

MANGT 522. Operations Planning and Control. (3) I. 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-522-0-0506

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-530-0-0516

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-531-0-0506

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 MANGT 520. MANGT-566-0-0506

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-596-0-0501

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-620-0-0506

MANGT 622. Decision Analysis. (3) I, II. Application of decision-making models and quantitative techniques to business problems and policy. Pr.: MANGT 421. MANGT-622-0-0506

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-623-0-0506

MANGT 625. Materials and Procurement Management. (3) II. Principles and concepts of planning and control of materials movement and storage activities in business organizations. Topics include: materials handling, purchasing, order processing, inventory management systems, and the application of materials requirement planning. Pr.: MANGT 421. MANGT-625-0-0506

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, NCRP policies, employee rights, union rights, employer rights, and contract enforcement. Pr.: Junior standing. MANGT-630-0-0516

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-631-0-0516

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-633-0-0506

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 MANGT 630. MANGT-637-0-0516

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-639-0-0516

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-666-0-0506

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-690-0-0506

MANGT 691. Business Measurements and Forecasting. (3) On sufficient demand. Performing the measurement and forecasting functions in the organization, selecting and analyzing organizational and economic data, applying appropriate techniques, and integrating results with formal plans and decisions. Applications and forecast preparation. Pr.: CMPSC 200 and lab, and MANGT 421. MANGT-691-0-0506

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-695-0-0501

MANGT 696. Computer Applications in Management. (3). A study of computer solutions to business problems and the development of computer models and programs in PERT, inventory control, mathematical programming, simulation, operations data analysis, and information systems. Pr.: CMPSC 200 and lab, and MANGT 421. MANGT-696-0-0506

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-720-0-0506

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-721-0-0506

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.: CMPSC 110 and MANGT 720. MANGT-766-0-0506

Graduate credit (graduate students only)

MANGT 820. Behavioral Management Theory. (3) II, S. An in-depth analysis of the development of the behavioral bases of individual and group behavior in business, governmental, educational, and other organizations with emphasis on current research literature and applications. Pr.: MANGT 720. MANGT-820-0-0506

MANGT 866. Advanced Management Information Systems. (3) I, II. An in-depth, analytical treatment of organizing, producing, and using information in complex organizations. Examination of information-management tools and concepts including technological developments, data processing, information systems' impact on organizations, and system output implementation. Problems and techniques concerning the development and installation of responsive systems' outputs. Pr.: MANGT 766. MANGT-866-0-0506

MANGT 888. Administrative Strategy. (3) I, S. Through case analysis, a study of the functions, responsibilities, and point of view of general management and the problems which affect the total organization's character and success. The formulation and application of administrative strategy; specifically, analysis of interrelationships between the external and internal environments, choice of purpose, molding of organizational character, definition of what needs to be done, and mobilization of resources for goal attainment. Pr.: FINAN 850, MANGT 820 and 893, and MKTG 840. MANGT-888-0-0506

MANGT 890. Decision Theory. (3) On sufficient demand. An integration of economic theory and operations research in solving business problems and making decisions with emphasis on model building, information selection and use, reducing uncertainty, and strategy development and optimization. Pr.: MANGT 720, MATH 205, STAT 707 or conc. enrollment. MANGT-890-0-0506

MANGT 891. 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. MANGT-891-0-0501

MANGT 893. Business Operations Analysis. (3) II, S. The application of management science methods to business problems to provide a basis for rational decision making. Includes mathematical programming, inventory theory, simulation, model building, and heuristics. Pr.: MANGT 720, MATH 205, STAT 707 or conc. enrollment. MANGT-893-0-0506

MANGT 898. Special Problems in Management. (Var.) As scheduled. An in-depth study of specified topics. Pr.: Twelve hours of management and consent of the instructor and department head. MANGT-898-0-0506

Marketing

Wayne Norvell,* Head

Professors Coleman* and Norvell;* Associate Professors Andrus, Bellizzi, Fraser, and Hite; Instructors Ahern and Thierer.

Study in marketing covers such areas as the consumer, the seller, marketing strategy, marketing research, and marketing decisions. The Department of Marketing offers an undergraduate degree program as well as graduate work in the master of business administration (M.B.A.) degree. Undergraduate dual degree and dual major programs, combining marketing with other fields, may be arranged by consulting the marketing department office. Extracurricular activities are available through the Marketing Club (for all students), Pi Sigma Epsilon (sales management), and Alpha Mu Alpha (national honorary). Each offers continuing social and professional functions involving practicing marketers.

Requirements for major in marketing

In addition to completing the 60-credit-hour business administration pre-professional program, marketing majors must complete the following requirements:

FINAN 450	Business 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 Economic Statistics II	3
Total credit hours of required courses		34
Marketing electives		9
nine hours from the following courses:		
MANGT 692	Computer Applications in Management	3
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
MKTG 641	Business Logistics	3
Unrestricted electives		9
Restricted electives		11
Economics		6
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

*Additional economics requirements may not overlap with economics courses in major field or as social science electives.

Humanities, natural, social, quantitative
any courses from the four categories below: 9

Humanities—All courses in art,* history, modern languages, music,* philosophy, dance,* theatre;* ARCH 301; English: all literature plus four (230, 231, 233, 234) humanities courses.

*All courses from these areas are acceptable; however, one may take a maximum of three credit hours total from these four areas in participation or artistic skill development courses.

Natural science—All courses in biochemistry, biology, chemistry, geology, and physics; ANTH 280, 281; DEN 420, 425; GEOG 220,221. Note: One laboratory course is required.

Social science—All courses in anthropology, political science, psychology, sociology, and economics, except those used as BAPP requirements; all courses in geography, except those listed as natural sciences; DEN 250, Impact of Engineering Technology on Society; ENVD 510, Places and People; HDFS 230, Introduction to Human Development; HDFS 350, Family Relationships and Sex Roles.

Quantitative—Select quantitative electives from the following areas: computer science (300 level and above); statistics (500 level and above); plus: MATH 221, Analytic Geometry and Calculus II; MATH 222, Analytic Geometry and Calculus III.

Total credit hours of elective areas 27
Total credit hours required (including 60 BAPP) .. 126

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-400-0-0509

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-442-0-0509

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-450-0-0509

MKTG 498. Independent Study in Marketing. (Var.) I, II, S. Selected topics in marketing. Pr.: Consent of department head. MKTG-498-2-0509

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-541-0-0509

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-542-0-0509

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-543-0-0509

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-544-0-0509

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-545-0-0509

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. MKTG-550-0-0509

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-640-0-0509

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 MKTG 450. MKTG-690-0-0509

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. MKTG-700-0-0509

Graduate credit (graduate students only)

MKTG 840. Advanced Marketing Management. (3) II. An analytical approach to the study of marketing problems of business firms and other types of organizations. Attention to the influence of the marketplace and the marketing environment on marketing decision making; the organization's services, products, and communication strategies; and the organization's systems for planning and controlling its marketing effort. Pr.: Six hours of economics, three hours in marketing, three hours in statistics, and MATH 205 or 220. MKTG-840-0-0509

MKTG 841. Special Topics in Marketing. (3) On sufficient demand. Investigation and discussion of a selected advanced topic in marketing. One of the following five topics will be chosen for intensive study: (1) industrial marketing management, (2) advanced consumer behavior, (3) product policy, (4) financial aspects of marketing management, (5) marketing in the service sector. Pr.: MKTG 840 or six hours of marketing. MKTG-841-0-0509

MKTG 892. Research Methods in Business. (3) I. Application of statistical methods of analysis to problems in business. Experimental design, data collection, and methods of analysis are covered. Pr.: STAT 350 and MANGT 420. MKTG-892-0-0509

MKTG 898. Independent Study. (Var.) I, II, S. Selected topics in marketing. Pr.: Consent of department head. MKTG-898-0-0509

Faculty

AHERN, MICHAEL, Instr. of Marketing (1981). BS 1979, MBA 1981, Kansas St. U.

AINSWORTH, PENNE L., Asst. Prof. of Accounting (1987). BS 1983, MAcc 1984, Kansas St. U.; CPA 1985, Kansas; PhD 1988, U. of Nebraska.

ANDRUS, DAVID M., Asst. Dean; Assoc. Prof. of Marketing (1983). BS 1976, Oklahoma St. U.; MA 1978, U. of Hawaii; PhD 1981, U. of Iowa. (*)

ARTHUR, CHARLES S., Instr. of Accounting (1971). BS 1967, Kansas St. U.; MLL 1970, New York U.

BARTON-DOBINEN, JOSEPH, Prof. Emeritus of Management (1958). BS 1956, MA 1958, PhD 1966, U. of Nebraska. (*)

BELLIZZI, JOSEPH A., Assoc. Prof. of Marketing (1984). BS 1970, MS 1972, PhD 1978, U. of Nebraska. (*)

BILES, BERTRAM R., Asst. Dean of Graduate School and Asst. Prof. of Marketing (1972). BA 1963, PhD 1976, Kansas St. U.

BUTLER, DAYLIN J., Asst. Prof. of Management (1984). BA 1972, U. of Southern California; MBS 1984, U. of California, Berkeley; PhD 1984, U. of Michigan.

BUZENBERG, MILDRED E., Asst. Prof. Emerita of Management (1964). BA 1938, Michigan St. U.; MS 1951, Kansas St. U.

CLARK, WILLIAM J., Prof. Emeritus of Accounting (1946). BS 1929, Pittsburg St. U.; MA 1940, St. U. of Iowa; CPA 1954, Kansas. (*)

COLEMAN, RAYMOND J., Prof. of Marketing and Dir. of International Trade Inst. (1965). BS 1948, U. of Kansas; MA 1963, Central Missouri St. U.; PhD 1967, U. of Arkansas. (*)

COLEMAN, RICHARD P., Prof. of Marketing (1981). BA 1948, U. of Tulsa; MA 1949, U. of Iowa; PhD 1959, U. of Chicago. (*)

DEIHL, LINCOLN W., Prof. of Management (1979). BS 1949, Bowling Green St. U.; MS 1951, Indiana U.; PhD 1964, Ohio St. U.

DEINES, DAN, Assoc. Prof. of Accounting (1982). BA 1970, Fort Hays St. U.; MS 1974, Emporia St. U.; CPA 1984, PhD 1985, U. of Nebraska.

DONNELLY, DAVID P., Assoc. Prof. of Accounting (1977). BS 1973, MBA 1977, Kansas St. U.; PhD 1983, U. of Illinois; CPA 1973, Kansas. (*)

EBADI, YAR M., Prof. and Head of Management (1983). PhD 1977, Indiana U. (*)

ELSEA, STANLEY W., Asst. Prof. of Management (1985). BS 1954, MBA 1981, Kansas St. U.; DBA 1984, Indiana U.

ERIKSEN, CONRAD J. K., Assoc. Prof. Emeritus of Finance (1946). BA 1929, U. of Kansas; MBA 1931, Harvard U.

FATEMI, ALI, Assoc. Prof. of Finance (1980). BA 1972, Tehran Bus. Col.; MBA 1975, PhD 1979, Oklahoma St. U. (*)

FOX, KENNETH L., Prof. of Accounting (1969). BA 1953, MA 1960, Baylor U.; CPA 1958, Texas, Louisiana; CPA 1971, Kansas; PhD 1966, U. of Illinois. (*)

FRASER, CYNTHIA, Assoc. Prof. of Marketing (1986). BA 1974, U. of Missouri-Kansas City; PhD 1980, U. of Pennsylvania.

GRAHAM, JOHN, Prof. of Accounting (1970). BA 1967, Kansas St. U.; MBA 1968, PhD 1970, U. of Arkansas. (*)

GUGLER, MERLE E., Assoc. Prof. Emeritus (1947). BS 1940, Emporia St. U.; MS 1948, Kansas St. U.; CPA 1956, Kansas. (*)

HAGMANN, CONSTANZA, Instr. of Management (1976). BS 1975, U. of Oregon; MBA 1976, MS 1984, Kansas St. U.

HARRISON, PAUL D., Asst. Prof. of Accounting (1982). BS 1976, MBA 1977, Kansas St. U.; DBA 1982, Arizona St. U.

HAYCOCK, ANN, Instr. of Accounting (1980). BS 1963, Sacramento St. Col.; M.Acc. 1980, Kansas St. U.; CPA 1981, Kansas.

HITE, ROBERT E., Assoc. Prof. of Marketing (1986). BS 1970, Indiana U.; MBA 1977, Indiana St. U.; PhD 1982, U. of Arkansas. (*)

HOLLINGER, ROBERT D., Assoc. Dean; Prof. and Head of Finance (1966). BS 1964, MS 1968, PhD 1973, Kansas St. U. (*)

HOSTETLER, CHARLES H., Instr. of Finance (1983). BA 1960, Kansas St. U.; LLB 1963, U. of Kansas.

JONES, C. CLYDE, Prof. Emeritus of Management (1960). AB 1944, Marshall U.; MA 1950, PhD 1954, Northwestern U. (*)

KIM, SANG-OOK, Asst. Prof. of Management (1986). BA 1981, Hankook U., Korea; MBA 1985, PhD 1986, U. of Nebraska-Lincoln.

LAUGHLIN, EUGENE J., Prof. of Accounting (1955). BS 1951, Rockhurst Col.; MS 1959, Kansas St. U.; CPA 1960, Kansas; PhD 1965, U. of Illinois. (*)

LYLE, JOHANNA D., Instr. of Accounting (1983). BA 1965, U. of Kansas; MAcc 1983, Kansas St. U.; CPA 1983, Kansas.

MULANAX, ALVIN E., Assoc. Prof. Emeritus of Marketing (1947). BS 1946, MS 1951, Kansas St. U. (*)

MURRAY, CATHERINE D., Instr. and Asst. Dir. International Trade Inst. (1987). BA 1974, Kansas St. U.; MA 1982, MBA 1983, U. of Kansas.

NORVELL, WAYNE, Prof. and Head of Marketing (1977). BS 1964, Arkansas Polytechnic Col.; MBA 1965, U. of Arkansas; DBA 1973, Mississippi St. U. (*)

OLDFATHER, KATHLEEN J., Instr. of Finance (1984). BA 1980, Augustana Col.; MBA 1984, Kansas St. U.

OTT, RICHARD L., Asst. Prof. of Accounting (1986). BA 1969, U. of St. Thomas; MBA 1980, U. of Houston at Clear Lake City; MAcc 1982, PhD 1986, Texas Tech U.

PARK, MIKE MYUNG, Asst. Prof. of Management (1987). BA 1980, Korea U.; MA 1983, Virginia St. U.; PhD 1987, Texas A & M.

PAUL, ROBERT J., Prof. of Management (1978). BBA 1954, U. of Wisconsin; MS 1962, Oklahoma St. U.; PhD 1966, U. of Arkansas. (*)

POHLMAN, RANDOLPH A., Dean; Prof. of Finance (1976). BS 1967, MS 1969, Kansas St. U.; PhD 1976, Oklahoma St. U. (*)

RICHARDS, VERLYN D., Prof. of Finance (1965). BS 1956, MS 1960, Kansas St. U.; CPA 1961, Kansas; PhD 1967, U. of Illinois.

RILEY, MERRILL J., Asst. Prof. of Management (1966). BS 1951, John Brown U.; MBA 1955, U. of Arkansas.

SANTIAGO, EMMANUEL S., Asst. Prof. of Finance (1982). MA 1978, PhD 1984, Kansas St. U.

STARK, MAURICE E., Prof. and Head of Accounting (1976). BS 1959, MS 1966, Kansas St. U.; PhD 1972, U. of Missouri; CPA 1961, Kansas; 1968, Michigan. (*)

STEWART, KAY C., Asst. Dean; Instr. in Business Administration (1972). BS 1966, West Virginia Inst. of Tech.; MS 1971, Fort Hays St. U.

THIERER, JODI L., Instr. of Marketing (1984). BS 1980, MBA 1984, Kansas St. U.

THIESSEN, EMIL A., Assoc. Prof. Emeritus of Business Administration (1968). AB 1948, Tabor Col.; MS 1951, Emporia St. U.; EdD 1959, Colorado St. Col. (*)

THOMAS, LYNN R., Assoc. Prof. of Accounting (1986). BS 1971, MBA 1973, Kansas St. U.; CPA 1973, Kansas; PhD 1980, U. of Kansas. (*)

TOWNSEND, JAMES B., Assoc. Prof. of Management (1977). BS 1945, U.S. Military Acad.; MA 1964, DBA 1976, Georgia Washington U. (*)

VRUWINK, DAVID R., Assoc. Prof. of Accounting (1982). BS 1973, U. of Wisconsin-Stevens Point; MBA 1976, U. of Wisconsin-Oshkosh; PhD 1982, U. of Arkansas.

WORTHINGTON, ROY H., Instr. of Finance (1983). BA 1967, U. of Colorado; JD 1973, Washburn U.

Education

David R. Byrne, Dean

Michael C. Holen, Associate Dean

Jerry G. Horn, Associate 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

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 at KSU in its interdisciplinary approach to the preparation of teachers and other educational personnel.

The KSU undergraduate teacher education programs and the master of science and doctor of philosophy degree programs are accredited by the Kansas Board of Education, North Central Association of Colleges and Secondary Schools, and National Council of Accreditation of Teacher Education. A new degree, the doctor of education (Ed.D.), has been approved and is available in a number of professional areas.

The College of Education participates in the intercollegiate programs in women's studies and gerontology, described earlier in this catalog under Academic Programs.

Support facilities

In addition to major instructional and research programs, the College of Education provides service to KSU faculty and students, local schools, and a wide variety of other entities in the state and region. Specific services of the College of Education are provided/coordinated through the following centers.

Center for Extended Services and Studies

The center initiates and responds to requests for in-service programs, administrative searches, curriculum studies, program evaluations, and other studies designed to generally enhance the improve-

ment of education at all levels and environments. The center is staffed and maintained through the assignment of faculty and staff in the College of Education and through contracts with faculty from KSU and other professionals as determined by the nature of the project. Coordination of resources at KSU for educational development is a major responsibility of this service unit.

Center for Rural Education and Small Schools

Activities designed to address the unique needs of rural and small schools 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 faculty and staff in the College of Education.

Center for Economic Education

With joint support by KSU and many Kansas businesses, the Center for Economic Education has developed and conducted pre- and in-service programs on economic education. Center staff provide consultation seminars, demonstrations, and 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. From its inception, the center has recognized the importance of the classroom teacher, and most of its programs and activities are designed to help teachers improve the quality and increase the quantity of economics taught in schools and colleges.

Kansas Center for Community Education

The center helps schools and other agencies to: develop closer cooperative relationships; avoid costly duplication of facilities and services; make maximum use of community human and physical resources; provide lifelong learning and enrichment opportunities for all community citizens; increase cooperation to meet economic, social, cultural, recreational, health, educational, and aesthetic needs; develop a process for identifying existing and future needs of the community; and marshal community

resources capable of effecting appropriate change.

The center develops and disseminates basic information about community education. The center's staff is available to help in organizing and implementing programs of community education. The center also is involved in providing in-service seminars, workshops, and institutes. It also serves as a liaison with the national network of institutions and agencies involved in the development of community education.

Instructional Media Center

The Instructional Media Center provides a wide range of services, instructional materials, and audiovisual equipment for faculty and students. Materials of professional quality 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 wide variety of audio and video 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 has assembled a group of faculty affiliates specializing in science, mathematics, computer science, and environmental education from across the K-State campus. The center's mission is to facilitate collaboration among individuals and units on and off campus for the purpose of creating, implementing, evaluating, and disseminating models for teaching theoretical and applied science concepts and principles to individuals. Specific activities include implementing elementary and secondary science curriculum studies, providing innovative in-service and renewal classes for teachers of the state and region,

and applying research findings to school practice. The center faculty affiliates work cooperatively in research, in-service, and evaluation projects throughout Kansas.

Honors program

The honors program in the College of Education, more fully described earlier in this catalog under Academic Programs, has been established for those 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 Kansas State University.

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 nine 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 a special section of EDAF 315, Educational Psychology (3), 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 two credit hours under the supervision of a professor in the College of Education.

Features of the 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 of KSU. The seminars will be focused on topics which will broaden the knowledge of future teachers and give them insights into leadership responsibilities in their professions.

Honors Research gives the students an opportunity to work with professors having similar research interests. Research topics may be selected from a wide range of areas and they may reflect the student's particular interests.

Teacher education

Undergraduate study

The College of Education is the designated authority for all KSU teacher certification recommendations to the Kansas Department of Education. All certification programs offered by KSU have been approved by the Kansas Department of Education. The programs are designed to develop competencies essential for teaching. Some programs are a part of degree requirements in a college 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 advisor 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.

Requirements for admission to teacher education

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.

Hours

Fifty total hours must be completed including all transfer and KSU credits.

English composition

Both English Composition 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 C grade 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 KSU 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. Those 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 teaching specialty

A 2.5 GPA is required in all college work attempted in the teaching specialty at other institutions and at KSU. There is no probationary admission for students with a teaching field GPA of less than 2.5.

Pre-professional skills test

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 the student will be dropped from teacher education. Tests will be given in a series of days in the early fall and early spring semesters 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, vocational agriculture, early childhood education, or speech clinician programs should contact their advisors concerning the proper course which satisfies 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.

The professional semester

The professional semester comprises a series of prescribed courses which 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 KSU must earn credit for teaching participation in residence. Those students who have had any secondary methods course in another college or university will be required to audit the equivalent course at KSU.

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

The coordinator of laboratory experiences will notify applicants of admission to the professional semester. Students will be approved for the professional semester when the requirements listed below have been met. If the student is notified that all requirements for the professional semester have not been satisfied, the student 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 secondary majors

A grade point average of 2.5 in all teaching fields based on all teaching field courses attempted at KSU and at all colleges or universities attended.

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.

Note: 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:

The 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 request for this program.

The CUTE option. The Cooperative Urban Teacher Education option is in an urban educational setting in Kansas City in which the 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 persons seeking teacher certification as well as those enrolled in degree programs in the College of Education.

Students who graduate within six years from the time they enter KSU 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 the student cannot be certified by the state of Kansas under the original entry requirements.

Students who interrupt their programs but do complete the degree or teacher education program within the six-year period shall be required to modify the entry program if the Kansas Department of Education has made changes in Kansas teaching certification requirements.

If more than six years have elapsed since original entry the student will need to complete the degree or teacher education program requirements in existence at the time the student re-enters the University for the final and uninterrupted phase of the program.

This policy applies to students who are admitted to the University with previously attained credit as follows:

	allowed for completion
less than 30 credits	6 years
30 to 59 credits	5 years
60 to 89 credits	4 years
90 or more credits	3 years

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 certification requirements have changed, whereupon the student must modify the entry program to include the current certification requirements.

Professional certification

Initial certification

The College of Education has the responsibility to serve as the recommending agent for all KSU 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. Those 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. Effective May 1, 1986, the state of Kansas will issue initial teaching certificates only to

those 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 Kansas State University 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.

Persons 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
KSU 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). KSU may become the recommending agent for individuals presenting degrees from other accredited institutions. These persons must complete eight hours in residence.

Recertification
The Kansas Board of Education has eliminated the parent institution role in recertification. Renewal applications not requesting an additional certification endorsement are sent directly to the Kansas Department 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.

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 English Composition I 3
ENGL 120 English Composition II 3

SPCH 105 Public Speaking IA 2
or
SPCH 106 Public Speaking I 3
or
SPCH 109 Oral Communication Honors 3
Modern language, linguistics, or literature 3-4

Psychology (minimum, one course)
PSYCH 110 General Psychology 3

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, 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 308, Topics in Mathematics for Elementary School Teachers.

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.

The minimum total hours required in general education 50

Physical education requirement
PE 101 Concepts in Physical Education 1

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 KSU 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, the student is admitted to the professional level and assigned to a professional-level advisor.

College of Education teacher education
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.

Professional and specialized courses required
The following course is required for admission to teacher education:
DED 100 Pre-Professional Laboratory Experience 1

The following courses may be taken before a student is admitted to the teacher education program.

ART 170 Art for Elementary Schools 3
EDAF 215 Educational Implications of Growth and Development 3
EDCI 300 Principles of Elementary Education 3
HDFS 352 Concepts of Personal Health 3
or
PE 379 Physical Education for the Elementary School Teacher 3
MUSIC 405 Music for Elementary Teachers 3
ENGL 540 Literature for Children 3
EDAF 623 Exceptional Child in the Regular Classroom 3

The application for admission to a teacher education program must be filed and approved before the 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.

EDAF 315 Educational Psychology 3
EDCI 318 Instructional Media and Technology 2
EDCI 470 Science for Elementary Schools 3
EDCI 471 Language Arts for Elementary Schools 3
EDCI 472 Social Studies for Elementary Schools 3
EDCI 473 Mathematics for Elementary Schools 3
EDCI 474 Elementary School Reading 3

Professional semester: see earlier information for specific prerequisites.
EDCI 585 Teaching Participation in the Elementary School 8
EDCI 600 Reading with Practicum 3
EDAF 611 Educational Sociology 3
Total 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.

*Those choosing a modern language area of 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 major studies as specifically outlined in the following sections.

General education requirements

Communications (8-9 hours)

ENGL 100	English Composition I	3
ENGL 120	English Composition II	3
SPCH 105, 106, 109	Public Speaking	3

Humanities (12 hours)

Any two of the following four: ENGL 230, 231, 233, 234		6
Literature: ENGL 260, 265, 280, 285, 360, 365, 370, 375		3
Restricted elective		3

Social science (9 hours)

History: HIST 101, 102, 251, 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		
CMPSC 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

PE 101	Concepts of Physical Education	1
Total		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
EDAF 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.

EDAF 315	Educational Psychology	3
EDAF 323	Exceptional Students/Secondary School	2
EDCI 376	Core Teaching Skills and Lab	3

Block II—Courses must be taken concurrently and are a prerequisite for Block III.

EDCI 476	Content Area Methods/Secondary School	2
EDCI 477	Middle Level/Secondary Reading	2
EDCI 420	Content and Reading Methods Lab	1

Block III—Courses must be taken concurrently.

EDCI 455	Teaching in a Multicultural Society	1
EDAF 525	Interpersonal Relations in the School	1

EDCI 586	Teaching Participation/Secondary School	12
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Non-blocked courses—These courses must be taken after admission to teacher education and prior to student teaching.

EDAF 410	Foundations of Education	3
EDCI 318	Instructional Media and Technology	2
Total		36

Electives

Hours will vary with majors; they will bring the total hours to 126.

Majors

Art education (EDART)

Students preparing for K-12 certification must complete ART 170, 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 ---	Art electives	4

Additional hours in one of the following specialized art subjects: painting, prints, ceramics, sculpture, metal-smithing and jewelry, graphic design, drawing

Total		45
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Business education (EDBUS)

GENBA 215	Information Processing	3
GENBA 315	Administrative Data Applications	3
FINAN 460	Insurance	3
ACCTG 211	Financial Accounting	3
ACCTG 221	Managerial Accounting	3
GENBA 415	Administrative Support Services	3
EDAO 686	Topics/Office Management	3
MANGT 390	Business Law I	3
MANGT 420	Management Concepts	3
MKTG 400	Marketing	3
FINAN 450	Business Finance	3
ECON 530	Money and Banking	3

Option A: Shorthand (minimum 6 hours)

*subject to revision

GENBA 114	Fundamentals of Shorthand	4
GENBA 214	Intermediate Shorthand	3
GENBA 344	Transcription Shorthand	3

Option B: Computer literacy (6 hours)

CMPSC 300	Algorithmic Processes	3
EDCI 618	Microcomputers in Instruction	2
EDCI 619	Microcomputers in Instruction Lab	1

Supporting courses required:

ECON 110	Economics I	3
ECON 120	Economics II	3
POLSC 325	United States Politics	3
SOCIO 211	Introduction to Sociology	3
MATH 100	College Algebra	3
CMPSC 110	Introduction to Personal Computing	3
CMPSC 200	Fundamentals of Computer Programming	2
CMPSC 20-	Computer language lab (PASCAL recommended)	2
or		
CMPSC 591	Computer Science Applications	3

FEC ---	Family economics elective (selection must be approved by College of Education advisor)	3
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Total **63-65**

*Shorthand option under revisions. See business education advisor for current status prior to enrollment.

English (EDENG)*

Two of the following four survey courses:

ENGL 260	British Survey I	3
ENGL 265	British Survey II	3
ENGL 280	American Survey I	3
ENGL 285	American Survey II	3

Required:

ENGL ---	A world literature course	3
ENGL 250	Forms of Literature	3
ENGL 400	Advanced Composition	3
ENGL 530	Modern English Grammar	3
ENGL 545	Literature for Adolescents	3
ENGL 350	Introduction to Shakespeare	3
or		
ENGL 716	Shakespeare: Comedies and Histories	3
or		
ENGL 717	Shakespeare: Tragedies and Romances	3
ENGL ---	Literature electives at 600 level and above	9
ENGL ---	Composition elective (may include ENGL 500, or ENGL 761, or ENGL 763)	3
ENGL 790	History of the English Language	3
PSYCH 650	Psychology of Language	3

May include one introduction to genre (ENGL 310, 320, 340, or 350) or fourth survey course.

Total **39**

*Includes changes for which Faculty Senate approval is expected. Students interested in both English and journalism, see English education advisor.

Journalism (EDJOR)*

JMC 235	Introduction to Mass Communications	3
JMC 275	Writing for Mass Communications	3
JMC 300	Editing and Design	3
JMC 310	Photography I	3
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
or		
RTV 250	Television Video I	3
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

Total **30**

*Includes changes for which Faculty Senate approval is expected.

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
MATH 240	Elementary Differential Equations	4

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
MATH 512	Introduction to Modern Algebra I ..	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 573	Transformation and Vector Geometry	3
MATH 791	Topics in Mathematics for Secondary School Teachers	3

Supporting courses required:

STAT 320	Elements of Statistics	3
STAT 510	Introductory Probability and Statistics I	3
CMPS ---	Computer science with language course	3-4
Total		40-41

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
FREN 513	French Composition and Conversation	3
FREN 514	French Civilization	3
FREN 719	Advanced Spoken and Written French	3
FREN ---	French electives at 500 and above	6
Total		30

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
GRMN 523	German Composition	3
GRMN 530	German Civilization	3
GRMN 731	Advanced Spoken and Written German	3
GRMN ---	German electives at 500 and above	6
Total		30

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
SPAN 563	Introduction to the Literature of Spanish America	3
SPAN 564	Spanish Composition and Grammar	3
SPAN 565	Spanish Civilization	3
SPAN 566	Hispanic-American Civilization	3
SPAN 567	Introduction to the Literature of Spain	3
SPAN 571	Advanced Spanish Conversation ...	2
SPAN ---	Spanish electives at 500 and above ..	7
Total		30

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:

EDCI 585	Teaching Participation in the Elementary School	Var.
EDCI 620	Foreign Language Methods for Elementary Schools (offered spring of even years)	3

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
THTRE ---	500 level or above in Theatre	3
SPCH 322	Interpersonal Communication	3
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
SPCH 235	Introduction to the Art of Film	3
Total		36

Natural science majors**Biological science (EDBSC)**

BIOL 198	Principles of Biology	4
BIOL 201	Organismic Biology	5
BIOL 555	Microbiology	5
BIOL 303	Ecology of Environmental Problems	3
BIOL 529	Fundamentals of Ecology	3
BIOL 631	Ecology	3
ASI 500	Genetics	3
BIOL 400	Human Genetics	3

Eight hours of biology electives. Many different biology courses may be used but it is strongly 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 440	Cell Biology	3
BIOL 510	Embryology	3
BIOL 560	Evolutionary Biology	2

Chemistry courses required:

CHM 210	Chemistry I	4
CHM 230	Chemistry II	4
CHM 240	Environmental Chemistry Laboratory	1
CHM 350	General Organic Chemistry	3

Other required courses:

GEOL 130	Elementary Geology Laboratory	1
GEOL 512	Earth Science	3
PHYS 115	Descriptive Physics	4
EDCI 614	Lab Techniques in Teaching Science	3
Total		51

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	Descriptive 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
EDCI 614	Laboratory Techniques in Teaching Science	3
Total		53

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	Geology I	3
GEOL 130	Elementary Geology Laboratory	1
GEOL 502	Mineralogy and Petrology I	4
GEOL 520	Geomorphology	4
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
PHYS 193	Descriptive Meteorology	3
EDCI 614	Laboratory Techniques in Teaching Science	3
Total		57

Additional courses recommended:

GEOL 503	Mineralogy and Petrology II	4
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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 193	Descriptive Meteorology	3
PHYS 506	Physics Laboratory I	3
PHYS 551	Introduction to Modern Physics	3
PHYS 452	Contemporary Physics	3
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	Geology I	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
EDCI 614	Laboratory Techniques in Teaching Science	3
Total		65

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	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
EDCI 614	Laboratory Techniques in Teaching Science	3
Total		57

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.

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 500+	Early U.S.	3
HIST 500+	Recent U.S.	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

9 hours from the following:

HIST 599	Senior Seminar	3
POLSC 400	Political Inquiry and Analysis	3
HIST 500+	U.S. History	3
One non-Western social science		3
HIST 500+	One European history course	3
One social science women's studies course		3
One social science American ethnic studies course ..		3
Total		51

Additional endorsements in the social sciences are available in economics, geography, sociology/anthropology. See optional secondary certification programs.

Optional secondary education certification programs

In addition to the majors described above, optional secondary certification programs are available. Certification in one or more of these optional programs is available to only those students who have successfully

completed an approved full certification program in another (first or primary) teaching area. These optional programs allow 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. KSU 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

EDCI 476	Methods of Teaching in the Secondary Schools	3
Total		42

Business

GENBA 215	Information Processing	3
GENBA 315	Administrative Data Applications ..	3
ACCTG 211	Financial Accounting	3
ACCTG 221	Managerial Accounting	3
MANGT 390	Business Law I	3
FINAN 460	Insurance	3
EDAO 686	Topics/Office Management	3
ECON 110	Economics I	3
ECON 120	Economics II	3
EDCI 476	Methods Teaching Business in Secondary School	3

Option A: Secretarial (minimum 9 hours)
(Subject to revision. See business education advisor.)

Shorthand (minimum 6 hours)		
GENBA 114	Fundamentals of Shorthand	4
GENBA 214	Intermediate Shorthand	3
GENBA 344	Transcription Shorthand	3

GENBA 415	Administrative Support Services ...	3
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Option B: Computer literacy (7 hours)

CMPSC 200	Fundamentals of Computer Programming	2
CMPSC 20-	Computer Language Laboratory ...	2
GENBA 415	Administrative Support Services ...	3
Total		37-39

This prepares a student to teach typing, business law, business economics, and bookkeeping, in addition to the option selected.

Computer studies

1. Computer science component (a or b, followed by c)		
a. CMPSC 200	Fundamentals of Computer Programming	2
CMPSC 207	PASCAL language lab	2
or		
b. CMPSC 591	Computer Science Applications	3

Followed by		
c. CMPSC 300	Algorithmic Processes	3
2. Professional knowledge component (9 hours)		
EDCI 476	Methods of Teaching in the Secondary School (Computer Studies)	3
EDCI 618	Microcomputers in Instruction	2
EDCI 619	Microcomputers in Instruction Lab	1
EDCI 686	Microcomputers in Management of Instruction ..	3
or		
CMPSC 110	Introduction to Personal Computing	3
Total		(minimum) 15

English

Take two of the following four courses:

ENGL 260	British Survey I	3
ENGL 265	British Survey II	3
ENGL 280	American Survey I	3
ENGL 285	American Survey II	3
ENGL ---	A world literature course	3
ENGL 400	Advanced Composition	3
ENGL 530	Modern English Grammar	3
ENGL 545	Literature for Adolescents	3
ENGL 350	Introduction to Shakespeare	3
ENGL 790	History of the English Language ...	3
EDCI 476	Methods of Teaching English in Secondary School	3
PSYCH 650	Psychology of Language	3
Total		30

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
EDCI 476	Methods of Teaching English/Journalism in the Secondary School	3
Total		15

Health

FN 132	Basic Concepts of Nutrition	3
HDFS 352	Concepts of Personal Health	3
PE 376	First Aid and CPR	1
HDFS 465	You and Your Sexuality	3
HDFS 555	Community Health Programs	3
BIOL 240	Structure and Function of the Human Body	6
PSYCH 202	Drugs and Behavior	2
FEC 110	Consumer Action	2
BIOL 198	Principles of Biology	4
BIOCH 120	Introductory Organic and Biological Chemistry	5
A course in safety education		2
EDCI 476	Methods of Teaching in Secondary School	3
Total		37

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
or		
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
CMPSC ---	Computer Science with Language Course	3-4
EDCI 476	Methods of Teaching Mathematics in the Secondary School	3
Total		33-34

Supporting courses recommended: a course in physics.

General mathematics

MATH 100	College Algebra	3
MATH 308	Topics in Mathematics for Elementary School Teachers	4
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
EDCI 476	Methods of Teaching Secondary School Mathematics	3
STAT 320	Elements of Statistics	3
CMPSC ---	Computer Science with Language	3-4
Total		27-29

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. Students should 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
	or	
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
EDCI 476	Methods of Teaching Foreign Language in the Secondary School	3
Total		27

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
	or	
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
EDCI 476	Methods of Teaching Foreign Language in the Secondary School	3
Total		27

Spanish

24 hours in Spanish at 200 level or above, to include:		
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
	or	
SPAN 566	Hispanic-American Civilization	3
SPAN ---	Spanish electives at 500 or above ...	6
SPAN 563	Spanish-American Masterpieces ...	3
	or	
SPAN 567	Spanish Masterpieces	3
EDCI 476	Methods of Teaching Foreign Language in the Secondary School	3
Total		27

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:

EDCI 620	Foreign Language Methods for Elementary Schools (offered spring of even years)	3
EDCI 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
	or	
BIOL 529	Fundamentals of Ecology	3
CHM 110	General Chemistry	5
	or	
CHM 210	Chemistry I	4
EDCI 614	Laboratory Techniques in Teaching Science	3
EDCI 476	Methods of Teaching Science in the Secondary School	3

Plus a minimum of six 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
	or	
ASI 500	Genetics	3
BIOL 555	Microbiology	4
Total		28-29

Some 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
	or	
PHYS 115	Descriptive Physics	4
EDCI 614	Laboratory Techniques in Teaching Science	3
EDCI 476	Methods of Teaching Science in the Secondary School	3

Plus a minimum of three semester hours chosen from the following:

BIOL 201	Organismic Biology	5
CHM 500	Descriptive Physical Chemistry	3
GEOL 512	Earth Science	3
GEOL 100	Introductory Geology	3

PHYS 114	General Physics II	4
PHYS 191	Descriptive Astronomy	3
PHYS 193	Descriptive Meteorology	3
Total		29

Some 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
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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
	or	
PHYS 115	Descriptive Physics	4
EDCI 614	Laboratory Techniques in Teaching Science	3
EDCI 476	Methods of Teaching Science in the Secondary School	3

Plus a minimum of two courses chosen from the following:

GEOL 200	Historical Geology	4
GEOL 502	Mineralogy and Petrology I	4
GEOL 520	Geomorphology	4
GEOL 105	Oceanography	3
PHYS 191	Descriptive Astronomy	3
PHYS 193	Descriptive Meteorology	3
Total		31-33

Some 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:

GEOL 220	Environmental Geography I	4
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General science

Core:

BIOL 198	Principles of Biology	4
CHM 110	General Chemistry	5
	or	
CHM 210	Chemistry I*	4
GEOL 512	Earth Science	3
PHYS 113	General Physics I	4
	or	
PHYS 115	Descriptive Physics	4
EDCI 614	Laboratory Techniques in Teaching Science	3
EDCI 476	Methods of Teaching Science in the Secondary School	3

Total hours required in core 21-22

*Required for chemistry and physics options.

The core in addition to one of the following options must total a minimum of 27 semester hours.

Options:

Biology

BIOL 201	Organismic Biology	5
BIOL 303	Ecology of Environmental Problems	3
	or	
BIOL 529	Fundamentals of Ecology	3

Chemistry

CHM 230	Chemistry II	4
CHM 271	Chemical Analysis	4
	or	
CHM 350	General Organic Chemistry and	3
CHM 351	General Organic Chemistry Laboratory	2

Physics

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

GEOL 100	Introductory Geology	3
GEOL 130	Elementary Geology Laboratory	1

Plus at least two courses selected from the following:

GEOL 105	Oceanography	3
GEOL 200	Historical Geology	4
GEOL 502	Mineralogy and Petrology	4
GEOL 520	Geomorphology	3
PHYS 191	Descriptive Astronomy	3
PHYS 193	Descriptive Meteorology	3

Each student seeking second field certification recommendation in general science must select from the above any necessary course work required to bring the total natural science credits to 24 semester hours.

Some 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	
	or	
BIOL 201	Organismic Biology	4-5
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	
	or	
BIOL 303	Ecology of Environmental Problems	
	or	
BIOL 310	Biology and the Future of Man	3
CMPSC 200	Fundamentals of Computer Programming	2
CMPSC 206	BASIC Language Laboratory	
	or	
CMPSC 207	PASCAL Language Laboratory	2
	or other approved language	
MATH 205	General Calculus and Linear Algebra	3
EDCI 476	Methods of Teaching Science in the Secondary School	2
EDCI 614	Laboratory Techniques in Teaching Science	3
Total		38-39

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
EDCI 614	Laboratory Techniques in Teaching Science	3
EDCI 476	Methods of Teaching Science in the Secondary School	3
Total		28

Physical education

One course selected from the following:

PE 325	History and Philosophy of Physical Education	3
PE 340	Social and Psychological Dimensions of Physical Education (Pr.: SOCIO 211, 3 cr.)	3

Following courses required:

PE 315	Treatment of Athletic Injuries	3
PE 320	Motor Development and Learning	3
PE 330	Kinesiology (Pr.: BIOL 240, 6 cr.; BIOL 198, 4 cr.)	3
PE 335	Physiology of Exercise (Pr.: BIOL 240)	3
PE 359	Administration of Physical Education and Athletic Programs	3
PE 376	First Aid and CPR	1
PE 410	Gymnastics for Secondary Schools	3
PE 415	Team Sports for Secondary Schools	3
PE 420	Rhythms for Secondary Schools	3
PE 425	Individual and Dual Sports for Secondary Schools	3
PE 561	Adapted Physical Education	3
PE 710	Measurement and Evaluation in Physical Education (Pr.: STAT 320)	3
EDCI 476	Methods of Teaching Physical Education in the Secondary School	3
Total		34

Note: Students are advised to include in the General Education requirements for the degree the following courses:

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
	or	
PSYCH 475	Principles of Learning and Motivation	3
	or	
PSYCH 480	Fundamentals of Perception and Sensation	3

Supporting courses required:

STAT 320	Elements of Statistics	3
	or	
STAT 330	Elementary Statistics for the Social Sciences	3
EDAF 715	Principles of Measurement	3
EDCI 476	Methods of Teaching Social Science in the Secondary School	3
Total		25

Social science

The following three social science 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
	One of the following:	3
ANTH 220	Introduction to Linguistics	
ANTH 508	Male and Female: Cross-Cultural Perspectives	
ANTH 519	Practical Anthropology	
SOCIO 530	Population: Human Ecology	
ANTH 532-550	Ethnography Courses	

ANTH 604	Culture and Personality
SOCIO 640	Sociology of the Family

Total 12**Geography**

GEOG 500	Geography of the United States	3
	One of the following:	3
GEOG 440	Geography of Natural Resources	
GEOG 450	Geography of Economic Behavior	

One 600 level regional geography course or one 700 level systematic geography course (course 710 through 780)

Total 9**Economics**

ECON 510	Intermediate Macroeconomics	3
ECON 520	Intermediate Microeconomics	3
ECON 530	Money and Banking	3
ECON 636	Capitalism and Socialism	3
Total		12

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
	or	
SPCH 326	Small Group Discussion	3
EDCI 476	Methods of Teaching Speech in the Secondary School	3
Total		21

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 home economics and agriculture. Students in these fields should see their academic advisor for specific requirements.

Those who pursue a degree in a certifiable major 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. These students will be enrolled in the College of Agriculture and receive the degree bachelor of science. Certification will cover grades 7-12.

Professional education requirements*

EDAO 319	Agricultural Education Colloquium	2
EDAF 215	Educational Implications of Growth and Development	3

The following courses must be completed before entry into the professional semester.

EDAF 315	Educational Psychology	3
EDAF 323	Exceptional Student in the Secondary School	2
EDCI 477	Mid-Level Secondary Reading	2
EDCI 318	Instructional Media and Technology	2
EDAO 620	Principles and Philosophy of Vocational Education	3
EDAO 721	Program Planning in Vocational Education	3

Professional semester (see information earlier for specific prerequisites):

EDCI 455	Teaching in a Multicultural Society	1
EDAF 525	Interpersonal Relations in Schools ..	1
EDAO 500	Methods of Teaching Agriculture ..	2
EDAO 586	Teaching Participation in the Secondary School	8
AMC 659	Agricultural Mechanic Methods ...	3
EDAO 576	Professional Development Seminar	2
Total		38

*Possible program changes may affect this curriculum. See agricultural education advisor.

Vocational home economics education (HED)

Students planning to be vocational home economics teachers must complete the approved program in vocational home economics education. Students will be enrolled in and receive the bachelor of science in vocational home economics education degree from the College of Human Ecology. Completion of this program satisfies state of Kansas program requirements for vocational home economics certification for grades 7-12.

Professional education requirements*

EDAO 320	Exploration in Home Economics Education	1
EDAO 321	Field Experience in Home Economics Education	1
EDAF 215	Educational Implications of Growth and Development	3

The following courses must be completed before entry into the professional semester:

EDAF 315	Educational Psychology	3
EDAF 323	Exceptional Student in the Secondary School	2
EDAF 525	Interpersonal Relations in the School	1
EDAO 550	Methods of Teaching Home Economics	2
EDAO 620	Principles and Philosophy of Vocational Education	3
EDAO 737	Practica in Home Economics Related Occupations	1
EDCI 318	Instructional Media and Technology	2
EDCI 477	Middle Level/Secondary Reading ..	2

Professional semester (see information earlier for specific prerequisites):

EDAO 710	Occupational Home Economics Education	2
EDAO 721	Program Planning in Vocational Education	3
EDAO 586	Teaching Participation in Secondary School	8
EDAO 612	Job Analysis	1
EDAO 611	Coordination Techniques	1
Total		27

*Possible program changes may affect this curriculum. See home economics education advisor.

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:

EDAF 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.

EDCI 420	Content and Reading Methods Lab	1
EDCI 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
EDAF 315	Educational Psychology	3
EDAF 323	Exceptional Student in the Secondary School	2
EDAF 410	Foundations of Education	3
EDAF 525	Interpersonal Relations in the School	1
EDCI 376	Core Teaching Skills and Lab	3
EDCI 455	Teaching in a Multicultural Society	1
EDCI 477	Middle Level/Secondary Reading ..	3

Professional semester (see information earlier for specific prerequisites):

EDCI 582	Teaching Participation in Music*	8-12
Total		39-43

*A full semester of student teaching is required in music education.

Physical education (PE)

Students planning to be physical education teachers must complete the approved program in physical education. These students will be enrolled in the College of Arts and Sciences and receive the degree Bachelor of Science.

Physical education core

To be taken by all majors

PE 101	Concepts in Physical Education	1
PE 206	Professional Orientation	1
PE 320	Motor Development and Learning ..	3
PE 325	History and Philosophy of Physical Education	3
PE 330	Kinesiology	3
PE 335	Physiology of Exercise	3
PE 340	Social-Psychological Dimensions of Physical Activity	3
PE 561	Adapted Physical Education	3
PE 710	Measurement and Evaluation in Physical Education	3
Total		22

A. Elementary specialization

PE 315	Treatment of Athletic Injuries	3
PE 359	Administration of Physical Education, Athletic, and Intramural Programs	3
PE 376*	First Aid and CPR	1
PE 410	Gymnastics in Physical Education ..	3
PE 420	Rhythms in Physical Education	3
PE 445	Movement Exploration and Creative Dance for Children	3
PE 455	Physical Education Activities for Elementary Schools	3
DANCE 120	Modern Dance I	1
Skill competency**		0-6
Total		20-26

B. Secondary specialization

PE 315	Treatment of Athletic Injuries	3
PE 359	Administration of Physical Education, Athletic, and Intramural Programs	3
PE 376*	First Aid and CPR	1
PE 410	Gymnastics in Physical Education ..	3
PE 415	Team Sports for Secondary Schools	3
PE 420	Rhythms in Physical Education	3
PE 425	Individual and Dual Sports for Secondary Schools	3
DANCE 120	Modern Dance I	1
or		
DANCE 165	Ballet I	1
or		
DANCE 171	Jazz Dance I	1
Skill competency**		0-6
Total		20-26

C. K-12 specialization

PE 315	Treatment of Athletic Injuries	3
PE 359	Administration of Physical Education, Athletic, and Intramural Programs	3
PE 376*	First Aid and CPR	1
PE 410	Gymnastics in Physical Education ..	3
PE 415	Team Sports for Secondary Schools	3
PE 425	Individual and Dual Sports for Secondary Schools	3
PE 420	Rhythms in Physical Education	3
PE 445	Movement Exploration and Creative Dance for Children	3
PE 455	Physical Education Activities for Elementary Schools	3
DANCE 120	Modern Dance I	1
Skill competency**		0-6
Total		26-32

*or minimum of current first aid and CPR certification 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, aquatics (WSI or current WSI certification at time of petition).

Category B. Individual sports: archery, badminton, golf, racquetball/handball, tennis, wrestling.

Professional education requirements

For those seeking teacher certification

EDAF 215	Educational Implications of Growth and Development	3
EDAF 315	Educational Psychology	3
EDAF 410	Foundations of Education	3
EDAF 525	Interpersonal Relations in the School	1
EDCI 477	Middle Level/Secondary Reading ..	2
EDAF 323	Exceptional Student in the Secondary School	2

Physical education professional semester teaching participation (must be done in area of specialization)

EDCI 300	Principles of Elementary Education	3
or		
EDCI 376	Core Teaching Skills and Lab	3
EDCI 318	Instructional Media and Technology	2
EDCI 455	Teaching in a Multicultural Society	1
EDCI 476	Methods of Teaching in the Secondary School	2-3
and/or		
EDCI 469	Physical Education in Elementary Schools	3
DED 100	Pre-Professional Laboratory Experiences (Elementary)	1
or		
DED 102	Teaching as a Career (Secondary) ..	1
EDCI 420	Content and Reading Methods Lab	1

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.

Certification requiring work beyond the bachelor's degree

The College of Education will recommend for certification individuals satisfying program requirements for the following:

Guidance and counseling. The approved M.S. programs in elementary or secondary guidance and counseling satisfy the state of Kansas certification requirements.

Applicants must hold a degree-teaching certificate and have two years teaching experience, or one year teaching experience and one year field experience (may satisfy these requirements concurrently with the program). A minimum of 12 hours in counseling and student personnel program required courses must be earned at KSU. Three of the 12 hours must include the course EDAF 887, Counseling Practicum.

Speech/language pathologist. The speech pathology-audiology program at KSU 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 clinician. 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.S. 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.

Administrator. A graduate degree is required for any administrative certificate granted by the state of Kansas. The program required by the College of Education must be completed. Eight hours from courses required for the administrator certification must be earned at KSU before the College of Education may recommend administrative certification. The educational administration faculty should be contacted regarding advisement for specific administrative certification.

Special education. Certification in special education is available to those completing programs to serve the following exceptionalities: the gifted, mentally retarded, learning disabled, or emotionally disturbed. Each program is considered as being primarily one that leads to a master's degree. At least half of the credits required for special education certification must be earned at KSU, including at least one major course and one practicum, before the

College of Education may recommend for special education certification.

Early childhood handicapped. This endorsement is offered through the cooperative efforts of the Department of Human Development and Family Studies (HDFS) in the College of Human Ecology and the Department of Administration and Foundations (EDAF) in the College of Education. Students are to choose their department affiliation in either HDFS or EDAF and are assigned an advisor in the department chosen.

Reading specialist. Special certification requirements exist for both elementary and secondary school teachers of special reading classes in Kansas. In addition to degree certification and teaching experience, a minimum of 17 semester hours in a planned sequence of graduate reading courses is required for certification. The College of Education offers a variety of courses which meet these requirements.

Library/media specialist. Certification in elementary, secondary, or K-12 school library/media is available in the Department of Curriculum and Instruction. Completion of an approved course of study will certify the teacher for a position entitled librarian or media specialist. The intensive 24- or 26-hour course of study teaches educators to develop, organize, and maintain a school library or media center, and to effectively administer the educational programs offered through a library/media center. In addition, the library/media specialist will be prepared to consult with other educators in the selection and development of primary and supportive curriculum materials. With four more graduate hours (three of those in a multicultural course) students may receive a master's degree.

Supervisor. The supervisor endorsement programs offered in the College of Education provide course work and practical experience for individuals involved in leadership roles in curriculum and instruction. The supervisor endorsement is developed for department heads, directors of curriculum and instruction, supervisors of elementary or secondary instruction, program coordinators, library/media center supervisors or directors, and other educators in leadership positions. A solid background in program planning, curriculum development, staff supervision, and leadership practice for educators is provided through a combination of courses and internships. The Department of Curriculum and Instruction works closely with other University departments and disciplines in developing individual programs of study for educators. Certification recommendation is initiated through the Office of Certification, 13 Bluemont Hall.

Graduate study

The College of Education offers work leading to the master of science degree, the doctor of philosophy in education degree, and the doctor of education degree. Admission to the Graduate School is required of all students enrolling for graduate credit. The general requirements for advanced degrees are set forth in the Graduate School section of the catalog.

The college offers numerous off-campus courses throughout the state of Kansas for those persons who cannot attend classes on campus. Credit toward a graduate degree may be earned off campus. Doctoral candidates must meet specific on-campus residency requirements.

General admission requirements. Candidates for graduate work shall meet the following admission requirements:

Graduation from an accredited institution whose requirements for the bachelor's degree are substantially equivalent to those of Kansas State University.

Undergraduate grade average of 3.0 or better in the junior and senior years. Undergraduate preparation substantially equivalent to that given by KSU in the specific field in which the applicant expects to do graduate work.

Undergraduate preparation in closely related or supporting subjects adequate to support advanced work in the field of the applicant's choice.

Students lacking preparation in certain areas may be required to do additional work.

International students whose native language is not English must make available the results of the Test of English as a Foreign Language (TOEFL). A minimum score of 550 is required on this examination.

Master of science degree

Major work leading to the degree master of science is offered in agricultural education; home economics education; adult/occupational and continuing education; administration; student counseling and personnel services; secondary education; elementary education; and special education.

All students expecting to work for a master's degree shall make available to the Office of Graduate Studies, College of Education, two copies of the graduate school application, two official transcripts from each institution attended, and a statement of academic objectives for graduate study. International students must make available three letters of recommendation. Advisors and/or departments may require additional information.

M.S. degree requirements. A minimum of 30 semester hours, approximately one-half of which shall be in the major field.

Academic advisors should be consulted regarding specific departmental program requirements.

Thesis, report, nonreport options: Departments shall have the option of using one or more of three plans: (1) a thesis of six to eight semester hours; (2) a written report of two semester hours either of research or of problem work on a topic in the major field; or (3) course work only, but including evidence of scholarly effort such as term papers, production of art, music, designs, as determined by the student's supervisory committee.

A final oral examination and/or a comprehensive written examination shall be required of the student. These may include a defense of the thesis or report, an interpretation of other scholarly products, or a testing of the student's understanding of the fields of study. Choice of examination procedures shall be a departmental option.

Information on special requirements for an advanced degree may be obtained by writing to the department head.

Doctor of philosophy degree in education

Major work is available in the following specializations: adult/continuing and occupational education; educational psychology; student counseling and personnel services; and curriculum and instruction. Joint programs involving selected departments in other colleges at KSU will prepare individuals for teaching positions in community and four-year colleges.

Admission requirements. In addition to the general admission requirements, applicants to the Ph.D. program in education shall provide to the Office of Graduate Studies, College of Education, two copies of the graduate school application, two official transcripts for undergraduate and graduate courses, an official record of a score at least at the national mean for education students on the Miller Analogies Test or the verbal and quantitative sections of the Graduate Record Examination, a statement of objectives indicating educational experience and professional goals showing a commitment to a career with responsibilities congruent with those associated with college faculty membership, and three letters of recommendation from higher education faculty members.

Basic program requirements. Basic requirements for the Ph.D. in education include:

A minimum of 90 semester hours beyond the baccalaureate degree.

A minimum of one year of full-time, on-campus study, normally indicated by at least 24 semester course hours within 12 calendar months including two consecutive full-time academic semesters.

A minimum of nine graduate level semester hours of course work in research methods and interpretation, in experimental design, and in quantitative analysis, with additional or alternate methodological course work appropriate to advancing the discipline's scholarship through a quality dissertation.

Evidence of supervised experience during the program which socializes the candidate to the teaching and scholarship responsibilities and expectations of the university community.

Satisfactory completion of all segments of a monitored, written examination of at least 12 hours over all major and minor areas specified on the program of study.

A minimum of 30 semester hours of supervised dissertation research.

Completion of a dissertation which examines a topic congruent with the program of study and which promises to advance or confirm important theoretical premises of the profession using a systematic methodology consistent with accepted research paradigms; the dissertation must be successfully defended in a public, oral defense.

Beyond the courses specified in the research core, each student's program of study is individualized with the approval of the major professor and the supervisory committee, to optimize the student's interests, expertise, and professional goals.

The program is directed by a minimum of five members of the University graduate faculty, to include a major professor with substantial expertise in the area of emphasis and at least two faculty outside the College of Education, one appointed by the dean of the Graduate School and serving as the chair of the examination committee.

Information on special requirements for the Ph.D. degree may be obtained by writing to the relevant department head.

Doctor of education degree

Major work is available in the following specializations: adult/continuing and occupational education; educational administration; special education; curriculum and instruction; educational psychology; and student counseling and personnel services. These programs are intended to develop leaders in the resolution of problems of professional practice.

Admission requirements. In addition to the general admission requirements, applicants to the Ed.D. program shall provide to the Office of Graduate Studies, College of

Education, two copies of the graduate school application, two official transcripts for undergraduate and graduate courses, an official record of a score at least at the national mean for education students on the Miller Analogies Test or the verbal and quantitative sections of the Graduate Record Examination, a statement of objectives indicating educational experience and goals showing a commitment to a career in leadership positions in professional practice, and three letters of reference verifying at least two years of successful, relevant professional experience.

Basic program requirements. Basic requirements for the Ed.D. include:

A minimum of 94 semester hours beyond the baccalaureate degree.

An academic residency indicated by the completion of one of the following options: (1) four summers within a five-year period in which 27 semester hours of course work are completed; (2) three summers within a four-year period in which 24 semester hours of course work are completed, with a minimum of six semester hours of additional course work completed in one intervening semester; (3) 24 semester hours of course work completed within 12 calendar months.

A supervised clinical experience of at least nine semester hours.

A supervised internship of at least three semester hours.

A minimum of nine semester hours of course work in research methodology consistent with that required for the dissertation, to include the course EDAF 816.

A foundation core of 12 semester hours, to include specified courses in the techniques and interpretation of educational research, in the historical and philosophical analysis of educational practice, in social science explanations of educating a diverse society, and in the psychological bases of educational thought and practice.

Completion of a major area of emphasis which includes at least 54 semester hours.

Satisfactory completion of all segments of a monitored, written examination of at least 12 hours, three of which must be over the foundations core.

A minimum of 16 semester hours of supervised dissertation research.

Completion of a dissertation which treats an important topic of professional education practice using a systematic methodology consistent with accepted research paradigms; the dissertation must be successfully defended in a public, oral defense.

The program is directed by a minimum of five members of the University graduate faculty, to include a major professor with substantial expertise in the area of emphasis, two other faculty with strengths in the area of emphasis, one faculty member from outside the College of Education, and one faculty member, appointed by the dean of the Graduate School, from another department within the College of Education who serves as the chair of the examination committee.

Information on special requirements for the Ed.D. may be obtained by writing to the relevant department head.

Doctoral degree offerings

Adult/continuing and occupational education (Ed.D. and Ph.D.)

Special education (Ed.D.)

Educational psychology (Ed.D. and Ph.D.)

Student counseling and personnel services (Ed.D. and Ph.D.)

Educational administration (Ed.D.)

Curriculum and instruction (Ed.D. and Ph.D.)

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-010-0-0801

DED 020. Honors Program. (0) I, II, S. 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-020-0-0801

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 three hours. No more than one credit per semester. DED-100-2-0808

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-102-2-0801

DED 105. Introduction to Women's Studies. (3)

DED 315. Introduction to Gerontology. (3) II. A multi-disciplinary 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-315-0-4900

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-320-0-0801

DED 405. Senior Seminar in Women's Studies. (3)

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-415-0-4900

DED 420. Honors Research. (1-3) I, II, S. Individual research projects under the supervision of a professor in the College of Education. For students in honors program only. Pr.: A minimum of two hours credit in DED 320 or one hour credit in DED 320 and one hour selected from GENAG 310, DAS 399, GNHE 399. DED-420-4-0801

Administration and Foundations

The focus of the department is twofold: to provide the foundations of education at the undergraduate level in special education and educational sociology and psychology; and to offer graduate studies in educational administration, guidance and counseling, educational psychology, special education, and higher education.

Counselor Education and Educational Psychology

Fred O. Bradley*

Professors Bradley,* Danskin,* Hanna,* Holen,* D. Hoyt,* K. Hoyt,* Neely,* Newhouse,* Parish,* and Sinnett;* Associate Professors Lynch,* Newton,* and Steffen;* Assistant Professors Benton,* Hawes, Rowlett, Scott, and Schuette; Emeritus: Associate Professor Kaiser.*

Graduate studies in counseling and student personnel services emphasize behavioral sciences, therapeutic intervention into the lives of humans, the organization and administration of helping services, and research.

The study of educational psychology at the graduate level focuses on applications of the behavioral sciences to the educational process. Emphasis is on human growth and development, learning theory, statistics and measurement, and their impact in educational settings. Students in this area typically provide leadership at all levels of education.

Educational Administration

Charles E. Litz*

Professors Bailey,* Litz,* Shoop,* and Wilson;* Associate Professor Stewart;* Assistant Professors Pankake and Thompson.

The graduate programs in educational administration stress both breadth and depth of content to provide the student ample opportunity to develop an understanding of leadership in educational organization and competencies in behavioral and managerial sciences, educational planning, educational law, educational finance, and research including overarching theoretical frameworks.

The foundations of education include such topics as community education, educational sociology, and history and philosophy of education. The intent is to bring to bear upon the problems of contemporary education the contributions of the humanities and the behavioral sciences at both the undergraduate and graduate levels.

Special Education

Warren J. White*

Professor R. Zabel;* Associate Professors Dettmer,* Dyck,* and White;* Assistant Professors M. K. Zabel and Thurston; Emeritus: Associate Professor 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.

Courses in administration and foundations

Undergraduate credit

EDAF 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. EDAF-111-1-0801

EDAF 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. EDAF-211-1-0801

EDAF 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. EDAF-215-0-0822

EDAF 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.

EDAF 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 difference, and measurement. Pr.: Admission to teacher education, and EDAF 215. Secondary education students must take this course simultaneously with EDAF 323 and EDCI 376. EDAF-315-0-0822

EDAF 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 EDAF 215. Must be taken simultaneously with EDAF 315 and EDCI 376. EDAF-323-0-0808

EDAF 410. Foundations of Education. (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. EDAF-410-0-0821

Undergraduate and graduate credit in minor field

EDAF 511. 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. EDAF-511-3-0801

EDAF 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 person-

nel. Pr.: EDCI 420, EDCI 477, and either EDCI 476, EDAO 500, or EDAO 550. Simultaneous enrollment required for EDCI 455, EDAF 525, and either EDCI 586 or EDAO 586. EDAF-525-0-0826

Undergraduate and graduate credit
EDAF 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. EDAF-611-0-0801

EDAF 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.: EDAF 315. EDAF-711-0-0826

EDAF 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.: EDAF 315. EDAF-715-1-0825

EDAF 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 EDAF 215. EDAF-721-0-0808

EDAF 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 EDAF 215. EDAF-722-1-0808

EDAF 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.: EDAF 215. EDAF-723-9-0808

EDAF 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 empha-

sized. Pr.: EDAF 722 or 763 and/or consent of instructor. EDAF-728-1-0816

EDAF 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.: EDAF 722 or 763. EDAF-731-0-0818

EDAF 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.: EDAF 315. EDAF-732-0-0808

EDAF 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.: EDAF 731. EDAF-733-0-0808

EDAF 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.: EDAF 763. EDAF-753-1-0810

EDAF 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.: EDAF 722 or 763. EDAF-755-0-0802

EDAF 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.: EDAF 215 and EDCI 300 or EDCI 451. EDAF-763-1-0808

EDAF 764. Mental Retardation. (3) On sufficient demand. Etiological, psychological, sociological, and educational aspects of mental retardation. Pr.: EDAF 763. EDAF-764-0-0808

EDAF 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.: EDAF 215. See EDAO 775 and EDCI 775. EDAF-775-3-0801

EDAF 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. EDAF-785-2-0808

EDAF 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.: EDAF 215. See EDAO 786 or EDCI 786. EDAF-786-3-0801

EDAF 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.: EDAF 722 or 763. EDAF-787-2-0808

EDAF 795. Problems in Administration and Foundations. 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. EDAF-795-3-0801

Graduate credit

EDAF 802. Stress Management for Teachers, Counselors, and Administrators. (3) On sufficient demand. Systematic training in stress-management strategies and techniques for the professional educator and for use in classroom and counseling settings. Includes knowledge of self-directed and instrumental techniques, psychophysiology of stress, issues in stress management, and role of teacher and counselor in delivering stress-management training. Pr.: EDAF 315. EDAF-802-1-5-0826

EDAF 804. Survey Techniques and Questionnaire Construction. (3) I. Principles of survey research including instrument design, sample selection, assessment of instruments and samples, and interpreting results. Pr.: Senior standing and EDAF 315. EDAF-804-1-0824

EDAF 810. The Impact of College on Students. (3) II. Study of institutional practices and policies and their impact on college students. Special attention will be given to the environmental, sociological, and psychological influences on the personal and educational maturity of students. Pr.: EDAF 715. EDAF-810-0-0826

EDAF 811. Philosophy of Education. (3) I, II, S. A critical analysis of major educational philosophies with discussion of their impact on the problem of education for democracy. Pr.: Twelve hours of education and consent of instructor. EDAF-811-0-0826

EDAF 812. History and Philosophy of Higher Education. (3) I. History and development of higher education with a study of the philosophy, objectives, and functions of various types of institutions. Pr.: Consent of instructor. EDAF-812-0-0821

EDAF 813. History of American Education. (3) II. Historical study of the educational endeavor in the United States with special attention to problems that have relevance to contemporary education. Readings, discussion, presentations by instruction leader and students. Pr.: EDAF 611 or consent of instructor. EDAF-813-0-0801

EDAF 815. Individual Appraisal. (3) II. Intensive study of standardized tests and their use. Emphasis given to values and problems of testing, selection and evaluation of measuring instruments, testing programs, and interpretation of test results. Pr.: EDAF 720 and 715. EDAF-815-1-0825

EDAF 816. Research Methods and Treatment of Data. (3) I, II, S. Principles of research in education; nature, organization, and presentation of research data; basic statistical computations and interpretations; selection of research problems. Pr.: Nine hours of education or consent of instructor. EDAF-816-1-0824

EDAF 817. Statistical Methods in Education. (3) I, II, S. An introductory yet comprehensive survey of common statistical analyses encountered in educational research. Computer oriented. Pr.: A first course in college mathematics plus either STAT 703 or EDAF 816. EDAF-817-1-0824

EDAF 818. General School Administration. (3) II, S. A panoramic view of the problems and tasks of school-system administration centered on the administrative process and substantive problems of leadership, personnel, business and finance, curriculum, facilities, and school-community relations. Pr.: One year of teaching experience. EDAF-818-1-0827

EDAF 819. Educational Finance. (3) II, S. An examination of issues relating to the financing of education, including local, state, and federal fiscal support, tax structures, distributional formulas, school finance reform strategies, and budget preparation and administration. Pr.: EDAF 818. EDAF-819-1-0827

EDAF 820. Individual Intelligence Testing. (3-5) On sufficient demand. Appraisal of individual intelligence with emphasis on techniques of administration, scoring, interpreting, and applying in school settings. Supervised practice in the use of WISC-R and other tests such as the Stanford-Binet, K-ABC, and WAIS-R. Pr.: EDAF 715 and consent of instructor. EDAF-820-1-0825

EDAF 822. Principles and Practices of Guidance. (3) S. Need and nature of guidance functions; personnel, their duties and relations; programs and evaluation of results. Pr.: EDCI 585 or 586 or consent of instructor. EDAF-822-1-0826

EDAF 823. Counseling Theory. (3) I, S. Theories, methods, and problems in counseling, relating the counseling process to dynamics of human behavior. Pr.: EDAF 886 or PSYCH 520 or equiv. and conc. enrollment. EDAF-823-1-0826

EDAF 825. Social Psychology of Education. (3) S. Consideration of the literature and applications of social/psychological studies of the student, student cultures, characteristics of educational institutions, and organizational change. Pr.: EDAF 611 or 812 or consent of instructor. EDAF-825-0-0821

EDAF 827. Foundations of Community Education. (3) II, alternate S. A study of the relationship between the school and the community, with special emphasis on the development of a comprehensive community education program. Organizational patterns, financing, program development, and interaction with other community agencies are analyzed. Pr.: EDAF 818 or 611. EDAF-827-0-0827

EDAF 829. Learning Principles for Effective Teaching. (3) S and on sufficient demand. Exploration of learning theories with emphasis on the application of psychological principles to the teaching-learning process, as a basis for examining and understanding contemporary research in teaching effectiveness. Pr.: EDAF 315. EDAF-829-0-0822

EDAF 830. Educational Facility Planning. (3) S. Examination of issues relating to the provision of educational building and other facility needs, including planning, financing, construction, maintenance, and utilization. Pr.: EDAF 818. EDAF-830-1-0827

EDAF 831. Educational Law. (3) I, S. An examination of the legal status of educational institutions in the United States; the legal rights and responsibilities of educators including due process, tort liability, and contracts; student rights; landmark court decisions; federal and state legislation impacting on education, and resources available to assist in developing solutions to

legal problems. Pr.: EDAF 818. EDAF-831-0-0827

EDAF 832. The Community/Junior College. (3) I. This course is designed to give the student an overview of community/junior colleges. Emphasis on philosophy, purposes, curriculum, organization, professional staff, student-personnel programs, and the role of the comprehensive community junior college in higher education. Pr.: EDAF 315. EDAF-832-1-0806

EDAF 833. Administration of Special Education Programs. (2-3) On sufficient demand. The study of administrative units for special education, placement procedures, federal and state legislation, and program reimbursement and funding. Pr.: EDAF 818 or 811. EDAF-833-2-0808

EDAF 834. Strategies for Educational Change. (3) I, S. This course provides educators with conceptual knowledge concerning the problems and processes of educational change. Case studies of change are analyzed in the attempt to develop models of educational change. Pr.: EDAF 818 or EDCI 857 or 831. EDAF-834-0-0827

EDAF 835. The Principalship. (3) I, alternate S. Analysis of the principal's role as he or she interacts with various referent groups. Applicable to both elementary and secondary administration. Pr.: One year of teaching experience. EDAF-835-1-0827

EDAF 836. School-Public Relations. (2-3) I, S. Interrelationships that exist between the school and the community and the role of the teacher and administrator in such relationships. Pr.: EDAF 818 for graduate students in educational administration. One year of teaching experience for all others. EDAF-836-1-0827

EDAF 841. Educational Program Management and Evaluation. (3) II, S. An examination of program management techniques as well as formative evaluation strategies used in educational project and program administration. Pr.: EDAF 818. EDAF-841-0-0827

EDAF 845. Special Education Programming: Parental Involvement. (3) S. An in-depth consideration of the role of home and parents in the educational programming for school-age exceptional children. Emphasis on practical and positive strategies used in working with parents. Pr.: EDAF 722. EDAF-845-0-0808

EDAF 846. 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, identification procedures, program prototypes, and

current issues in gifted education. Pr.: EDAF 722 or 723. EDAF-846-0-0811

EDAF 847. Curriculum for the Gifted. (3) On sufficient demand. Theories and strategies for differentiating the curriculum for gifted students, emphasis on appropriate methods and materials. Pr.: EDAF 846. EDAF-847-0-0811

EDAF 852. Educational and Career Development Information. (3) I. A study of the competencies, skills, and demands necessary for individual growth in various careers, with attention to the collection, evaluation, dissemination, and use of career development information in school and community settings by counselors. Particular emphasis will be given to career life planning. Pr.: Senior or graduate standing. EDAF-852-0-0801

EDAF 856. Guidance in the Elementary School. (3) II. The nature and philosophy of guidance in the elementary school; the function of specialized child appraisal and counseling techniques in the unique interrelationships of the specialist and the teacher in the team approach to elementary school guidance. Pr.: EDCI 585, EDAF 720, and consent of instructor. EDAF-856-0-0826

EDAF 857. Organization and Administration of the Guidance Services Program. (3) I. Staff, facilities, tools, and techniques of the school and community in an organized guidance program. Pr.: Twelve semester hours in courses required to meet standard counselor qualifications; consent of instructor. EDAF-857-0-0826

EDAF 858. Group Guidance. (3) I, S. Designed to acquaint students with group procedures as basic tools in counseling, guidance, and other education services. Pr.: EDAF 823 or PSYCH 550. EDAF-858-1-0826

EDAF 859. Principles of Student Personnel Administration. (3) I. Principles, administrative organization, procedures, and problems of student personnel work in higher education; analysis of policy formulation, staff relationships, finance and controls, and physical plant needs; an introduction to the personnel services of: health, housing, food, student activities, placement, and counseling services. Pr.: Graduate standing and consent of instructor. EDAF-859-1-0826

EDAF 860. Adult Counseling. (3) I. Study of adults and the problems they face in their educational, psychological, social, and career development. Particular emphasis will be given to counseling theories and strategies important for counselors working with adults experiencing these developmental problems. Pr.: EDAF 823 or conc. enrollment. EDAF-860-0-0807

EDAF 861. Organization of Counseling Services for Adults. (3) On sufficient demand. Strategies for the development and implementation of counseling services for adults in school, community, business, and industrial settings. The course will focus on the integration of formal and informal educational, career development, and mental health programs developed for adults having life adjustment problems. Local, state, and federal programs and agencies and their role in adult counseling services will be examined. Pr.: EDAF 860. EDAF-861-0-0807

EDAF 862. Leisure Counseling. (3) On sufficient demand. Course develops leisure counseling models for use in community and institutional recreational programs and to provide skills and competencies in assessing, interviewing, and counseling individuals and groups in the use of leisure experiences. Pr.: REC 725 and/or EDAF 858. Same as REC 862. EDAF-862-0-0826

EDAF 863. Vocational Psychology. (3) On sufficient demand. Environment and human factors in occupational adjustment; appraisal of vocational fitness. Pr.: Consent of instructor. EDAF-863-0-0839

EDAF 871. Consultation for Counselors. (3) II. This course acquaints students with the major models of consultation that may be used by counselors for intervention with individuals and organizations. Techniques, issues, and ethical considerations are also addressed. Pr.: EDAF 823 and 858. EDAF-871-0-0826

EDAF 885. Practicum in Student Personnel Work. (3) I, II. Supervised professional experience in the various agencies that comprise a total program of student personnel services within a post-secondary, college, or university setting. Pr.: EDAF 859 and consent of instructor. EDAF-885-2-0826

EDAF 886. Counseling Techniques and Practice. (3) I, II, S. A prepracticum in counseling and interviewing—building facilitative relationships, case conceptualization, appropriate counseling strategy choice, and evaluating termination. A consideration of ethics and unique features in selected cases will be discussed. Pr.: EDAF 823 or conc. enrollment. EDAF-886-1-2-0826

EDAF 887. Practicum in Counseling. (3) I, II. Supervised practical experience in counseling. Pr.: EDAF 823 and consent of instructor. Same as PSYCH 860. EDAF-887-2-0826

EDAF 888. Seminar in Student Personnel Work. (1-4) On sufficient demand. Intensive discussion of a problem of current professional interest based on study of pertinent original literature. May be repeated with consent of supervisory

committee. Pr.: Consent of instructor. EDAF-888-0-0826

EDAF 889. Practicum in School Administration. (3-6) I, II, S. Supervised on-the-job experience in school administration. Pr.: Consent of instructor. EDAF-889-2-0827

EDAF 890-894. Seminars in Administration and Foundations (Var.) On sufficient demand. These seminars will consider research in the several fields of education represented in terms of the special interests of the students. Pr.: Consent of instructor.

EDAF 890. Educational Administration. EDAF-890-0-0827

EDAF 891. Social Foundations. EDAF-891-0-0821

EDAF 892. Guidance Services. EDAF-892-0826

EDAF 893. Special Education. EDAF-893-0808

EDAF 894. Community Education. EDAF-894-0-0807

EDAF 898. Master's Report. (Var.) I, II, S. Pr.: Consent of instructor. EDAF-898-3-0801

EDAF 899. Master's Research. (Var.) I, II, S. Pr.: Consent of instructor. EDAF-899-4-0827

EDAF 910. Educational Personnel Administration. (3) II, S. Personnel practices in education are considered along with the implications of collective negotiations and professional accountability for personnel policies. Pr.: EDAF 818. EDAF-910-0-0805

EDAF 912. Psychological Bases of Educational Thought and Practice. (3) I, S. In studying educational applications of behavioristic and cognitive learning theories, attention is given to historical milieus of origin, relationships to major educational philosophies, relationships to features of instruction, and evaluation of impact on contemporary educational thought and practice. Pr.: EDAF 315 or EDAO 790 and either EDAF 410, 611, 811, 812, or 813. EDAF 912-0-0822

EDAF 915. Theory of Measurement. (3) On sufficient demand. A course designed to provide the theoretical background needed for students who wish to (1) develop greater competence in practical uses of tests in educational settings, (2) pursue academic study of measurement theory, and (3) develop instruments for research use. Pr.: EDAF 715. EDAF-915-1-0825

EDAF 917. Experimental Design in Educational Research. (3) I, II, S. Philosophy, planning, and evaluation of research in education. Experimental designs appropriate for educational research with

special emphasis on multivariable procedures. Computer oriented. Pr.: EDAF 817. EDAF-917-1-0824

EDAF 920. Advanced Educational Psychology: Learning. (3) I, on sufficient demand. The learning process, with special emphasis on human abilities and early and contemporary learning theories, with applications to selected recent developments in teaching and persistent problems and issues in education. Pr.: EDAF 315 or its equiv. EDAF-920-1-0822

EDAF 921. Advanced Educational Psychology: Development. (3) On sufficient demand. Advanced studies in physical, intellectual, emotional, social, and personality development with the focus on the importance of these factors to the educational process. Pr.: EDAF 315. EDAF-921-1-0822

EDAF 924. Systems and Theories of Vocational Counseling. (3) On sufficient demand. A historical and contemporary analysis of systems and theories of vocational psychology and their implications for use in the counseling setting. Pr.: EDAF 752 and 823. EDAF-924-0-0839

EDAF 926. Theory in Educational Administration. (3) II. Organizational and administrative theory as applied to the school and the functions of the school administrator. The process of theory development in educational administration is also considered. Pr.: EDAF 818. EDAF-926-0-0827

EDAF 927. Higher Education Administration. (3) II. Administration theory applied to the organization and administration of colleges and universities; special reference to structure, governing boards, administrative roles, decision-making, and analysis of selected problems. Pr.: EDAF 812. EDAF-927-1-0827

EDAF 928. Educational Governance. (3) S. An analysis of educational decision-making at the local, state, and national levels. The internal decision-making practices of professional educational organizations are also considered. Pr.: EDAF 818 and six additional hours in educational administration. EDAF-928-0-0801

EDAF 958. Advanced Group Counseling. (3) II. The examination of selected group counseling theories and their relevance for the practice of group counseling in a variety of settings. Pr.: EDAF 858. EDAF-958-0-0826

EDAF 959. Practicum in Group Counseling. (3) On sufficient demand. Supervised group counseling experience in a variety of settings. Pr.: EDAF 858 and 958. EDAF-959-2-0826

EDAF 985. Advanced Counseling Theory. (3) I. Reading and discussion of primary works of major counseling theories; advanced theoretical issues in counseling. Pr.: EDAF 823 and 887. EDAF-985-0-0826

EDAF 986. Advanced Counseling Practices. (3) I, II. Intense supervised practice in counseling. Particular emphasis will be given to the development of skills for intervention into human problems and time-limited case management. Pr.: EDAF 823 and 887. EDAF-986-2-0826

EDAF 987. Counseling Supervision Practicum. (3) On sufficient demand. An advanced course in the theory, techniques, and problems of supervising persons being trained as counselors. Course emphasis is on actual supervisory experiences with beginning counselors. Open to advanced doctoral students only with consent of instructor. EDAF-987-2-0826

Internship in EDAF. (Var.) On sufficient demand. Studies of and field experiences in the development of programs in cooperating schools and educational or related agencies under the supervision of College of Education graduate faculty members. A maximum of six credit hours may be chosen from the areas listed. Pr.: Consent of instructor.

EDAF 988. Special Education. (Var.) On sufficient demand. Studies of and field experiences in the development of programs in cooperating schools and educational or related agencies under the supervision of College of Education graduate faculty members. A maximum of six credit hours may be chosen. Pr.: Consent of instructor. EDAF-988-2-0808

EDAF 989. Educational Administration and Foundations. EDAF-989-2-0827

EDAF 990. Student Personnel Services. EDAF-990-2-0826

Advanced Seminars in Administration and Foundations. (2-3) On sufficient demand. These seminars will critically consider recent research in the designated fields. The emphasis will be upon individual studies and small group interaction. Enrollment is restricted to those students who have been admitted to the doctoral program in education and who have completed substantial amounts of graduate study in the designated fields. Pr.: Consent of instructor.

EDAF 994. Special Education. EDAF-994-2-0808

EDAF 999. Research in Administration and Foundations. (Var.) I, II, S. Individual investigation in the field of a student's specialization. Pr.: Sufficient training to carry on the line of research undertaken. EDAF-999-4-0801

Adult and Occupational Education

John D. Parmley,* Acting Head

Professors Field,* Meisner,* Prawl,* and Welton;* Associate Professors Carter,* Griffith,* Hausmann,* C. Oaklief,* Parmley,* and Wissman; Assistant Professors Angle, Harbstreit, and Polson;* Instructors Hachmeister, Havlicek, Jankovich, and Wineinger; Emeriti: Professor Terrass;* Associate Professor Hall.*

The Department of Adult and Occupational Education is composed of the adult and continuing education faculty and the occupational education faculty.

Adult and Continuing Education

The faculty of adult and continuing education offer master's and doctoral degree programs designed to prepare students for a broad spectrum of educational positions in schools, colleges and universities, business and industry, and government agencies. Courses focus on issues related to planning, developing, delivering, or facilitating instruction for adult learners.

Graduate programs offered by the faculty lead to master of science in education, doctor of philosophy, or doctor of education degrees.

Occupational Education

The undergraduate, master's, and doctoral degree programs offered by the occupational education faculty focus on the development of professional and technical competencies in the delivery of vocational, occupational, and career education to diverse populations in secondary and post-secondary institutions, business and industry, and governmental agencies such as the Cooperative Extension Service.

Students completing the agricultural education undergraduate curriculum offered in cooperation with the College of Agriculture are awarded a bachelor of science degree in agricultural education.

Students completing the home economics education undergraduate curriculum offered in cooperation with the College of Human Ecology are awarded a bachelor of science degree in vocational home economics.

Students completing the business education undergraduate curriculum offered in cooperation with the College of Business are awarded a bachelor of science degree in education.

Graduate programs lead to master of science degrees in home economics education or agricultural education, or a cooperative degree program in adult and occupational education; and to the doctor of philosophy or doctor of education degrees.

Courses in adult and occupational education

Undergraduate credit

EDAO 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 six hours may apply to a degree. EDAO-318-0-0807

EDAO 319. Agricultural Education Colloquium. (Var.) I, II. On sufficient demand. Discussion, assigned readings, and lectures over the selected trends, developments, and problems which are peculiar to agricultural education in Kansas. Developments in new legislation, techniques, and philosophies are discussed and applied. Students are encouraged to engage in self study concerning their place in the profession of agricultural education. EDAO-319-0-0899

Undergraduate and graduate credit in minor field

EDAO 500. Methods of Teaching Agriculture. (2) I, II. Lesson plans; organization of materials and direction of class, laboratory, and field instruction work in vocational agriculture; individual farming programs and class and group activities; coordination of farm mechanics work; administration, organization, and coordination of the Future Farmers of America organization with the program of instruction in vocational agriculture. Pr.: EDAF 315. EDAO-500-0-0899

EDAO 501. Independent Study in Education. (1-3). I, II. Selected topics in professional education. Maximum of three hours applicable toward degree requirements. Pr.: Consent of department head. EDAO-501-3-0899

EDAO 550. Methods of Teaching Home Economics. (2) I. Selection of techniques: organization, preparation, and presentation of materials for teaching secondary programs. One hour rec. and two hours lab. a week. Pr.: Junior standing; EDAO 621 or conc. enrollment; taken semester prior to EDAO 586. EDAO-550-0-0899

EDAO 586. Teaching Participation in the Secondary School. (Var.) I, II. Observation and teaching participation under direction of selected teachers in middle level, junior, and senior high schools. Pr.: Admission to student teaching. See EDCI 586. EDAO-586-2-0803

Undergraduate and graduate credit

EDAO 611. Coordination Techniques. (1) II. Acquaints students with techniques in selecting, implementing, and coordinating occupational programs between the school and the business community. Pr.: EDAO 620. EDAO-611-0-0899

EDAO 612. Job Analysis. (1) II. Acquaints students with techniques of analyzing jobs and tasks related to occupations. Pr.: EDAO 620. EDAO-612-0-0899

EDAO 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.: EDAF 315. EDAO-620-0-0839

EDAO 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. EDAO-701-0-0839

EDAO 703. 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.: EDAO 620. EDAO-703-0-0899

EDAO 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. Pr.: Senior standing or consent of instructor. EDAO-704-0-0807

EDAO 705. Organization Problems in Teaching Farm 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.: EDAO 586. EDAO-705-0-0839

EDAO 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. Pr.: Senior standing, juniors by consent of instructor. EDAO-706-0-0807

EDAO 710. Occupational Home Economics Education. (2) II, S. Principles and procedures in planning and organizing home economics related occupational programs, including considerations of methods and teaching materials peculiar to these programs. Pr.: EDAF 215 or conc. enrollment. EDAO-710-0-0899

EDAO 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. Pr. or conc.: EDAO 620. EDAO-713-0-0807

EDAO 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. EDAO-714-0-0899

EDAO 721. Program Planning in Vocational Education. (3) I, II, S. The program development and planning process; development of guides for teaching and evaluating reimbursable secondary programs. Pr.: EDAO 620. EDAO-721-0-0839

EDAO 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.: EDAF 215. EDAO-725-0-0807

EDAO 732-738. Practica in Adult and Occupational 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.

EDAO 732. Career Education. EDAO-732-2-0807

EDAO 733. Adult Education. EDAO-733-2-0807

EDAO 734. Agriculture-Related Occupations. EDAO-734-2-0899

EDAO 735. Business and Office Occupations. EDAO-735-2-0807

EDAO 736. Extension Education. EDAO-736-2-0807

EDAO 737. Home Economics Related Occupations. EDAO-737-2-0899

EDAO 738. Industrial Occupations. EDAO-738-2-0839

EDAO 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.: EDAO 620. EDAO-739-0-0839

EDAO 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. EDAO-740-0-0899

EDAO 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. EDAO-750-0-0899

EDAO 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. EDAO-753-0-0807

EDAO 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. EDAO-754-0-0807

EDAO 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.: EDAF 215. No more than six hours may apply to a graduate degree. See EDAF 775 and EDCI 775. EDAO-775-3-0801

EDAO 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. EDAO-780-0-0807

EDAO 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.: EDAO 680. EDAO-782-0-0807

EDAO 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.: EDAF 215. No more than six hours may apply to a graduate course. See EDAF 786 and EDCI 786. EDAO-786-3-0801

EDAO 788. Seminar in Agricultural Education. (Var.) On sufficient demand. Seminars will consist of problems in the several fields of agricultural education represented in terms of special interests of the students. Undergraduate and graduate. Pr.: Consent of instructor. EDAO-788-0-0899

EDAO 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.: EDAO 680 or EDAF 215 or PSYCH 110. EDAO-790-0-0807

EDAO 791. Career Education. (2-4) On sufficient demand. Emphasis on providing for prevocational experiences including orientation and exploratory and applied experiences in school and nonschool situations. Pr.: Teaching experience or consent of instructor. EDAO-791-0-0839

EDAO 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. Pr.: Consent of instructor. EDAO-792-0-0839

EDAO 795. Problems in Adult and Occupational Education. (Var.) I, II, S. Independent study of specific problems in the areas of adult or occupational education. Pr.: Consent of instructor. EDAO-795-3-0807

Graduate credit

EDAO 805. 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.: EDAO 620 and consent of instructor. EDAO-805-0-0899

EDAO 810. In-Service Education for Beginning Home Economics Teachers. (2-3) I, II, S. For beginning teachers who desire assistance with vocational program management, instructional planning and delivery, professional role development, and the organization of information related

to vocational home economics teaching. Pr.: EDAO 550 or equiv. EDAO-810-0-0899

EDAO 811. Consumer Education. (2-3) S. Evaluate syllabi and approaches to teaching consumer education. Relate consumer education to consumer economics and consumer affairs. Pr.: EDAO 550 or 752 and FEC 400 or consent of instructor. See FEC 811. EDAO-811-0-0807

EDAO 815. Introduction to Community Educational Development. (3). A comprehensive review of factors related to community change and the role of educational programs in dealing with them. Emphasis is on problem-solving approaches and change-implementing programs. EDAO-815-0-0807

EDAO 820. Advanced Methods in Adult Teaching. (3) On sufficient demand. Emphasis on teaching strategies, techniques, and media appropriate to various adult education programs. Pr.: Teaching experience or consent of instructor. EDAO-820-0-0807

EDAO 822. Young Farmer and Adult Farmer Education in Agriculture. (2-3) I, II, S. Organization, objectives, and procedures of conducting young farmer and adult farmer classes. Designed for teachers in service. Pr.: Experience in teaching vocational agriculture. EDAO-822-0-0899

EDAO 823. Agricultural Education for Beginning Teachers. (1-3) I, II. Securing and organizing information and planning teaching activities which will help the beginning vocational agriculture teacher. Pr.: Graduation from the curriculum in agricultural education. EDAO-823-0-0899

EDAO 825. Theory and Practice of Continuing Education. (3) I, S. Specific instruction on facilitating continuing education programs; emphasis on serving the institution, part-time students, community, and other interests. Pr.: EDAO 605 or 680. EDAO-825-0-0807

EDAO 830. Program Planning in Adult Education. (3) II, S. An examination of the basic situations in which adult education occurs and fundamental steps by which learning is made more effective in those situations. Pr.: Graduate standing. EDAO-830-0-0807

EDAO 834. Trends in Home Economics Teaching. (Var.) I, II, S. Advanced study of evolving trends and materials for secondary programs; application to teaching and curriculum. Pr.: EDAO 621 and teaching experience. EDAO-834-0-0899

EDAO 840. Curriculum in Agriculture I. (2-3) S. Curriculum problems; planning local programs in agriculture; developing facilities and plans for meeting current and advanced problems in the teaching of

agriculture. Pr.: One year of teaching in agriculture. EDAO-840-0-0899

EDAO 842. Curriculum in Agriculture II. (2-3) S. Continuation of EDAO 840. Pr.: EDAO 840 or consent of instructor. EDAO-842-0-0899

EDAO 844. Curriculum Development in Vocational Home Economics. (3) I, S. The course focuses on current trends in vocational home economics curricula. Designed especially to assist home economics teachers and supervisors in the articulation of secondary programs, analysis, and development of curriculum models for specific school situations. Pr.: EDAO 620. EDAO-844-0-0899

EDAO 845. Field Studies in Agricultural Education. (2-3) On sufficient demand. Planning, organizing, and coordinating the various phases of the local program of vocational education in agriculture. Pr.: Experience in teaching agriculture or consent of instructor. EDAO-845-0-0899

EDAO 860. Nontraditional Study for Adults. (3) II, S. Designed to provide a conceptual understanding of current forms of nontraditional study and accreditation with emphasis on organizing studies to serve adult needs. Pr.: EDAO 680. EDAO-860-0-0807

EDAO 864. Assessment in Home Economics Education. (3) II, S. A study of evaluation theory and techniques for home economics educators. The primary emphasis will be placed upon program, process, and product evaluation relative to federal, state, and local home economics education programs. Pr.: EDAF 315 or equiv. EDAO-864-0-0899

EDAO 890-892. Seminars in Education. Credit arranged. On sufficient demand. These seminars will consider research on the special interests of the students in the several fields of education represented. Pr.: Consent of instructor.

EDAO 890. Home Economics Education. EDAO-890-0-0899

EDAO 891. Agricultural Education. EDAO-891-0-0899

EDAO 892. Adult Education. EDAO-892-0-0807

EDAO 899. Master's Research. (Var.) I, II, S. Pr.: Consent of instructor. EDAO-899-3-0839

EDAO 910. Occupational Experience Supervision. (3) II, S. Analysis of objectives and scope of occupational experience programs. Emphasis is placed on the organization, administration, related instructional procedures, coordination techniques, and evaluation of occupational experience programs. Pr.: Teaching experience or consent of instructor. EDAO-910-0-0807

EDAO 914. Technical Education. (3) I, S. An analysis of the evolving role of technical education and other postsecondary occupational education with emphasis upon principles underlying organization and practice unique to technical education. Pr.: Graduate standing. EDAO-914-0-0839

EDAO 916. Foundations of Adult Education. (3) On sufficient demand. A study of adult education historical perspectives, contemporary institutions and programs, teaching-learning process, administrative practices, and conceptual roles. Pr.: One year of field experience or approval of instructor. EDAO-916-0-0807

EDAO 929. Supervision in Occupational Education. (2-3) I, S. Philosophy and principles of effective supervision related to occupational education programs; application of principles to problems met by student teacher supervisors. Pr.: Teaching experience or consent of instructor. EDAO-929-0-0839

EDAO 937. Organization and Administration of Adult Education. (3) I, S. A critical study of organizational procedures and administrative practices as related to the implementation and maintenance of an effective program in adult education. Pr.: Graduate standing. EDAO-937-0-0807

EDAO 940. Organization and Administration of Occupational Education. (3) I, S. An overview of the organization of occupational education programs in agriculture, business, distributive education, health, home economics, trade and industry, technical, and related fields and their administration. Emphasis on federal-state-local relationships. Pr.: EDAO 701 or consent of instructor. EDAO-940-0-0807

EDAO 952. Internship in Adult and Occupational Education. (Var.) On sufficient demand. Studies of and field experiences in the development of programs in cooperating schools and educational or related agencies under the supervision of College of Education graduate faculty members. A maximum of six credit hours. Pr.: Consent of instructor. EDAO-952-2-0807

EDAO 962. Advanced Seminars in Adult and Occupational Education. (Var.) On sufficient demand. These seminars will critically consider recent research in the designated fields. The emphasis will be upon individual studies and small group interaction. Enrollment is restricted to those students who have been admitted to the doctoral program in education and who have completed substantial amounts of graduate study in the designated fields. Pr.: Consent of instructor. EDAO-962-0-0807

EDAO 999. Research in Adult and Occupational Education. (Var.) I, II, S. Pr.: Sufficient training to carry on the line of research undertaken and consent of instructor. EDAO-999-4-0807

Curriculum and Instruction

Emmett Wright, Head
Paul Burden, Associate Head

Professors Boyer,* Brookhart,* Hause,* Horn,* Kurtz,* Lindsey, Price,* Schell,* and Wright;* Associate Professors Alexander,* Burden,* Enochs,* Heerman,* Hortin,* Laurie,* McAnarney,* and Sturr;* Assistant Professors Byars,* Clegg,* Cohoon, Danielson, Deering, French, Heller, McGrath, McLellan, K. Holen, Oliver, Perl,* Talab,* and Weimer;* Instructor Hoffman; Assistant Instructor Goodenow; Emeriti: Professors Bartel, Craig, Littrell, Smethers, and Trennepohl.

The Department of Curriculum and Instruction houses undergraduate and graduate programs in teacher education. There are two undergraduate degree programs in the department: elementary education—a four-year program leading to certification as an elementary school teacher; and secondary education—a four-year program leading to certification as a secondary school teacher in one or more of the following fields: art, English, journalism, mathematics, modern languages, speech, natural sciences, and social science. In addition, the department provides teaching methods courses and secondary education student teaching experiences for the College of Arts and Sciences to degree programs in music education and physical education.

An equally important mission of the department is expansion of the knowledge base of curriculum studies, teaching, and learning. Research and development efforts that have implications for improvement of practice and that clarify relationships among curricular decisions, instructional decisions, student outcomes, and educational equity are especially valued.

The graduate programs offered through the department lead to the master of science, doctor of philosophy, and doctor of education. The areas of specialization at the graduate level are: elementary education, secondary education, college teaching, computer-based education, science education, multicultural education, educational media and technology, reading/language arts, and curriculum and instruction leadership. Graduate programs leading to certification as a reading specialist, school library/media specialist,

or supervisory specialist are offered by the department, also, and may be incorporated into work for an advanced degree.

The department also offers graduate courses in off-campus settings and collaborates closely with the Center for Economic Education, Center for Science Education, and the Center for Extended Studies delivering quality courses, workshops, and consultancies for Kansas schools. These activities address in-service, recertification, and/or graduate program needs of educators.

Undergraduate credit

EDCI 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. EDCI-050-1-0801

EDCI 051. Study Skills Laboratory. (1-3) I, II, S. Helps the student to learn effective study methods, analyze difficulties in reading and studying, and prepare for and improve performance in examinations. EDCI-051-0-0829

EDCI 217. Introduction to the Library. (1-2) I, II, S. Use of the library to find information for papers and/or library-related assignments. Modular format permits study of reference materials related to the student's field of study. EDCI-217-3-0801

EDCI 218. Teacher Education Colloquium. (1-2) I, II, on sufficient demand. Discussion, assigned readings, and lectures over selected trends, developments, and problems in the field of teaching. EDCI-218-0-0801

EDCI 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. EDCI-300-0-0802

EDCI 316. Introduction to Instructional Media. (1) I, II, S. Experiences in the choice, production, evaluation, and use of instructional materials. Operation and simple maintenance of basic types of instructional equipment. Pr.: Admission to teacher education or consent of instructor. EDCI-316-1-0801

EDCI 317. Instructional Media for Elementary Children. (3) On sufficient demand. Methods of planning and evaluating experiences to help children gain skills for interpreting life experiences through book and nonbook media. Pr.: EDAF 215 or consent of instructor. EDCI-317-0-0802

EDCI 318. Instructional Media and Technology. (2) I, II, S. 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. EDCI-318-1-0801

EDCI 376. Core Teaching Skills: Secondary/Middle. (3) I, II, S. 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 EDAF 215. Must be taken simultaneously with EDAF 315 and 323. EDCI-376-1-0803

EDCI 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.: EDAF 315, EDAF 323, and EDCI 376. Simultaneous enrollment required for EDCI 420, EDCI 477, and either EDCI 476, EDAO 500, or EDAO 550. EDCI-420-1-0803

EDCI 451. Principles of Secondary Education. (3) I, II, S. Junior and senior high school organization and objectives, their genesis and curriculum trends, characteristics of student population, and legal status and practices. Pr.: EDAF 315. EDCI-451-0-0803

EDCI 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.: EDCI 420, EDCI 477, and either EDCI 476, EDAO 500, or EDAO 550. Simultaneous enrollment required for EDCI 455, EDAF 525, and either EDCI 586 or EDAO 586. EDCI-455-0-0801

EDCI 469. Physical Education in Elementary Schools. (3) I, II, S. Methods of teaching and organization of materials in a progression for an elementary physical education program. Pr.: Admission to teacher education, PE 206, and at least two courses from the elementary physical education specialization. EDCI-469-0-0802

EDCI 470. Science for Elementary Schools. (3) I, II, S. 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 or consent of instructor. EDCI-470-1-0834

EDCI 471. Language Arts for Elementary Schools. (3) I, II, S. Modern trends in the teaching of reading, oral language, composition, and spelling. Pr.: Admission to teacher education or consent of instructor. EDCI-471-1-0802

EDCI 472. Social Studies for Elementary Schools. (3) I, II, S. 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 or consent of instructor. EDCI-472-1-0802

EDCI 473. Mathematics for Elementary Schools. (3) I, II, S. 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 or consent of instructor. EDCI-473-1-0833

EDCI 474. Elementary School Reading. (3) I, II, S. An introductory course in the content, methods, and materials of the total reading program in the elementary school. Pr.: Admission to teacher education or consent of instructor. EDCI-474-1-0830

EDCI 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.: EDAF 315, EDAF 323, and EDCI 376. Simultaneous enrollment required for EDCI 420, EDCI 477, and either EDCI 476, EDAO 500, or EDAO 550. EDCI-476-1-0803

EDCI 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.: EDAF 315, EDAF 323, and EDCI 376. Simultaneous enrollment required for EDCI 476, EDAO 500, or EDAO 550. EDCI-477-0-0803

Undergraduate and graduate credit in minor field

EDCI 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. EDCI-502-3-0801

EDCI 560. Art for Exceptional Children. (3) I, II, S. 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. EDCI-560-0-0831

EDCI 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. EDCI-582-2-0832

EDCI 585. Teaching Participation in the Elementary School. (Var.) I, II. Observation and teaching participation under the direction of selected elementary teachers. Pr.: EDCI 300, 470, 471, 472, 473, and admission to student teaching. EDCI-585-2-0802

EDCI 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. Pr.: EDCI 420, EDCI 477, and either EDCI 476, EDAO 500, or EDAO 550. Simultaneous enrollment required for EDCI 455, EDAF 525, and either EDCI 586 or EDAO 586. EDCI-586-2-0803

Undergraduate and graduate credit
EDCI 600. Reading with Practicum. (3) I, II, S. Supervised observation and teaching of reading in approved school classrooms. Pr.: EDCI 474 or teaching experience. May not apply to reading specialist endorsement. EDCI-600-0-0802

EDCI 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.: EDCI 476 (Science). EDCI-614-1-0834

EDCI 704. Extra-Class Activities. (3) II, S. Organization, sponsorship, and objectives of clubs, publications, athletics, dramatics, musical organizations, assemblies, home room, and student council in junior and senior high schools. Pr.: EDCI 450, senior standing, or consent of instructor. EDCI-704-0-0803

EDCI 705. Organization and Processing of Instructional Materials. (2) II. 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.: EDCI 318 and ENGL 540 or ENGL 545. EDCI-705-1-7-0801

EDCI 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.: EDCI 586 or teaching experience. EDCI-706-1-0801

EDCI 714. Understanding and Teaching Reading. (3) I, S. Foundational issues in K-12 reading instruction. Focus on the reading process, the nature of the learner, the text, and the instructional setting.

Pr.: EDCI 585, 586, 582, or EDAO 586. EDCI-714-0-0803

EDCI 715. Reading in the Content Areas. 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. EDCI-715-0-0830

EDCI 717. Corrective Reading Instruction. (1-3) I, II, S. Supervised tutoring of children with reading difficulties. Not open to students with credit in EDCI 947. Pr.: Student teaching experience or consent of instructor. EDCI-717-2-0817

EDCI 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.: EDCI 585 or 586. EDCI-718-0-0801

EDCI 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 EDCI 718. Pr.: CMPSC 200 and 207. EDCI-719-1-0801

EDCI 720. Foreign Language Methods for Elementary Schools. (3) II. 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 (EDCI 585, 4 cr.). EDCI-720-0-0802

EDCI 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.: Consent of instructor. EDCI-721-0-0801

EDCI 725. The Teacher and Child Abuse. (3) II, S. 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. EDCI-725-0-0801

EDCI 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 relation-

ships in schools. The development of realistic, relevant goals for the teacher of the disadvantaged. Pr.: EDAF 611 or consent of instructor. EDCI-730-0-0813

EDCI 733. Curriculum Materials for Ethnic Diversity. (3) I, II, S. 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. EDCI-733-2-0801

EDCI 735. Curriculum Materials for Nonsexist Teaching. (3) II. 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. EDCI-735-0-0829

EDCI 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 and consent of instructor. EDCI-737-0-0801

EDCI 739. Environmental Education. (1-3) I, II, S. 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.: EDAF 302 and a course in environmental studies, or consent of instructor. EDCI-739-0-0801

EDCI 756. Instructional Communication Processes. (3) On sufficient demand. Processing of information via the auditory and visual perceptual systems and implications for the design and use of instructional technology. Pr.: Consent of instructor. EDCI-756-0-0801

EDCI 762. Instructional Television. (3) On sufficient demand. The principles of instructional television: its development, programming, techniques, and application. Pr.: Junior standing. EDCI-762-1-0801

EDCI 765. Planning and Developing Instructional Materials. (3) On sufficient demand. 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.: EDCI 760 or consent of instructor. EDCI-765-1-0801

EDCI 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.: EDAF 215 or EDAO 540. See EDAF 775 and EDAO 775. EDCI-775-3-0829

EDCI 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.: EDAF 315, middle level field experience, elementary or secondary content methods course. EDCI-776-0-0829

EDCI 779. Primary School Education. (3) I, II. 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.: EDAF 315 and/or consent of instructor. EDCI-779-0-0823

EDCI 780. Kindergarten Education. (3) S. 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.: EDAF 215, EDCI 300, and junior standing. EDCI-780-0-0823

EDCI 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.: EDAF 215. See EDAF 786 and EDAO 786. EDCI-786-0-0829

EDCI 795. Problems in Curriculum and Instruction. (Var.) I, II, S. Independent study of a specific problem in curriculum or instruction. Pr.: Consent of instructor. EDCI-795-3-0823

Graduate credit

EDCI 803. Curriculum Development. (3) I, II, S. An overall view of the entire school curriculum, patterns of organization, outlining of instructional fields, and specific helps in curriculum development for administrators and classroom teachers. Pr.: Twelve hours of education or consent of instructor. EDCI-803-0-0829

EDCI 805. Curriculum Construction for Elementary and Secondary Schools. (2-3) On sufficient demand. Procedures for organizing and conducting programs for curriculum improvement in the elementary and secondary schools; techniques for the development and evaluation of curriculum materials. Opportunity is provided for work on individual curriculum problems. Pr.: EDCI 803. EDCI-805-0-0829

EDCI 808. Curriculum in the Inner City. (3) On sufficient demand. Exploration of research and innovations in curriculum and instruction for inner city schools. Emphasis on curricular and instructional difficulties in low-income communities and on

productive compensatory educational practices. Pr.: EDCI 803 and/or consent of instructor. EDCI-808-0-0801

EDCI 816. Approaches to Reading Instruction. (3) I. A critical study of approaches, materials, and methods for effective reading instruction. Pr.: EDCI 582, 585, 586, or EDAO 586. EDCI-816-0-0803

EDCI 817. Reading Comprehension. (3) On sufficient demand. Reviews comprehension theory and research; explores strategies for developing reading comprehension in readers. K-12; examines evaluative devices for assessing comprehension abilities. Pr.: EDCI 600 or EDCI 715. EDCI-817-0-0830

EDCI 820. Trends in Elementary School Language Arts. (3) On sufficient demand. An analysis of current methods, issues, and trends in teaching, speaking, listening, and writing through the study of significant literature and research findings. Pr.: Teaching experience or consent of instructor. EDCI-820-0-0802

EDCI 821. Contemporary Mathematics Education in the Elementary School. (3) On sufficient demand. Advanced study of selected topics in elementary school mathematics emphasizing new programs, trends, controversial topics, and new recommendations for persistent problems; findings of recent research stressed. Pr.: Teaching experience or consent of instructor. EDCI-821-0-0833

EDCI 822. Trends in Elementary School Social Studies. (3) On sufficient demand. Current methods, materials, issues, and trends in developing social consciousness among elementary school children. Social science strategies usable by children. Pr.: Teaching experience or consent of instructor. EDCI-822-0-0802

EDCI 825. Creative Language Expression in the Elementary School. (3) II. On sufficient demand. Developing experiences in creative expression as part of the elementary school English language arts program; role of the arts in fostering creative language expression, strategies for teaching and evaluating creative writing and dramatic arts. Pr.: EDCI 471. EDCI-825-0-0802

EDCI 831. Leadership for Improved Instruction. (3) II, S. A consideration of the relationship and techniques involved when teachers, supervisors, and administrators plan and implement improvement of instruction. Pr.: EDCI 585 or 586 or EDAO 680. EDCI-831-0-0801

EDCI 832. Individualized Instructional Programs. (3) On sufficient demand. A study of the rationale, procedures, techniques, and materials which are appropriate and necessary to individualizing

instructional programs. Particular emphasis given to organizational structure, curriculum, and administration of non-graded, multigraded, and multitasked programs. Pr.: Teaching experience or consent of instructor. EDCI-832-0-0801

EDCI 833. Creativity in Education. (3) II, S. Clarification of creativity in education, discovery of creative talent, methods of encouraging creative talent; emphasis on learning models and research in creativity as compared with or contrasted with conformity; emphasis on divergent and convergent thinking and its role in creative teaching with major consideration given to the student's involvement in creative study and/or teaching. Pr.: Teaching experience or consent of instructor. EDCI-833-0-0801

EDCI 834. Improving Elementary Science Teaching. (3) I, II. Evaluation and implementation of psychological and philosophical foundations will be stressed in improving elementary science teaching. Recent materials will be compared and their unique and common elements examined. Pr.: Teaching experience and/or consent of instructor. EDCI-834-1-0834

EDCI 835. Supervision of Student Teaching. (3) On sufficient demand. Organization and functions of student teaching programs; orienting, supervising, and evaluating student teachers in elementary and secondary schools. Pr.: Teaching experience and consent of instructor. EDCI-835-0-0801

EDCI 840. Diagnosis of the Reader. (3) II, S. Principles, procedures, and instruments for the diagnosis of reading disabilities. Pr.: EDCI 714 or EDCI 816 or EDAF 663 and student teaching. EDCI-840-0-0817

EDCI 841. Remediation of Reading Disabilities. (2) II. Selected theories, research, approaches, materials, and techniques appropriate for remediating reading problems of students in grades K-12. Pr.: EDCI 816 or 840. EDCI-841-0-0817

EDCI 842. Directed Professional Development. (5) I, II. Research and teaching under supervision in the secondary school. Open only to outstanding liberal arts graduates enrolled in the special program for the professional preparation of such graduates for teaching in critical areas in secondary schools. Pr.: Registration in Graduate School and consent of instructor. EDCI-842-0-0803

EDCI 843. Principles of College Teaching. (3) I, II. Principles of learning, learning theory, educational objectives, methods and techniques, college students, and evaluation in the classroom. Emphasis upon preservice and in-service help in improving instruction at the college level. Pr.: Consent of instructor. EDCI-843-0-0805

EDCI 844. Current Issues in College Teaching. (2) II. Objectives, problems, and evaluation of college instruction, purpose of the university, creative teaching, student involvement and unrest, and current issues. Individual study of special interest topics. Pr.: EDCI 843 and consent of instructor. EDCI-844-0-0805

EDCI 845. Advanced Elementary School Reading. (3) On sufficient demand. A study and evaluation of selected theories, programs, practices, and materials, K-6, emphasizing current trends, issues, and problems. Pr.: EDCI 474 or consent of instructor. EDCI-845-1-0830

EDCI 846. Diagnosis and Treatment of Reading Disabilities. (3-4) I, S. A systematic study of the causes of reading problems, the use and interpretation of diagnostic instruments and procedures, and special materials and methods of remedial instruction. Includes diagnosis of a child with a reading problem. Pr.: EDCI 715 or 845 and teaching experience or consent of instructor. EDCI-846-3-0817

EDCI 847. Advanced Clinical Practicum in Reading. (3) S. Supervised experience in diagnosing and teaching students with reading problems. Pr.: EDCI 840 and 841. EDCI-847-0-0817

EDCI 848. Organization and Administration of Reading Programs. (2) II, S. An investigation of several topics of special interest to educators responsible for developing a total reading program, K-12, with special attention to the remedial reading program. Pr.: EDCI 715 or 845 or consent of instructor. EDCI-848-0-0817

EDCI 861. Educational Technology. (2-3) I, II, S. Principles and techniques in the use of visual and audiovisual materials; operation and maintenance of equipment and sources of supply. Pr.: Completion of student teaching or graduate standing. EDCI-861-1-0801

EDCI 864. Programmed Instructional Materials. (3) On sufficient demand. Design, testing, and instructional applications of programmed instructional materials, teaching machines, and automated systems of instruction with emphasis on multimedia formats. Pr.: EDCI 861 and EDAF 920 or consent of instructor. EDCI-864-1-0829

EDCI 873. The Science Curriculum. (3) On sufficient demand. National curriculum programs and projects at both elementary and secondary levels. Evaluation of appropriateness of content as it relates to a philosophy of science education. Modes for investigating scientific phenomena and their subsequent use in teaching the processes of the scientists. Pr.: EDCI 803 and consent of instructor. EDCI-873-0-0834

EDCI 874. The Mathematics Curriculum. (3) On sufficient demand. Trends in the teaching and supervision of mathematics. Analysis of literature and research relating to content, methods, and materials of mathematics education. Pr.: EDCI 803, experience teaching mathematics, and consent of instructor. EDCI-874-0-0833

EDCI 876. The Social Studies Curriculum in the Secondary School. (3) On sufficient demand. New trends, materials, and ideas in teaching the social sciences, based on recent research and experimental programs. Pr.: EDCI 803 and/or consent of instructor. EDCI-876-0-0803

EDCI 877. The Foreign Language Curriculum. (3) On sufficient demand. New trends and materials in teaching the foreign languages, based on recent research and experimental programs. Pr.: EDCI 803 and consent of instructor. EDCI-877-0-0829

EDCI 878. The Language Arts Curriculum. (3) On sufficient demand. The changing scene in the teaching of English: trends, materials, and ideas in literature, composition, and grammar that have emerged from recent research and discovery. Pr.: EDCI 803 and consent of instructor. EDCI-878-0-0801

EDCI 882. Teacher Self-Assessment. (3) I, II, S. A systematic study of how teachers can improve their instruction in an autonomous fashion (K-12 and higher education). Major topics include: videotape recording, verbal and nonverbal cues, means-referenced objectives, observation tools, student feedback instruments, and peer feedback. For teachers, administrators, and supervisors interested in improving or assisting people in improving their instruction. Pr.: EDCI 803 or EDCI 843. EDCI-882-0-0829

EDCI 884. Computer Applications in Education. (3) On sufficient demand. The effects of information retrieval systems, data processing, and computer-assisted instruction on the curriculum, instruction, and administration of educational institutions. Pr.: Educational experience and consent of instructor. EDCI-884-1-0801

EDCI 886. Seminars in Curriculum and Instruction. (Var.) On sufficient demand. These seminars will consider research in the several fields of education represented in terms of the special interests of the students. Pr.: Consent of instructor. EDCI-886-0-0829

EDCI 898. Master's Report. (Var.) I, II, S. Pr.: Consent of instructor. EDCI-898-3-0829

EDCI 899. Master's Research. (Var.) I, II, S. Pr.: Consent of instructor. EDCI-899-3-0829

EDCI 907. Curriculum Theory. (3) On sufficient demand. Theoretical concepts underlying significant curriculum developments. A systematic critique of current curricular theory. Consideration of model generation. Pr.: Consent of instructor. EDCI-907-0-0829

EDCI 908. Instructional Theory. (3) On sufficient demand. Comprehensive analysis of research on the teaching process. Theoretical models for understanding teacher-pupil interaction. The design of studies on factors affecting teacher behavior and classroom learning. Pr.: EDCI 831, EDAF 920, and consent of instructor. EDCI-908-0-0829

EDCI 910. Multicultural Curriculum Programming. (3) I, S. Application of multicultural curriculum principles to total school programming with particular emphasis on the cultural pluralism phenomenon. Includes analytic review of instruments on multicultural/multiracial curriculum evaluation as well as planning skills for equitable thrusts. Primarily involves elementary and secondary focus with some attention to postsecondary programming. Pr.: EDCI 803 or EDCI 808 or equiv. EDCI-910-0-0829

EDCI 960. Educational Media Programs. (3) On sufficient demand. Organization, administration, and evaluation of educational media service programs, with emphasis on the provision of services, materials, equipment, facilities, staff, and financial resources essential in support of modern instructional programs. Includes studies of programs in varying sizes and types of educational institutions. Pr.: EDCI 861 or consent of instructor. EDCI-960-0-0801

EDCI 966. Selecting and Evaluating Instructional Materials. (3) On sufficient demand. Principles and procedures for evaluating graphic, photographic, and audio instructional materials. Development of evaluative criteria, instruments, and utilization guides. Sources for selecting instructional materials. Pr.: EDCI 861 or consent of instructor. EDCI-966-1-0829

EDCI 972. Advanced Study of the Reading Process. (3) On sufficient demand. Survey of selected theories of the reading process. Investigation of the interrelationships of the reading act: cognitive processes; language; social-emotional factors; and experience. Emphasis upon recent developments in the field. Pr.: EDCI 845, EDCI 715, or consent of instructor. EDCI-972-0-0830

EDCI 979. Community/Junior College Curriculum. (3) II. Evaluation of community/junior college curricula, reasons for revision, aims and objectives. Designed to familiarize students with the entire curricular offerings of the comprehensive

community/junior college. Pr.: EDAF 832. EDCI-979-0-0806

EDCI 980. The Curriculum Information Consultant. (3) On sufficient demand. The process skills and knowledge needed for the retrieval and dissemination of curriculum information. For teachers and administrators involved with helping others in curriculum development. Pr.: EDCI 803, 808, or 979. EDCI-980-0-0829

EDCI 990. Internship in College Teaching. (2-6) On sufficient demand. An experiential course for graduate students devoted to improving instruction. Supervised teaching of college classes and seminars in conjunction with cooperating departments. Pr.: Master's degree, EDCI 844, and consent of department head. EDCI-990-2-0805

EDCI 991. Internship in Curriculum and Instruction. (Var.) On sufficient demand. Studies of and field experiences in the development of programs in cooperating schools and educational or related agencies under the supervision of College of Education graduate faculty members. A maximum of six credit hours may be chosen from the areas listed. Pr.: Consent of instructor. EDCI-991-2-0829

EDCI 999. Research in Curriculum and Instruction. (Var.) I, II, S. Pr.: EDAF 817 and/or consent of instructor. EDCI-999-4-0829

Faculty

ABBOTT, JAMES W., Instr. (1983). BA 1956, Drury Col.; MA 1959, U. of Missouri; LHD 1980, Concordia Teachers' Col.

ALEXANDER, LOREN R., Assoc. Prof. of Education and Modern Languages (1972). BM 1951, Southwestern Col.; MA 1954, Colorado St. Col. of Educ.; MA 1965, PhD 1972, Michigan St. U. (*)

ANGLE, DENNIS R., Asst. Prof. (1979). BA 1968, MS 1974, Emporia St. U.; PhD 1984, Kansas St. U.

BAILEY, GERALD D., Prof. (1972). BS 1966, MEd 1969, EdD 1972, U. of Nebraska. (*)

BARTEL, ROY A., Assoc. Prof. Emeritus (1963). AB 1942, Bethel Col.; MSE 1949, EdD 1959, U. of Kansas.

BENTON, STEPHEN L., Asst. Prof. (1983). BA 1977, MA 1980, PhD 1983, U. of Nebraska. (*)

BLOOMQUIST, MARGARET CHRISTINE, Instr. Emerita (1967). AB 1941, Bethany Col.; MBA 1949, U. of Denver.

BOND, CANDACE M., Instr. (1984). BA 1968, Michigan St. U.

BOYER, JAMES BUCHANAN, Prof. (1971). BS 1956, Bethune-Cookman Col., Florida; MEd 1964, Florida A & M U.; PhD 1969, Ohio St. U. (*)

BRADLEY, FRED O., Prof. (1972). BA 1962, Colorado St. Col.; MEd 1970, PhD 1972, U. of Wyoming. (*)

BROOKHART, CHARLES EDWARD, Prof. of Education and Music (1975). BM 1949, MM 1950, PhD 1960, Geo. Peabody Col. (*)

BROWN, ELIZABETH N., Instr. (1980). BS 1971, MS 1973, SUNY-Buffalo; PhD 1979, Ohio St. U.

BURDEN, PAUL R., Assoc. Prof. and Assoc. Head, Curriculum and Instruction (1980). BS 1970, MS 1973, Buffalo St. Col.; PhD 1979, Ohio St. U. (*)

BYARS, JACKSON A., Asst. Prof. (1969). BA 1959, Municipal U. of Omaha; MA 1964, Colorado St. Col.; PhD 1970, U. of Nebraska. (*)

BYRNE, DAVID R., Dean and Prof. (1984). BA 1959, Idaho St. U.; PhD 1971, U. of Utah. (*)

CARPENTER, FRANK R., Assoc. Prof. Emeritus (1961). BS 1948, MS 1951, Kansas St. U.; PhD 1967, U. of Missouri. (*)

CARTER, PHILLIP D., Assoc. Prof. (1980). BS 1962, Central Missouri St. U.; MEd 1966, Ed. Spec. 1969, PhD 1976, U. of Missouri. (*)

CLEGG, VICTORIA LOUISE, Asst. Prof. (1982). BS 1965, Kansas St. U.; MA 1972, Wichita St. U.; PhD 1979, Kansas St. U. (*)

COHOON, KRIS, Asst. Prof. (1988). BS 1975, MS 1984, Creighton U.; EdD 1988, U. of Nebraska-Lincoln.

CRAIG, M. DOROTHY, Asst. Prof. Emerita of Education (1959). BS 1931, Bethany Col.; BS 1941, Emporia St. U.; MA 1944, Columbia U.

DANIELSON, KATHY EVERTS, Asst. Prof. (1988). BS 1981, MS 1984, PhD 1987, U. of Nebraska-Lincoln.

DANNELLS, MICHAEL, Asst. Prof. (1986). BS 1971, Bradley U.; PhD 1978, U. of Iowa.

DANSKIN, DAVID G., Prof. of Psychology and Education, Center for Student Development (1959). AB 1950, U. of Redlands; MA 1951, PhD 1954, Ohio St. U. (*)

DEERING, ROSEMARIE J., Asst. Prof. (1987). BA 1951, Otterbein Col.; MS 1957, SUNY; PhD 1987, U. of Kansas.

DE MAND, JOHN WESLEY, Prof. Emeritus (1940). AB 1937, U. of Kansas; MS 1940, Kansas St. U.; EdD 1953, U. of Colorado. (*)

DETTMER, PEGGY A., Assoc. Prof. (1979). BME 1958, Pittsburg St. U.; MS 1976, PhD 1979, Kansas St. U. (*)

DYCK, NORMA J., Assoc. Prof. (1976). BA 1957, Bethany Col.; MS 1970, EdD 1972, U. of Kansas. (*)

ENOCHS, LARRY G., Assoc. Prof. (1983). BA 1967, Indiana U.; MA 1971, U. of Rochester; EdD 1982, Indiana U. (*)

FIELD, RALPH G., Prof. (1972). BS 1950, MS 1966, Kansas St. U.; PhD 1970, Purdue U. (*)

FRENCH, MICHAEL P., Asst. Prof. (1987). AB 1973, U. of Notre Dame; MA 1978, Col. of St. Thomas (St. Paul, Minnesota); PhD 1987, U. of Wisconsin-Madison.

GOODENOW, PHILLIP E., Asst. Instr. (1967). BA 1953, Kansas Wesleyan, Salina.

GRIFFITH, MARY EVAN, Assoc. Prof. (1969). BS 1950, Kansas St. U.; MS 1957, Iowa St. U.; PhD 1966, Ohio St. U. (*)

HACHMEISTER, MARVIN H., Instr. (1979). BS 1956, MS 1961, Kansas St. U.

HALL, LAWRENCE FENOR, Assoc. Prof. Emeritus of Education (1926). BS 1923, MS 1927, Kansas St. U. (*)

HAMMEL, MARY L., Asst. Instr. (1981). BFA 1980, Kansas St. U.

HANNA, GERALD, Prof. (1967). AB 1956, MA 1959, Long Beach St. Col.; EdD 1965, U. of Southern California. (*)

HARBSTREIT, STEVEN R., Asst. Prof. (1987). BS 1971, U. of Missouri-Columbia; MEd 1976, Northwest Missouri St. U.; PhD 1987, U. of Missouri-Columbia.

HAUSE, RICHARD G., Prof. (1966). AB 1954, MA 1955, Colorado St. Col.; EdD 1966, U. of Colorado. (*)

HAUSMANN, EVELYN L., Assoc. Prof.; Women's Studies Faculty (1976). BS 1961, Lindenwood Col.; MEd 1965, St. Louis U.; PhD 1976, U. of Missouri. (*)

HAWES, DEANNA J., Asst. Prof. (1986). BS 1965, MS 1982, Emporia St. U.; PhD 1987, Kansas St. U.

HEERMAN, CHARLES, Assoc. Prof. (1975). BA 1966, MS 1970, EdD 1974, Oklahoma St. U. (*)

HELLER, MARY, Asst. Prof. (1987). BA 1971, MS 1974, EdD 1979, Oklahoma St. U.

HOFFMAN, RON J., Instr.; Dir. of Instructional Media Center. AB 1960, U. of Michigan; MA 1967, MS 1974, EdS 1975, Indiana U.

HOLEN, KATHRYN, Asst. Prof. (1975). BS 1971, MS 1973, EdD 1975, Oklahoma St. U.

HOLEN, MICHAEL C., Assoc. Dean and Prof. (1971). BA 1967, Stanford U.; MA 1968, PhD 1971, U. of Oregon. (*)

HORN, JERRY G., Assoc. Dean and Prof. (1977). BS 1961, MS 1964, Oklahoma St. U.; EdD 1970, U. of Colorado. (*)

HORTIN, JOHN A., Assoc. Prof. (1980). BS 1967, MS 1968, Eastern Illinois U.; MSLs 1972, U. of Illinois; PhD 1980, Northern Illinois U. (*)

HOYT, DONALD P., Dir. of Planning and Evaluation Services; Prof. (1968). BS 1948, U. of Illinois; MA 1950, PhD 1954, U. of Minnesota. (*)

HOYT, KENNETH B., Distinguished U. Prof. (1984). BS 1948, U. of Maryland; MA 1950, George Washington U.; PhD 1954, U. of Minnesota. (*)

JANKOVICH, ANN G., Instr. (1982). BS 1953, Indiana U.; MS 1981, Kansas St. U.

KAISER, HERBERT EMIL, Assoc. Prof. Emeritus (1961). BS 1941, Concordia Teachers Col.; MS 1943, Oklahoma St. U.; PhD 1959, U. of Nebraska. (*)

KURTZ, VERNON RAY, Prof. (1970). BS 1955, MS 1959, Fort Hays St. U.; EdD 1967, U. of Nebraska. (*)

LAURIE, DAVID R., Assoc. Prof. of Physical Education and Leisure Studies (1968). BS 1963, MS 1966, Kansas St. U.; EdD 1974, Oklahoma St. U.

LINDSEY, LAVERNE BOYER, Asst. Provost for Continuing Education (1983). BS 1962, MEd 1972, EdD 1974, Mississippi St. U.

LITTRELL, J. HARVEY, Prof. Emeritus (1954). BA 1935, Iowa St. Teachers Col.; MA 1939, St. U. of Iowa; EdD 1950, U. of Missouri.

LITZ, CHARLES E., Prof. (1971). BA 1963, Ohio U.; MA 1967, PhD 1970, U. of Michigan. (*)

LYNCH, MICHAEL L., Assoc. Prof., Center for Student Development (1972). BS 1967, MS 1968, EdD 1972, Indiana U. (*)

McANARNEY, HARRY EDWARD, Assoc. Prof. (1957). BS 1943, Emporia St. U.; MS 1947, EdD 1958, U. of Kansas. (*)

McGRATH, DIANE, Asst. Prof. (1987). AB 1963, Oberlin Col.; MS 1969, MEd 1983, PhD 1973, U. of Illinois.

McLELLAN, HILARY, Asst. Prof. (1987). BA 1972, U. of California at Riverside; MEnvS 1976, Miami U. of Ohio; PhD 1987, U. of Wisconsin-Madison.

MEISNER, ROBERT G., Prof. (1969). BS 1948, Oklahoma A & M Col.; MS 1957, Oklahoma St. U.; EdD 1967, U. of California, Berkeley. (*)

MIXER, VIRGINIA K., Instr. (1975). BS Ed. 1969, Pittsburg St. U.; MS 1975, Kansas St. U.

NEELY, MARGERY A., Prof.; Women's Studies Faculty (1974). AB 1955, Southwest Missouri St. U.; MEd 1968, PhD 1971, U. of Missouri, Columbia. (*)

NELSON, WILLARD J., Instr. (1971). AA 1952, Luther Jr. Col.; BA 1954, Bethany Col.; MS 1976, Kansas St. U.

NEWHOUSE, ROBERT C., Prof. (1972). BS 1967, MA 1969, Western Michigan U.; PhD 1972, U. of Oregon. (*)

NEWTON, FRED B., Assoc. Prof. (1980). BA 1965, Muskingum Col., Ohio; MA 1967, Ohio St. U.; PhD 1972, U. of Missouri-Columbia. (*)

OAKLIEF, CHARLES R., Assoc. Prof. (1974). BS 1959, MS 1962, Ohio St. U.; PhD 1970, Wisconsin St. U. and Ohio St. U. (*)

ODOM-BRADLEY, MILDRED R., Asst. Prof. (1972). BS 1940, Texas Women's U.; MS 1966, Kansas St. U.

OHLSEN, ROBERT L., Assoc. Prof. Emeritus (1976). BA 1952, Ottawa U.; ME 1957, Wichita U.; EdD 1963, U. of Kansas. (*)

OLIVER, J. STEVE, Asst. Prof. (1986). BS 1977, MS 1983, North Carolina St. U.; PhD 1986, U. of Georgia.

OLSON, GEORGE ARTHUR, Prof. Emeritus of Education (1949). AB 1928, AM 1931, U. of Kansas; PhD 1953, Northwestern U. (*)

PANKAKE, ANITA, Asst. Prof. (1987). BA 1970, MS 1973, Indiana St. U.; EdD 1985, Loyola of Chicago.

PARISH, THOMAS S., Prof. (1976). BA 1968, Northern Illinois U.; MA 1969, Illinois St. U.; PhD 1972, U. of Illinois. (*)

PARMLEY, JOHN D., Assoc. Prof. and Acting Head, Adult and Occupational Education (1980). BS 1968, MEd 1974, Colorado St. U.; PhD 1980, Ohio St. U. (*)

PERL, MICHAEL F., Asst. Prof. (1976). BA 1966, St. Mary's Col., Minnesota; MS 1970, Winona St. Col., Minnesota; PhD 1976, U. of South Carolina. (*)

POLSON, CHERYL J., Asst. Prof. (1976). BS 1976, MS 1978, PhD 1983, Kansas St. U. (*)

PRAWL, WARREN L., Prof.; Extension Specialist, Staff Development (1952). BS 1954, Kansas St. U.; MS 1958, EdD 1962, Cornell U. (*)

PRICE, FLOYD HAMILTON, Prof. (1963). AB 1951, Friends U.; MEd 1957, Wichita St. U.; EdS 1960, George Peabody Col.; EdD 1965, U. of Oklahoma. (*)

PULS, MARILEE C., Asst. Instr. (1979). BA 1967, Wichita St. U.

RANKIN, CHARLES I., Assoc. Prof. (1978). BA 1964, ME 1968, Wichita St. U.; PhD 1973, Kansas St. U.

ROLAND-McGOWAN, JUANITA, Instr. (1980). MA 1975, U. of Kansas.

ROWLETT, JANE D., Asst. Prof. (1977). BS 1970, MS 1977, PhD 1981, Kansas St. U.

SCHELL, LEO M., Prof. (1966). AB 1955, Bethany Col.; MS 1962, U. of Kansas; PhD 1964, U. of Iowa. (*)

SCHUETTE, CLIFFORD G., Asst. Prof. (1975). AA 1967, Del Mar Com. Col., Scott; BBA 1969, U. of Texas; MS 1973, EdD 1975, East Texas St. U.

SCOTT, SUSAN S., Asst. Prof. and Assoc. Dean of Students, Center for Student Development (1979). BS 1973, MS 1974, Emporia St. U.; PhD 1982, Kansas St. U.

SHOOP, ROBERT J., Prof. (1976). BA 1968, MDiv 1972, Wittenberg U.; PhD 1974, U. of Michigan. (*)

SINNETT, E. ROBERT, Prof. (1962). BA 1948, U. of Iowa; MA 1950, PhD 1953, U. of Michigan. (*)

SMETHERS, HOWARD DEWIGHT, Asst. Prof. Emeritus of Education (1947). BS 1927, Emporia St. U.; MS 1935, Kansas St. U.

STEFFEN, JOHN D., Assoc. Prof. (1976). BA 1956, Hamline U.; PhD 1968, U. of Minnesota. (*)

STEWART, G. KENT, Assoc. Prof. (1973). BS 1955, Indiana St. U.; MEd 1958, U. of Illinois; EdD 1964, Indiana U. (*)

STURR, EDWARD, Assoc. Prof. of Education and Art (1974). BA 1959, St. Ambrose Col.; MS 1964, Illinois Inst. of Tech.; EdD 1973, Illinois St. U. (*)

TALAB, ROSEMARY STURDEVANT, Asst. Prof. (1984). BA 1971, Wichita St. U.; MA 1975, Arizona St. U.; PhD 1979, U. of Southern California. (*)

TERRASS, JOYCE J., Prof. Emerita (1973). BS 1942, Kansas St. U.; MS 1957, Colorado St. U.; PhD 1969, Purdue U. (*)

THOMPSON, DAVID C., Asst. Prof. (1987). BA 1974, Friends U.; MEd 1978, EdS 1983, Wichita St. U.; EdD 1985, Oklahoma St. U.

THURSTON, LINDA P., Asst. Prof. (1987). BS 1967, Baker U.; MS 1975, U. of Texas; PhD 1977, U. of Kansas.

TRENNEPOHL, HARLAN JEAN, Assoc. Prof. Emeritus (1956). BS 1947, MS 1951, Emporia St. U.; EdD 1956, U. of Colorado.

WEIMER, RITA J., Asst. Prof. (1966). BS 1956, Pittsburg St. U.; MS 1964, EdD 1974, U. of Kansas. (*)

WELTON, RICHARD F., Prof. (1977). BS 1959, MS 1966, Colorado St. U.; PhD 1971, Ohio St. U. (*)

WHITE, WARREN J., Assoc. Prof. (1981). BS 1973, Fort Hays St. U.; MS 1977, PhD 1980, U. of Kansas. (*)

WILLIAMS, KATHLEEN, Asst. Prof. (1984). BS 1974, U. of North Carolina; MS 1973, PhD 1982, U. of Wisconsin-Madison.

WILSON, ALFRED P., Prof. (1972). BS 1961, MEd 1965, EdD 1969, Utah St. U. (*)

WINEINGER, EARL, Instr. (1988). BS 1960, MS 1968, Kansas St. U.

WISSMAN, JANICE R., Assoc. Prof. (1968). BS 1963, MS 1968, Kansas St. U.; EdD 1981, U. of Kansas.

WRIGHT, EMMETT L., Prof. and Head, Curriculum and Instruction (1984). BS 1963, U. of Kansas; MA 1968, Wichita St. U.; PhD 1974, Pennsylvania St. U. (*)

ZABEL, MARY KAY, Asst. Prof. (1979). BA 1969, Grinnell Col.; MAT 1971, National Col. of Ed.; PhD 1977, U. of Minnesota. (*)

ZABEL, ROBERT, Assoc. Prof. (1977). BA 1969, Grinnell Col.; MEd 1973, National Col. of Ed.; PhD 1977, U. of Minnesota. (*)

Engineering

Donald E. Rathbone, Dean
Kenneth K. Gowdy, Associate Dean
John P. Dollar, Assistant Dean
Ray E. Hightower, Assistant Dean
Jose E. Pereles, 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 it equips the student 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 each of the following fields: agricultural engineering, architectural engineering, chemical engineering, civil engineering, construction science, electrical engineering, engineering technology, industrial engineering, mechanical engineering, nuclear engineering.

The master of science degree is offered in each of the preceding areas except construction science and engineering technology.

To provide the engineering graduate student with maximum access to all of its resources (including faculty and laboratories), the College of Engineering offers the Ph.D. degree in engineering. The student

may study in one of the traditional areas or develop a program of study to fit particular interests and needs. Major areas are: agricultural engineering, chemical engineering, civil engineering, electrical engineering, industrial engineering, mechanical engineering, nuclear engineering, systems engineering, materials science, energy processes, bioenvironmental engineering, information processing.

Additional information on the graduate program is included in the section on the Graduate School.

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.

Fall semester		
ENGL 100	English Composition 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
PE 101	Concepts in Physical Education	1
		17

Spring semester		
ENGL 120	English Composition II	3
or		
Elective*	.....	3
CHM 230	Chemistry II	4
MATH 221	Analytic Geometry and Calculus II	4
ECON 110	Economics I	3
Humanities or social science elective	.....	3
		17

*English Composition II is optional if prerequisites for Written Communication for Engineers (ENGL 415) are met from English Composition 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 KSU to ensure a proper selection of courses. Questions should be referred to the dean's office, College of Engineering. The following chart indicates the number of transferable credit hours for various courses, and is a guide to courses which current Kansas State University 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

Accounting	
Biology	
Chemistry	
Computer programming†	
Economics	
English Composition I and II**	
Geology	
Graphics	
Mathematics (Analytic Geometry and Calculus and Elementary Differential Equations)	
Mathematics (algebra and trigonometry)	
Organic chemistry	
Physics	
Qualitative analysis	
Social science/humanities electives††	
Speech (public speaking)	
Statics	
Statistics (calculus based)†††	

Use in various curricula; credit hours at KSU										
AGE	ARE	CE	CHE	CNS	EECE	ET	IE	ME	NE	
*				3	*	*	3			
4			*		*				*	
8	8	8	8	*	8	4	8	8	8	
2	3	2	1	3	3	2	2	2	2	
3	3	3	3	3	3	3	3	3	3	
6	6	6	6	6	6	6	6	6	6	
		3	*	3					*	
2	4	2	*	4	*	2	2	5	*	
16	16	16	16	4	16	6	16	16	16	
			8			6				
10	10	10	10	8	10	8	10	10	10	
		*	4						*	
13	12	13	15	12	15	12	13	15	13	
2	2	2	2	2	2	2	3	2	2	
3	3	3	*	3	3	*	3	3	3	
*	*	*			3	3	3	*		

***Elective**
Excess credit hours in courses listed above may possibly be used in elective areas after consultation with a KSU departmental advisor and the dean's office.

****English Composition II** is required for ET, but optional for all other programs if an A or B grade is achieved in English Composition I.

†FORTRAN

††Two courses must be junior/senior level (not available at two year schools)

†††ET need not be calculus based

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
IE 372	Computers and Data Processing ...	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. A minimum of 32 semester hours of engineering science courses.

B. At least nine semester hours of engineering science courses outside the student's major department.

C. At least four of the six subject areas in the following list must be represented in the 32 semester hours.

1. Engineering materials

CHE 350	Engineering Materials	2
CHE 352	Engineering Materials	3
NE 515	Nuclear Engineering Materials	2
EECE 695	Solid State Engineering	3

2. Analytical mechanics

Either		
CE 333	Statics	3
and		
ME 512	Dynamics	3
or		
CE 530	Statics and Dynamics	4

3. 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

4. Thermodynamics

CHE 515	Chemical Engineering Thermodynamics I	2
ME 513	Thermodynamics	3

5. Flow and rate processes

ME 571	Fluid Mechanics	3
CHE 530	Transport Phenomena I	3

6. Computing and information sciences

Note—It should be recognized that there are other courses in these subject areas which may properly be considered as belonging to engineering sciences. In addition, there are areas of engineering science which 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.

Architecture and design—any course in history or appreciation of architecture

Art—any course

Economics—any course above ECON 110

Engineering—DEN 250, Impact of Engineering Technology on Society (3)

DEN 299, Honors Seminar in Engineering (2)

DEN 399, Honors Colloquium in Engineering (1)

English—any course above ENGL 205 except ENGL 415 and ENGL 516

Geography—any course except GEOG 220, 221, 700, 702, and 795

History—any course

Journalism—JMC 235, Survey of Mass Media (3)

Modern languages—at least eight hours

Music—any course; Music Listening Lab must be the two-credit-hour course

Philosophy—any course except PHILO 110, PHILO 220, and PHIL 510

Political science—any course

Psychology—any course

Sociology and anthropology—any course

From the areas listed above 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 three credit hours may be taken in applied music and/or applied art. All courses must be taken for a letter grade.

Grade requirements

Before attempting a course taught in the College of Engineering, a grade of "C" or better must be earned in any courses which are prerequisite to it. This policy was effective with the fall 1983 semester and is not retroactive.

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.

Information concerning the courses offered is contained in the summer school catalog, which may be obtained from the director of admissions of the University. The summer school catalog is published in early spring for the coming summer.

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 accommodated, the College of Engineering reserves the right to apply more rigorous admissions criteria to applicants who are not U.S. citizens.

Program Options

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, the student 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 of the recent advances in medical research techniques, patient monitoring systems, artificial limbs and organs, and aerospace and undersea medicine have been developed from the partnership of medicine and engineering. Engineering students wishing to satisfy entrance requirements to a typical school of medicine must take: chemical analysis, two semesters of organic chemistry, and two semesters of biology (BIOL 198 plus one of the following: BIOL 201, BIOL 535, BIOL 650). The pre-medicine 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. An individual with training in both engineering and computer science possesses the background to attack problems over a broad range of areas. Appropriate courses include:

Languages

CMPSC 200	Fundamentals of Computer Programming
CMPSC 300	Algorithms and Data Structures
CMPSC 305	Computer Organization and Programming IA
CMPSC 405	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 571	Introduction to Operations Research
IE 573	Industrial Simulation
ME 760	Engineering Analysis I
NE 720	Nuclear Systems Analysis

Mathematics, physics, 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 very 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 551	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. The 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 of the world. 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.

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 be commenced 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
		37

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.

1. General requirements for B.S. degree in arts and sciences (see the College of Arts and Sciences section).

2. Complete the following courses in geology:

GEOL 300	Historical Geology	4
GEOL 502	Mineralogy	3
GEOL 503	Petrology	3
GEOL 520	Geomorphology	3
GEOL 530	Structural Geology	3
GEOL 630	Stratigraphic Geology	3
GEOL 680	Field Geology	6
Geology elective		5
		30

Chemistry and chemical engineering. In addition to the required courses in chemical engineering, interested students should take:

CHM 551	Organic Chemistry II Lab	2
CHM 597	Structure and Bonding	2
CHM 545	Chemical Separations	2
CHM 666	Instrumental Analysis	3
CHM 499	Undergraduate Research	3
MLANG 121	German I	4
MLANG 122	German II	4
CHM 667	Instrumental Analysis Lab	1
		21

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.

For those students enrolled in the Department of Architectural Engineering and Construction Science, there is an opportunity to undertake a dual major with the curriculum of architecture. Interested students should consult with their advisors.

Integrated master's degree program

A five-year integrated program leading to a B.S. degree in any of the fields of engineering 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 would be 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 which 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 the interested student an intellectual challenge consistent with one's ability 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, the student may enroll in a variety of seminars, colloquia, and research problems designed to enrich and challenge the interested student. The honors program in engineering is closely integrated with the honors programs of the other colleges at KSU and provides an excellent opportunity for interdisciplinary study. A student 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 College of Engineering 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

Donald E. Rathbone, Interim Director
Gale G. Simons, Interim Associate 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 himself or herself. 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 of Engineering. 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 \$6,000,000, with approximately 25 percent appropriated by the state and the remainder from other sources. 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
- Rail-highway grade crossing safety
- Buckling behavior of concrete shells
- Image enhancement
- Bioengineering
- Optimizing for comfort and energy use
- Human physiological responses to thermal stresses
- Improving quality of manufactured products
- Energy conservation
- Heat transfer augmentation during two-phase flow
- The effect of room and control systems dynamics on energy consumption
- Combustion kinetics
- Radiation dosimetry
- Robotics

Institute for Environmental Research

Byron W. Jones, Director

The institute provides opportunities and facilities for research into man's relation and response to environmental factors.

The objectives of the institute are to: provide a focal point for interdisciplinary research on the effect of normal and altered environments on man; determine response of human and other organisms to environmental factors affecting health, comfort, affectivity, productivity, and learning; investigate methods of environmental control and modification; provide opportunities and facilities for M.S. and Ph.D. research projects and specialized graduate-level courses and seminars; and collect and disseminate data and provide research and service to industry and governmental agencies interested in environmental problems.

University staff and graduate students carry out projects and research using the facilities of the institute with the assistance of its staff. The institute is under the direction of the dean of the College of Engineering, and its research is administered through the Engineering Experiment Station.

The institute's executive council is an interdisciplinary group, appointed from members of the participating staff and directors, which formulates policy procedures, initiates and directs research, and advises faculty and graduate students who associate with the institute for special projects. The research associates are members of their respective major departments throughout the University, are members of the graduate faculty, and come from the areas of: mechanical, electrical, chemical, and industrial engineering; psychology; physiological sciences; architecture; human development and family studies; clothing, textiles, and interior design; foods and nutrition; grain science and industry; infectious diseases; pathology; statistics; and education. The institute is organized so faculty members or students from any department can carry out research in the institute within its stated objectives.

Institute for Systems Design and Optimization

L. T. Fan, Director
F. A. Tillman, Associate Director

The Institute for Systems Design and Optimization at Kansas State University, to promote interdisciplinary research, teaching, and communications in systems engineering, was approved in 1967 by the Kansas Board of Regents.

The institute is administered through the College of Engineering and the Engineering Experiment Station and provides channels of communication between disciplines

throughout Kansas State University in engineering systems design.

Specific objectives of the institute include the promotion of interdisciplinary research; the development of opportunities for interdisciplinary communication in systems engineering through seminars and conferences; preparation of research proposals; and providing assistance in recruitment of graduate students, post-doctoral students, and faculty in systems design.

Center for Energy Studies

N. Dean Eckhoff, Director

The goal of the center is to conduct interdisciplinary studies and to provide 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 interdisciplinary 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 for Research in Computer Controlled Automation

J. Garth Thompson, Director

The goal of the center is to provide high technology research that will help industry expand services, manufacture new products, and increase productivity. It will promote cooperative research between the University and private companies engaged in development and use of high technology.

The center is in the College of Engineering; however, other disciplines outside of engineering also will be involved in cooperative research with industrial partners.

Forming the nucleus of the center are faculty from the Departments of Mechanical Engineering, Electrical and Computer Engineering, Chemical Engineering, Nuclear Engineering, Agricultural Engineering, and Civil Engineering. As more projects are identified, faculty from departments outside of engineering will participate.

The focus of the center is the use and study of computers, robotics, artificial intelligence, numerically controlled machines, flexible manufacturing systems, and instrumentation in the sensing, controlling, communicating, and decision-making processes in engineering design and manufacturing.

The center is presently focusing development in two major application areas: the automation of the design and production of mechanical parts and assemblies, and the automation of food processing and agricultural production. These developments include not only the establishment of important University/industrial partnerships, but also the establishment of enhanced research facilities. A \$375,000 grant from the U.S. Department of Education (to be matched by \$375,000 in local funds) has been secured for special research equipment to expand the automated design and production research laboratory.

Center for Transportation Research and Training

Bob L. Smith, Director

The center's goal is to conduct interdisciplinary research and training in the planning, design, and operation of rural and urban transportation systems.

The center carries out interdisciplinary 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. Aiken, 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

Kansas State University 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 which 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 (KIES) 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 on the KSU campus, 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.

To use the service, write or call Kansas Industrial Extension Service, 133 Ward Hall, Kansas State University, Manhattan, Kansas 66506, (913) 532-6026.

Kansas Energy Extension Service

Richard B. Hayter, Director

The Kansas Energy Extension Service (KEES) is a technical assistance program for the small energy consumer ranging from residential to small business and industry. The 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 are offered as is assistance with alternate energy systems.

Inquiries should be directed to the Kansas Energy Extension Service, 133 Ward Hall, Kansas State University, Manhattan, Kansas 66506, (913) 532-6026.

General Engineering

Donald E. Rathbone, Dean

Undergraduate credit

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-160-1-0901

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-200-2-0901

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-201-0-0901

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-202-0-0901

DEN 250. Impact of Engineering 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. DEN-250-0-0901

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-299-0-0901

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-380-0-0910

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-399-0-0901

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-400-0-0901

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-420-0-0901

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-425-0-0901

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-499-4-0901

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-550-0-0901

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. DEN-740-0-0901

Agricultural Engineering

Stanley J. Clark, Acting Head

Professors Chung,* Clark,* Johnson,* Manges,* Murphy, and Spillman;* Associate Professors Baugher, Black, Eckhoff,* Kuhlman, Powell, Rogers, Schrock,* Steichen,* TenEyck, and Thierstein; Assistant Professors Barnes, Chang,* Harner,* Heber,* Martin, Pacey, Slocombe,* and Young;* Emeriti: Professors Fairbanks, Holmes, Jepsen, Larson, Lipper, Stover, and Wendling; Associate Professors Schindler and Stevenson.

Undergraduate study

Agricultural engineering is the field that applies engineering science and technology to the food production and agricultural industry. Students completing this program are prepared to develop new methods as well as to further the application of engineering fundamentals in such areas as agricultural machinery; soil and water conservation; irrigation and drainage; energy systems; plant and animal environment; and feed or waste handling, processing, and storage. Due to the broad scope of agricultural engineering, two curriculum options are available.

General option with area of specialization

The general curriculum outlined for agricultural engineering provides the basic requirements for the program. The 12 hours of technical electives in the junior and senior years allow the student 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. Choice of a specific specialty is not required. Lists of approved technical electives for each specialty are available from the agricultural engineering office.

Food engineering option

A student pursuing the option of food engineering within the Department of Agricultural Engineering 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 mechanization

Description and curriculum outline are listed in the catalog under the College of Agriculture, Department of Agricultural Mechanization.

Graduate study

Major work leading to the master of science and doctor of philosophy degrees is offered in power and machinery, soil and water engineering, animal environment and waste management, food and feed processing, and energy use in agriculture.

Excellent opportunities and capabilities exist for advanced study. In addition to modern departmental facilities, irrigation experimental fields and the USDA Grain Marketing Research Center offer unique possibilities for graduate research.

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	English Composition 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 electives	3
	17

Spring semester

ENGL 120	English Composition II* 3
or	
Elective	3
MATH 221	Analytic Geometry and Calculus II 4
ECON 110	Economics I 3
CHM 230	Chemistry II 4
AGE 220	Agricultural Engineering Analysis II 1
ME 212	Engineering Graphics I 2
	17

Sophomore

Fall Semester	
MATH 222	Analytic Geometry and Calculus III 4
PHYS 213	Engineering Physics I 5
BIOL 198	Principles of Biology 4
PE 101	Concepts in Physical Education . . . 1
Humanities or social science electives	3
	17

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
	15

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
	17

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
	17

Senior

Fall semester	
AGE 536	Agricultural Engineering Design I . . 3
AGE 575	Fundamentals of Agricultural Process Engineering 3
EECE 510	Circuit Theory 3
Humanities or social science electives	3
Technical electives	6
	18

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
	17

*English Composition II is optional if prerequisites for Written Communication for Engineers (ENGL 415) are met from English Composition 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	English Composition 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
	17

Spring semester

ENGL 120	English Composition II* 3
or	
Elective	3
CHM 230	Chemistry II 4
MATH 221	Analytic Geometry and Calculus II 4
ECON 110	Economics I 3
AGE 220	Agricultural Engineering Analysis II 1
PE 101	Concepts in Physical Education . . . 1
	16

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
	16

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
	17

Junior

Fall semester	
CHE 520	Chemical Engineering Thermodynamics I 2
BIOL 555	Microbiology 5
CHM 585	Physical Chemistry I 3
BIOCH 521	General Biochemistry 3
AGE 575	Fundamentals of Agricultural Process Engineering 3
	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 311	Introduction to Food Chemistry . . . 3
AGE 630	Food Process Engineering Lab 1
	17

Senior

Fall semester	
EECE 510	Circuit Theory 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
	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
	18

*English Composition II is optional if prerequisites for Written Communication for Engineers (ENGL 415) are met from English Composition 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.

Courses in agricultural engineering 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-200-1-0903

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-220-1-0903

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-320-1-0903

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. AGE-499-4-0903

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-500-1-0903

Undergraduate and graduate credit in minor field

AGE 510. Environmental Design of Agricultural Buildings. (3) I. Theory and application of psychrometrics, 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-510-1-0903

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-512-1-0903

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-520-1-0903

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. or conc.: AGE 551, ME 571, and AGRON 305. AGE-530-1-0903

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-536-1-0903

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 PHYS 213. Cross listed with CE 551. AGE-551-0-0903

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; computer-aided drafting and introduction to finite element analysis. Three hours rec. a week. Pr.: CE 533. AGE-566-0-0903

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-575-1-0903

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. AGE-581-0-0903

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-620-3-0903

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-625-0-0903

AGE 630. Food Process Engineering Laboratory. (1) 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-630-1-0903

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-635-1-0903

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-636-1-0903

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 EECE 519 and MATH 240. AGE-640-1-0903

AGE 650. Agricultural Systems Engineering. (2) I. Development of plans and specifications for buildings, equipment and controls for selected systems of agricultural production. Six hours lab a week. Pr.: AGE 536, AGE 566. AGE-650-1-0903

AGE 680. Principles of Occupational Safety and Health Management. (3) II. Concepts of recognition, evaluation, and control of occupational hazards. Detection and identification of occupational hazards. Emphasis on theory and performance-related practice. Familiarization with specifications, standards, codes, and regulations. Three hours rec. a week. Pr.: IE 501 or MANGT 420. AGE-680-0-0903

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-700-1-0903

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-705-1-0903

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-710-1-0903

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 EECE 519. AGE-780-1-0903

Graduate credit

AGE 810. Research in Agricultural Engineering. (Var.) I, II, S. The laboratories of the University are available for research in all areas of agricultural engineering. The results of such investigation may be incorporated in bulletins of the Agricultural Experiment Station. Pr.: Approval of department head. AGE-810-4-0903

AGE 815. Graduate Seminar in Agricultural Engineering. (1) I, II. Presentation and discussion of research philosophies, procedures, and results. One hour rec. a week. Required of all graduate students in agricultural engineering. Pr.: Graduate standing. AGE-815-0-0903

AGE 898. Master's Report. (Var.) I, II, S. Topics selected with approval of major professor and department head. AGE-898-4-0903

AGE 899. Master's Thesis. (Var.) I, II, S. Topics selected with approval of major professor and department head. AGE-899-4-0903

AGE 999. Dissertation Research. (Var.) I, II, S. Topics selected with approval of major professor and department head. AGE-999-4-0903

Architectural Engineering/Construction Science

Robert E. Dahl, Head

Professors Bissey,* Burton,* Dahl,* Hodges,* and Lindley,* Associate Professors Blackman and Goddard; Instructors Goodman, Mayo, Peterson, and Waters; Emeritus: Professor Thorson.*

Undergraduate study

Architectural engineering

The architectural engineering program is planned for the student who is particularly interested in the engineering aspects of building design. The architectural engineer must be sympathetic with the practical, functional, and aesthetic possibilities of contemporary materials, and with mechanical, electrical, and structural systems. As an important member of the building design team, he must be able to create designs that will answer the economic, safety,

and aesthetic requirements of a project. He must have a feeling of the total design.

See architectural engineering curriculum.

Graduate study in architectural engineering

Major work is offered in programs of study leading to the master of science degree with specialization in mechanical and electrical systems design for buildings. A student, in addition to major studies, will generally develop strength in mathematics, architecture, and structures by taking course work in those fields.

Students who pursue the M.S. program are generally B.S. graduates in architectural engineering from an accredited program. Students with undergraduate degrees in other disciplines may apply but may need to take additional undergraduate courses. Additional requirements will be decided individually by the Graduate Faculty Committee of the Department of Architectural Engineering and Construction Science.

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	English Composition I	3
MATH 220	Analytic Geometry and Calculus I ..	4
CHM 210	Chemistry I	4
CNS 200	History of Building and Construction	3
ARE 020	Architectural Engineering Seminar	0
		16

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	English Composition II* or Humanities or social science electives	3
ARE 020	Architectural Engineering Seminar	0
PE 101	Concepts in Physical Education	1
		16

Sophomore

Fall semester

ART 190	Drawing I	2
CNS 210	Introduction to Construction Programming	3
CNS 321	Construction Techniques and Detailing	3
PHYS 213	Engineering Physics I	5
MATH 222	Analytic Geometry and Calculus III	4
ARE 020	Architectural Engineering Seminar	0
		17

Spring semester

CNS 325	Construction Drawing	3
CE 333	Statics	3
SPCH 105	Public Speaking IA	2
PHYS 214	Engineering Physics II	5
MATH 240	Elementary Differential Equations	4
ARE 020	Architectural Engineering Seminar	0
		17

Junior

Fall semester

ENVD 207	Form, Space, and Order I	3
ME 512	Dynamics	3
CE 533	Mechanics of Materials	3
CE 534	Mechanics of Materials Lab	1
ECON 110	Economics I	3
ENGL 415	Written Communications for Engineers	3
ARE 020	Architectural Engineering Seminar	0
		16

Spring semester

ARE 537	Acoustic Systems	2
ARE 532	Lighting Systems Design	2
ME 513	Thermodynamics I	3
CE 537	Introduction to Structural Analysis	4
CE 212	Elementary Surveying Engineering	3
ENVD 208	Form, Space, and Order II	3
ARE 020	Architectural Engineering Seminar	0
		17

Senior

Fall semester

ARE 411	Architectural Engineering Design I	3
ME 571	Fluid Mechanics	3
EECE 519	Electric Circuits and Control	4
ARE 523	Timber Structures	3
Humanities or social science elective	.....	3
ARE 020	Architectural Engineering Seminar	0
		16

Spring semester

ARE 524	Theory of Structures II	4
ARE 412	Architectural Engineering Design II	3
ARE 533	Building Electrical Systems	3
GEOL 100	Introduction to Geology	3
Humanities or social science elective	.....	3
ARE 020	Architectural Engineering Seminar	0
		16

Fifth year

Fall semester

ARE 536	Sanitation Systems	3
CE 522	Soil Mechanics I	3
ARE 528	Theory of Structures III	4
ARE 534	Thermal Systems	3
Humanities or social science elective	.....	3
ARE 020	Architectural Engineering Seminar	0
		16

*English Composition II is optional if prerequisites for Written Communication for Engineers (ENGL 415) are met from English Composition 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.

Spring semester	
ARE 595	Senior Project 5
ARE 539	Architectural Engineering Management 3
Complementary elective	..... 4
Free elective	..... 3
ARE 020	Architectural Engineering Seminar 0
	15

Construction science

The construction science program prepares the student to be a professional constructor; a manager of personnel resources, financial resources, material, and machines. The program is an engineering based management program designed to produce a technically competent manager of construction.

The graduate enters the construction field in areas generally categorized as:

Building construction—in this category are apartments, office buildings, industrial plants, hospitals, churches, schools.

Highway construction—dams, tunnels, flood control projects.

Utilities construction—sanitary works, waterworks, power lines, pipelines.

See construction science curriculum.

Curriculum in construction science (CNS)

Bachelor of science in construction science
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	English Composition I 3
MATH 220	Analytic Geometry and Calculus I .. 4
ENVD 205	Graphics I 2
SPCH 105	Public Speaking IA 2
PE 101	Concepts in Physical Education 1
CNS 016	Construction Seminar 0
	15

Spring semester

CE 212	Elementary Surveying Engineering 3
ENVD 206	Graphics II 2
ENGL 120	English Composition II* or
Humanities or social science elective	..... 3
CNS 210	Introduction to Construction Programming 3
PHYS 113	General Physics I 4
CNS 320	Construction Materials 2
CNS 016	Construction Seminar 0
	17

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	Economics I 3
CNS 016	Construction Seminar 0
	15

Spring semester	
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 211	Financial Accounting 3
Humanities or social science electives	..... 3
CNS 016	Construction Seminar 0
	17

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 electives	..... 3
CNS 016	Construction Seminar 0
	17

Spring semester

CNS 523	Timber Construction 3
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 electives	..... 3
CNS 016	Construction Seminar 0
	18

Senior

Fall semester	
CNS 524	Steel Construction 3
CNS 541	Construction Estimating 3
CNS 542	Construction Management I 3
Professional electives	..... 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	..... 4
Free electives	..... 3
CNS 016	Construction Seminar 0
	16

*English Composition II is optional if prerequisites for Written Communication for Engineers (ENGL 415) are met from English Composition 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.

Courses in architectural engineering Undergraduate credit

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. ARE-020-0-0904.

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-100-0-0904.

ARE 411. Architectural Engineering Design I. (3) I. Principles and elements of design; synthesis of structural, mechanical, electrical, sanitary, and construction, considering interrelationship in performance and economics. Nine hours lab a week. Pr.: ENVD 208, CNS 325. ARE-411-1-0904

ARE 412. Architectural Engineering Design II. (3) II. Continuation of Architectural Design I. Nine hours lab a week. Pr.: ARE 411. ARE-412-1-0904

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. ARE-499-4-0904

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-522-1-0904

ARE 523. Timber Structures. (3) I, II. Analysis and design of timber structures using solid and laminated materials. Three hours rec. a week. Pr.: CE 537. ARE-523-0-0904

ARE 524. Theory of Structures II. (4) I, II. Analysis and design of metal structures; emphasis on buildings. Six hours a week. Pr.: CE 537. ARE-524-1-0904

ARE 528. Theory of Structures III. (4) I, II, S. Design of reinforced concrete building frames; footings, columns, and floor systems, attention being given to costs and economical design. Six hours a week. Pr.: CE 537. ARE-528-1-0904

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 PHYS 214. ARE-532-0-0904

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-533-0-0904

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-534-0-0904

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-535-0-0904

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-536-0-0904

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 PHYS 213. ARE-537-0-0904

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-539-0-0904

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-540-0-0904

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, 537. ARE-595-1-0904

ARE 596. Senior Project II. (2) II. Continuation of ARE 595. Pr.: ARE 595. ARE-596-1-0904

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-620-3-0904

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-634-1-0904

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-635-1-0904

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-724-0-0904

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-731-0-0904

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-740-0-0904

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-742-0-0904

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. ARE-780-0-0904

Graduate credit

ARE 834. Advanced Building Thermal Systems Design. (3) I. Applications of special requirements in heating, ventilating, and air conditioning systems design. Three hours rec. a week. Pr.: ARE 634. ARE-834-0-0904

ARE 885. Structural Systems Design. (3) I, II. A study of integrated structural, mechanical, and electrical systems; economic evaluation. Two hours rec. and three hours lab a week. Pr.: ARE 780. ARE-885-1-0904

ARE 898. Master's Report. (Var.) I, II, S. Topics selected with approval of major professor and department head. ARE-898-4-0904

ARE 899. Master's Thesis. (Var.) I, II, S. Topics selected with approval of major professor and department head. ARE-899-4-0904

Courses in construction science

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-016-0-0904

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-200-0-0904

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-210-0-0904

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, CNS 210, CE 212. Four hours a week. CNS-250-1-0904

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-320-0-0904

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. Pr. or conc.: CNS 320. CNS-321-1-0904

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-325-1-0904

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. CNS-499-4-0904

Undergraduate and graduate credit in minor field

CNS 523. Timber Construction. (3) I, II. Principles of design, fabrication, and erection of timber structures including both solid and laminated materials. Three hours rec. a week. Pr.: ARE 522. CNS-523-0-0904

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-524-0-0904

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-528-0-0904

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-534-0-0904

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-535-0-0904

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-536-0-0904

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-540-0-0904

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-541-1-0904

CNS 542. Construction Management I. (3) I, II. General business and management procedures of construction contracting; human relations and communications. Pr. or conc.: CNS 541. CNS-542-0-0904

CNS 543. Construction Management II. (3) I, II. Construction safety; project planning and scheduling techniques. Computer applications. Pr.: CNS 210, 541, and 542. CNS-543-0-0904

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-544-3-0904

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, CNS 523, CNS 325. Pr. or conc.: CNS 524. CNS-545-0-0904

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 CNS 535. CNS-638-1-0904

Chemical Engineering

L. T. Fan,* Head

Professors Akins,* Erickson,* Fan,* Kyle,* Lai,* Matthews,* and Walawender;* Associate Professor Glasgow; Assistant Professors Edgar and Schlup;* Emeriti: Professors Bates and Honstead.

Undergraduate study

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 the 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 also offers a five-year dual degree program in chemistry/chemical engineering. The program may be pursued entirely at KSU, 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 KSU and Pittsburg State University in which the student spends the first three years at PSU and the last two at KSU. Graduates of this program are especially well suited for work in the 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, and environmental engineering, lists of recommended technical electives are available in the department office. The Interdisciplinary

Studies 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.

Graduate study

Major work leading to the master of science and doctor of philosophy degrees in several areas is offered. Research in transport phenomena, reaction engineering, diffusional processes, thermodynamics, process dynamics, materials processing, optimization techniques, and process development is underway, and new fields of research are being developed. Support for this research comes from federal, state, and industrial sources. Laboratory space, equipment, and instruments are available for this research. The department has shop facilities in which unusual equipment is built and repaired. A glassblower is available on the campus, and the College of Engineering and the University computing centers are used extensively by graduate students.

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	English Composition I*	3
CHM 210	Chemistry I	4
MATH 220	Analytic Geometry and Calculus I	4
ECON 110	Economics I	3
SPCH 105	Public Speaking IA	2
PE 101	Concepts in Physical Education	1
CHE 015	Engineering Assembly	0
		17

Spring semester

ENGL 120	English Composition II*	
or		
	Humanities or social science electives	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
		18

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	1
Elective		3
CHE 015	Engineering Assembly	0
		16

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
		17

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
		16

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
		17

Senior**Fall semester**

CHE 532	Chemical Engineering Lab II	2
CHE 560	Separational Process Design	2
CHE 561	Chemical Process Dynamics and Control	2
CHE 550	Chemical Reaction Engineering	3
CHE 570	Chemical Engineering Systems Design I	2
Elective		6
CHE 015	Engineering Assembly	0
		17

Spring semester

CHE 542	Chemical Engineering Lab III	3
CHE 571	Chemical Engineering Systems Design II	4
Elective		9
CHE 015	Engineering Assembly	0
		16

*English Composition II is optional if prerequisites for Written Communication for Engineers (ENGL 415) are met from English Composition I.

A total of 33 hours of electives is 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), 11 hours must satisfy the engineering science requirements, and the remaining seven 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.

Courses in chemical engineering**Undergraduate credit**

CHE 015. Engineering Assembly. (0) I, II. CHE-015-0-0906

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-314-0-0906

CHE 316. Chemical Engineering Computational Techniques. (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-316-1-0906

CHE 350. Engineering Materials. (2) I, II. Engineering requirements of materials; arrangements of atoms in materials; metallic and ceramic phases and their properties; polymers; multiphase equilibrium and nonequilibrium relationships; modification of properties through changes in microstructure; stability under service stresses: thermal behavior in service; corrosion; behavior in electromagnetic fields; effects of radiation on materials. Two hours rec. a week. Pr.: CHM 230. Pr. or conc.: PHYS 213. CHE-350-0-0913

CHE 352. Engineering Materials I. (3) I, II, S. Engineering requirements of materials; arrangements of atoms in materials; metallic and ceramic phases and their properties; polymers; multiphase equilibrium and nonequilibrium relationships; modification of properties through changes in microstructure; stability under service stresses: thermal behavior in service; corrosion; behavior in electromagnetic fields; effects of radiation on materials. Two hours rec. and three hours lab a week. Pr.: CHM 230. Pr. or conc.: PHYS 213. CHE-352-1-0913

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. CHE-499-4-0906

Undergraduate and graduate credit in minor field

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-520-0-0906

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-521-0-0906

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-522-1-0906

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-530-0-0906

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-531-0-0906

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-532-1-0906

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-542-1-0906

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 CHE 531. CHE-550-0-0906

CHE 560. Separational Process Design. (2) I. Development of the basic theory and design of separational processes such as distillation, gas absorption, liquid extraction, adsorption, and ion exchange. Two hours rec. a week. Pr.: CHE 521 and CHE 531. CHE-560-0-0906

CHE 561. Chemical Process Dynamics and Control. (2) I. A study of the unsteady state behavior and control of chemical processes. Two hours rec. a week. Pr. or conc.: CHE 550. CHE-561-0-0906

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 CHE 560. CHE-570-1-0906

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, CHE 560, CHE 561, and CHE 570. CHE-571-1-0906

CHE 580. Problems in Chemical Engineering or Materials Science. (Var.) I, II, S. An introduction to chemical engineering research. Pr.: Approval of department head. CHE-580-4-0906

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 chromatography.

graphic separations. Two hours rec. a week. Pr.: CHE 531 or AGE 575. CHE-626-0-0906

CHE 655. Metal Casting. (3) II. An advanced course in the materials and metals used in modern metal casting processes. Application of metallurgical principles in the study of cast metals. Two hours rec. and three hours lab a week. Pr.: IE 241 and CHE 350. CHE-655-1-0913

CHE 664. Electrochemical Behavior of Metals. (3) I. The electrochemical processes involved in corrosion of metals and the basic factors determining the nature and rate of attack; corrosion problems and methods of combating corrosion. Two hours rec. and three hours lab a week. Pr.: CHM 230, PHYS 213. CHE-664-1-0913

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 CHE 352. CHE-681-0-0913

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-682-0-0906

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-715-0-0906

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-725-0-0906

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-735-0-0906

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. CHE-745-0-0906

Graduate credit

CHE 802. Selected Topics in Materials Science. (Var.) I, II, S. Areas of current interest in materials including solidification, transformations, solutions, dislocations, creep, fracture, failure analysis, and failure prevention. Pr.: CHE 681. CHE-802-4-0913

CHE 805. Selected Topics in Biochemical Engineering. (3) II, S. Subjects of current interest in the broadest sense of biochemical engineering. These involve not only chemical engineering problems which contain biochemical, biological, or medical elements but also applications of chemical engineering principles and methodologies to biochemical, biological, medical, and ecological problems. Pr.: CHE 715. CHE-805-0-0906

CHE 810. Research in Chemical Engineering. (Var.) I, II, S. Original investigations in transport phenomena, unit operations, thermodynamics, process dynamics, applied chemical kinetics, and process development. The results of these investigations may be used for the master's thesis or the doctoral dissertation. CHE-810-4-0906

CHE 815. Advanced Chemical Engineering Thermodynamics. (3) I, II, S. Advanced topics in thermodynamics, with emphasis on chemical and physical equilibria and the estimation of thermodynamic properties. Three hours rec. a week. Pr.: Graduate standing in chemical engineering. CHE-815-0-0906

CHE 822. Advanced Chemical Reaction Engineering. (3) I, II, S. Theory of kinetics and catalysis in homogeneous and heterogeneous systems, with applications in chemical reactor design and process development. Three hours rec. a week. Pr.: CHE 550. CHE-822-0-0906

CHE 826. Advanced Unit Operations I. (3) I, II, S. Advanced study of mass transfer operations. Three hours rec. a week. Pr.: CHE 560. CHE-826-0-0906

CHE 832. Advanced Unit Operations II. (3) I, II, S. Advanced study of the operations involving mechanical separation of materials. Three hours rec. a week. Pr.: CHE 560. CHE-832-0-0906

CHE 850. Advanced Chemical Process Dynamics. (3) I, II, S. The dynamical behavior of chemical reaction systems and process equipment used in chemical plants. Control mechanisms for these systems. Three hours rec. a week. Pr.: Graduate standing in chemical engineering. CHE-850-0-0906

CHE 862. Advanced Transport Phenomena I. (3) I, II, S. Advanced treatment of momentum, energy, and mass transport, with emphasis on momentum transport in chemical engineering applications. Three hours rec. a week. Pr.: CHE 735. CHE-862-0-0906

CHE 867. Advanced Transport Phenomena II. (3) I, II, S. Advanced treatment of momentum, energy, and mass transport, with emphasis on energy and mass transport in chemical engineering applications. Three hours rec. a week. Pr.: CHE 862. CHE-867-0-0906

CHE 871. Advanced Process Design and Optimization. (3) I, II, S. Advanced problems in the optimal design and economic evaluation of plant equipment and processes for the chemical and allied industries. Three hours rec. a week. Pr.: CHE 571, CHE 735. CHE-871-0-0906

CHE 875. Graduate Seminar in Chemical Engineering. (1) I, II. Discussion of current advances and research in chemical engineering and related fields. CHE-875-0-0906

CHE 898. Master's Report. (Var.) I, II, S. Topics selected with approval of department head and major professor. CHE-898-4-0906

CHE 899. Master's Thesis. (Var.) I, II, S. Topics selected with approval of department head and major professor. CHE-899-4-0906

CHE 901. Selected Topics in Reaction Engineering. (3) I, II, S. Advanced study in this field of such topics as complex reactions, catalysis, dispersion effects, fast reactions, reactions in fluidized beds. Three hours rec. a week. Pr.: CHE 822 and one course in chemical engineering numbered 851 or higher. CHE-901-0-0906

CHE 910. Selected Topics in Transport Phenomena. (3) I, II, S. Subjects of current interest such as surface phenomena, turbulent transport, droplet mechanics, multicomponent systems. Three hours rec. a week. Pr.: CHE 867. CHE-910-0-0906

CHE 915. Selected Topics in Process Dynamics. (3) I, II, S. Study of the most recent methods for analysis of the dynamic behavior and control of complex systems and industrial processes. The use of Lyapunov theorems and the maximum principle are examples of the methods to be studied. Three hours rec. a week. Pr.: CHE 850 and one graduate course in chemical engineering numbered 851 or higher. CHE-915-0-0906

CHE 920. Selected Topics in Unit Operations. (3) I, II, S. Study of such topics as zone melting, foam fractionation, membrane permeation, thermal diffusion, and unsteady state operations. Three hours rec. a week. Pr.: CHE 826 or CHE 832

and one course in chemical engineering numbered 851 or higher. CHE-920-0-0906

CHE 925. Selected Topics in Process Design and Optimization. (3) I, II, S. Study of advanced methods of process design and optimization, such as modern variational methods and dynamic programming. Applications to be chosen mainly from the chemical and allied industries to include stochastic as well as deterministic problems. Three hours rec. a week. Pr.: CHE 871. CHE-925-0-0906

CHE 930. Selected Topics in Thermodynamics. (3) I, II, S. Advanced study in this field of such topics as irreversible thermodynamics, solution theory, and surface phenomena. Three hours rec. a week. Pr.: CHE 815 and one course in chemical engineering numbered 851 or higher. CHE-930-0-0906

CHE 999. Dissertation Research. (Var.) I, II, S. Topics selected with approval of department head and major professor. CHE-999-4-0906

Civil Engineering

Robert R. Snell,* Head

Professors Best,* Cooper,* Hu,* Koelliker,* Russell,* Smith,* Snell,* Swartz,* and Williams,* Associate Professors Knostman* and Mathews,* Assistant Professors Lamb and Lin,* Emeriti: Professors McCormick, Morse, Munger, and Taylor.

Undergraduate study

Civil engineering is the engineering of constructed facilities and systems. Because civil engineering is so broad in scope, it has become desirable for many civil engineers to develop specialties within the broad field. As a means of satisfying that desire for specialization the civil engineering department offers three options within the B.S. in civil engineering degree.

The general option allows the student to pursue a B.S. in civil engineering degree in a broad 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:

Hydraulics—design and construction of reservoirs, canal systems, and dams for flood control, irrigation, power, and water supply.

Soils and foundations—foundations for structures, earth embankments, retaining walls and bulkheads, and pavements for highways and airports.

Environmental—protection of public health and environmental quality through the planning and designing of 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 wide variety of buildings and bridges, as well as the structural framing of aircraft, ships, and space vehicles.

The **construction engineering option** allows the student to pursue a B.S. in civil engineering program while preparing specifically for employment in the construction industry.

The **geological engineering option** allows the student to pursue a B.S. in civil engineering program while preparing specifically to deal with the geologic factors affecting the location, design, and construction of foundations, excavations, tunnels, dams, reservoirs, and canals. Students are also prepared to assist in the search for and development of metallic ores, industrial minerals and rocks, petroleum and natural gas, and groundwater supplies.

Graduate study

Major work leading to the master of science and doctor of philosophy degrees is offered in the areas of specialization in structural analysis and design, soil mechanics and foundations, hydraulic engineering, sanitary/environmental engineering, highway and traffic engineering, and transportation planning. Laboratory facilities for advanced study and research are available in the areas of structures, soil mechanics, hydraulics, sanitary engineering, and transportation.

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

Fall semester	
MATH 220	Analytic Geometry and Calculus I .. 4
CHM 210	Chemistry I 4
ENGL 100	English Composition I* 3
ECON 110	Economics I 3
ME 212	Engineering Graphics I 2
PE 101	Concepts in Physical Education 1
17	

Spring semester

MATH 221	Analytic Geometry and Calculus II 4
CHM 230	Chemistry II 4
ENGL 120	English Composition II* or 3
Option elective	..... 3
IE 372	Computer and Data Processing 2
GEOL 100	Introductory Geology 3
CE 015	Engineering Assembly 0
16	

Sophomore

Fall semester	
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
17	

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
17	

Junior

Fall semester	
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
17	

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
16	

Senior

Fall semester	
CE 015	Engineering Assembly 0
Option elective	..... 6
Civil engineering electives	..... 6
Humanities or social science electives	..... 6
18	

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
16	

*English Composition II is optional if prerequisites for Written Communication for Engineers (ENGL 415) are met from English Composition 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 options General

In the general option, the student may select a set of interrelated option and civil engineering electives which will enable the student to complete a broad general program or to concentrate on one or more areas within the general option. The areas of concentration available are structural analysis and design, soil mechanics and foundations, hydraulic engineering, sanitary/environmental engineering, and highway and traffic engineering.

Construction engineering

A student pursuing the construction engineering option within the Department of Civil Engineering can fulfill the requirements for a B.S. in civil engineering by following the outlined 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 211	Financial Accounting	3
ACCTG 221	Managerial Accounting	3

Geological engineering

A student pursuing the option of geological engineering with the Department of Civil Engineering can fulfill the requirements for a B.S. in civil engineering by following the outlined course curriculum for civil engineering as well as the following selection of option electives:

GEOL 130	Elementary Geology Lab	1
GEOL 300	Historical Geology	4
GEOL 502	Mineralogy	3
GEOL 503	Petrology	3
GEOL 530	Structural Geology	3
CHE 350	Engineering Materials	2
Geological option elective	.....	0-3

Courses in civil engineering

Undergraduate credit

CE 015. Engineering Assembly. (0) I, II. CE-015-0-0908

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-212-1-0908

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-231-0-0999

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-322-0-0908

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-331-0-0999

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 ENGL 100 with grade of A or B, and one course in graphics. Pr. or conc.: CE 331. CE-332-1-0999

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-333-0-0999

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 IE 372. CE-380-1-0908

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-411-1-0908

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. CE-499-4-0904

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-522-1-0908

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-528-1-0908

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-530-0-0999

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 CE 530. Pr. or conc.: MATH 222. CE-533-0-0999

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-534-1-0999

CE 537. Introduction to Structural Analysis. (4) I, II. Elastic analysis of beams, frames, and trusses; calculation of influence lines and deflections; introduction to the displacement method using matrix algebra. Four hours rec. a week. Pr.: CE 533. CE-537-0-0908

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-542-1-0908

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-544-1-0908

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 PHYS 213. Cross listed with AE 551. CE-551-0-0908

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-552-1-0908

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 multi-purpose reservoirs; ground water flow analysis and water well design. Three hours lab a week. Pr. or conc.: CE 551 and IE 372. CE-553-1-0908

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. CE-563-1-0908

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 and PHYS 114 or PHYS 214. CE-565-1-0908

CE 571. Transportation Engineering. (3) I. The development, economic feasibility, method of financing, location, geometric design, and operational analysis of transportation systems. Two hours rec. and three hours lab a week. Pr.: CE 411 and junior standing. CE-571-1-0908

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.: 6 additional credit hours of CE electives. CE-585-2-0908

Undergraduate and graduate credit

CE 620. Geological Engineering. (3) II. Application of geology and civil engineering in the design of subsurface exploration programs; excavation and evaluation of construction materials; regional planning and environmental policy; rock slopes; foundations on rock. Legal liability and selected case studies will be included. Two hours rec. and three hours lab a week. Pr.: CE 528. Pr. or conc: GEOL 530. CE-620-0-0908

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 CE 542 or CE 544. CE-641-1-0908

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 411. CE-675-1-0908

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-680-0-0908

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-686-1-0908

CE 718. Engineering Photo Interpretation. (3) II. Photo interpretation techniques, types of aerial photographic film and their uses; application in land use studies, land surveying, site selection, rainfall runoff and stream flow, location of construction materials, and in the determination of soil properties; other applications. Two hours rec. and three hours lab a week. Pr.: Senior standing and consent of instructor. CE-718-1-0908

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-722-0-0908

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-724-1-0908

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 CE 528. CE-728-1-0908

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, MATH 240. CE-730-0-0999

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-732-0-0908

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-733-0-0908

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-735-0-0908

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-736-0-0999

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, MATH 240. CE-737-0-0999

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-742-0-0908

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-743-0-0908

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-744-0-0908

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-751-0-0908

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-752-0-0908

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-761-0-0908

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, CE 761, or consent of instructor. CE-762-0-0908

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, CE 565, or consent of instructor. CE-763-0-0908

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-766-0-0908

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, CE 761, or permission of instructor. CE-767-0-0908

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-771-1-0908

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-773-1-0908

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-774-1-0908

CE 790. Problems in Civil Engineering. (Var.) I, II, S. Pr.: Approval of instructor. CE-790-3-0908

Graduate credit

CE 791. Research in Civil Engineering. (Var.) I, II, S. Original investigation or advanced study in some field related to the practice of civil engineering. Pr.: Approval of department head. CE-791-3-0908

CE 822. Soil Mechanics of Embankments. (3) I. Application of soil mechanics to cutting and filling operations for the construction of embankments, soil investigations, slope stability, stability and settlement of embankments, structures in embankments. Water control in and through embankments. Two hours rec. and three hours lab a week. Pr. or conc.: CE 722. CE-822-1-0908

CE 823. Engineering Properties of Cohesive Soils. (3) I. Mineralogy and structures of clay minerals; fabric and bonding of the clay particles; compressibil-

ity and strength characteristics of clays; moisture effects, retention, and movement through clay. Two hours rec. and three hours lab a week. Pr. or conc.: CE 722. CE-823-1-0908

CE 835. Structural Dynamics. (3) I. In alternate years. Analysis of structures subjected to dynamic loading. Three hours rec. a week. Pr.: CE 735. CE-835-0-0908

CE 838. Theory of Plates and Shells. (3) I. In alternate years. Equations for bending of thin plates, symmetrical bending of circular plates, simply supported rectangular plates; rectangular plates with various edge conditions, plates of various shapes. Membrane theory for cylindrical shells, shells of revolution, other shells. Introduction to bending theory of shells. Three hours rec. a week. Pr.: CE 730. CE-838-0-0999

CE 849. Design of Shell Structures. (3) II. In alternate years. Review of membrane theory and bending theory for cylindrical shells, shells of revolution, and folded plate shells. The design of reinforced concrete shell structures. Three hours rec. a week. Pr.: CE 838. CE-849-0-0908

CE 854. Analysis of Groundwater Flow. (3) II. Principles of flow through porous media; applications of flow theory to well analysis and design; groundwater resource evaluation and regional groundwater systems analysis. Three hours rec. a week. Pr.: CE 552. CE-854-0-0908

CE 863. Advanced Topics in Environmental Engineering. (1-3) On sufficient demand. This course will involve discussion of selected advanced topics in environmental engineering, and critical analysis of research in the area. CE-863-0-0908

CE 875. Traffic Engineering II. (3) II. Theory of traffic flow; design of traffic control devices and signal systems; application of statistical methods to traffic engineering problems. Two hours rec. and three hours lab a week. Pr.: CE 675. Pr. or conc.: STAT 510. CE-875-1-0908

CE 890. Graduate Seminar in Civil Engineering. (0) I, II. Discussion of current advances and research in civil engineering. One hour seminar biweekly. Pr.: none. CE-890-4-0908

CE 898. Master's Report. (Var.) I, II, S. Topics selected with approval of major professor and department head. CE-898-4-0908

CE 899. Master's Thesis. (Var.) I, II, S. Topics selected with approval of major professor and department head. CE-899-4-0908

CE 999. Dissertation Research. (Var.) I, II, S. Topics selected with approval of major professor and department head. CE-999-4-0908

Electrical and Computer Engineering

Donald R. Hummels,* Head

Professors Carpenter,* Gallagher,* Haft,* Hummels,* Johnson,* Kirmser,* Lenhart,* Lucas,* and Rathbone,* Associate Professors Dollar, S. Dyer* and Fowler;* Assistant Professors Chandra,* Cottom,* Devore, R. Dyer,* Harms,* Morcos, Pahwa,* and Rys;* Instructors Gordon and Wakabayashi; Emeriti: Professors Hunt, Koepsel, and Ward.

Undergraduate study

Electrical and computer engineers are involved in the design of electrically oriented systems for a wide 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. The electrical or computer engineer is 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 at Kansas State University are primarily mathematics and physical sciences. These two years prepare the student for the advanced work to be undertaken in the junior and senior years. In the third year, the student begins 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, the student's 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 is a new program which has been developed from the computer engineering option in the electrical engineering curriculum. The

curriculum leads to the bachelor of science in computer engineering. The new 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, the student is individually advised and counseled by the faculty. At various times during the year, engineers from industry are invited to the University to speak to the students on topics of current interest to the profession.

Graduate study

Major work is offered in programs of study leading to the master of science and doctor of philosophy degrees with specialization in signal processing, communications, bioengineering, computer engineering, instrumentation, control systems, solid state electronics, and electric energy systems.

Special facilities available for graduate research include a computer and signal processing laboratory, an instrumentation and control laboratory, a communications laboratory, a bioengineering laboratory, an energy systems laboratory, and an integrated circuits laboratory. Computing facilities include a wide range of mini and microcomputers within the department as well as College of Engineering and University computing centers.

Students who pursue the M.S. program in electrical or computer engineering are generally B.S. graduates in electrical or computer engineering from an accredited program. However, students with undergraduate degrees from other disciplines wishing to enter the M.S. program are encouraged to apply. The need to take additional undergraduate courses will be decided on an individual basis by the Graduate Affairs Committee of the Department of Electrical and Computer Engineering.

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	English Composition I* 3
CHM 210	Chemistry I 4
MATH 220	Analytic Geometry and Calculus I . . 4
SPCH 105	Public Speaking IA 2
ECON 110	Economics I 3
16	

Spring semester

CHM 230	Chemistry II 4
MATH 221	Analytic Geometry and Calculus II 4
CMPSC 211	FORTTRAN 1
CMPSC 200	Fundamentals of Computer Programming 2
PE 101	Concepts in Physical Education . . . 1
Humanities or social science electives 3	
15	

Sophomore

Fall semester

PHYS 213	Engineering Physics I 5
MATH 222	Analytic Geometry and Calculus III 4
EECE 241	Introduction to Computer Engineering 3
CHE 350	Engineering Materials 2
Humanities or social science electives 3	
17	

Spring semester

PHYS 214	Engineering Physics II 5
MATH 240	Elementary Differential Equations 4
CE 333	Statics 3
EECE 510	Circuit Theory I 3
Humanities or social science electives 3	
18	

Junior

Fall semester

EECE 511	Circuit Theory II 3
EECE 525	Electronics I 3
EECE 501	Electrical Engineering Lab I 2
ME 512	Dynamics 3
STAT 510	Introduction to Probabilities and Statistics 3
Humanities or social science electives 3	
17	

Spring semester

EECE 526	Electronics II 3
EECE 581	Energy Conversion I 3
EECE 502	Electrical Engineering Lab II 2
ENGL 415	Written Communication for Engineers* 3
EECE 512	Linear Systems 3
EECE 557	Electromagnetic Theory I 4
18	

Senior

Fall semester

ME 513	Thermodynamics I 3
EECE 530	Control Systems Design 3
Option electives 6	
Complementary electives 6	
18	

*The prerequisite for ENGL 415 is satisfied with an A or B in ENGL 100. Otherwise, the student must take ENGL 120 which, if necessary, may be substituted for three 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 up to a maximum of six semester hours from electrical and computer engineering courses (ten 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 courses and one course from the approved list of senior level laboratory courses.

Spring semester

EECE 590	Seminar	1
Option electives		3
Complementary electives		9
Humanities or social science electives		3
		16

Electrical engineering options**General**

In the general option a set of specializations is possible. The student is expected to select a set of interrelated courses which will 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

A student pursuing the option of bioengineering within the Department of Electrical and Computer Engineering 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 which support the life science component of the bioengineering option follows:

CHM 531	Organic Chemistry I	3
CHM 532	Organic Chemistry Lab	2
BIOCH 521	General Biochemistry	3
BIOL 198	Principles of Biology	4
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, the student 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

Freshman**Fall semester**

ENGL 100	English Composition I*	3
PE 101	Concepts in Physical Education	1
CHM 210	Chemistry I	4
MATH 220	Analytic Geometry and Calculus I	4
CMPSC 200	Fundamentals of Computer Programming	2
CMPSC 207	PASCAL Language Lab	2
		16

Spring semester

SPCH 105	Public Speaking IA	2
ECON 110	Economics I	3
MATH 221	Analytic Geometry and Calculus II	4
EECE 241	Introduction to Computer Engineering	3
CMPSC 211	FORTRAN Lab	1
Humanities or social science elective		3
		16

Sophomore**Fall semester**

PHYS 213	Engineering Physics I	5
MATH 222	Analytic Geometry and Calculus III	4
CMPSC 300	Algorithms and Data Structures	3
EECE 444	Computer Engineering Lab I	1
Humanities or social science elective		3
		16

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
		18

Junior**Fall semester**

CMPSC 500	Analysis of Algorithmic and Data Structures	3
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
		17

Spring semester

EECE 512	Linear Systems	3
EECE 557	Electromagnetic Theory I	4
EECE 636	Introduction to Computer Graphics	3
EECE 649	Digital Computer Systems Design I	3
EECE 544	Computer Engineering Lab II	2
Humanities or social science elective		3
		18

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
		16

Spring semester

EECE 530	Control Systems Design	3
EECE 590	Seminar	1
CMPSC 520	Operating Systems I	3
Complementary electives		11
		18

*The prerequisite for ENGL 415 is satisfied with an A or B in ENGL 100. Otherwise, the student must take ENGL 120 which, if necessary, may be substituted for three credit hours of complementary electives.

Complementary electives must include an approved engineering science course in either engineering materials, thermodynamics, or flow and rate processes.

Courses in electrical and computer engineering**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, shiftregisters, memories, etc., basic engineering aspects of computer architecture and elements of machine language. Three hours rec. a week. EECE-241-0-0909

EECE 444. Computer Engineering

Laboratory I. (1) I, II. Laboratory experience in design, construction, and debugging of simple digital systems and sub-systems. Three hours lab a week. Pr.: EECE 241. EECE-444-1-0909

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. EECE-499-4-0909

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 EECE 510. Pr. or conc.: EECE 511 and EECE 525. EECE-501-1-0909

EECE 502. Electrical Engineering

Laboratory II. (2) I, II. Continuation of Electrical Engineering Laboratory I. Three hours lab a week. Pr.: EECE 501, EECE 511, and EECE 525. Pr. or conc.: EECE 526. EECE-502-1-0909

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.: CMPSC 200, CMPSC 211, MATH 222, and PHYS 213. EECE-510-0-0909

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-511-0-0909

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 and STAT 510. EECE-512-0-0909

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-519-0-0909

EECE 525. Electronics I. (3) I, II. Fundamentals of electronic components, devices, and circuits. Three hours rec. a week. Pr.: EECE 510 or EECE 519 or ET 530. EECE-525-0-0909

EECE 526. Electronics II. (3) I, II. Continuation of Electronics I. Three hours rec. a week. Pr.: EECE 511, EECE 525. EECE-526-0-0909

EECE 530. Control Systems Design. (3) I, II. Modeling, analysis, and design of control systems. Three hours rec. a week. Pr.: EECE 512. EECE-530-0-0909

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, EECE 501. Pr. or conc.: EECE 557, EECE 649. EECE-544-1-0909

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-557-0-0909

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-581-0-0909

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-589-1-0909

EECE 590. Seminar. (1) I, II. Preparation and oral presentation of a written technical report. One hour rec. a week. Pr.: Senior standing in electrical and computer engineering. EECE-590-0-0909

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-603-1-0909

EECE 624. Power Semiconductor Circuits. (3) I. Theory and application of semiconductor devices to the control and conversion of electric power; 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. Conc.: EECE 526. EECE-624-0-0909

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-625-1-0909

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-627-0-0909

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 526. EECE-628-1-0909

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, EECE 525 or equiv., and CMPSC 200. EECE-631-1-0909

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-632-1-0909

EECE 636. Introduction to Computer Graphics. (3) I, II. An introduction to the hardware and software aspects of graphics generation. The laboratory will provide practical experience in implementing software drivers and simple graphics routines. Pr.: CMPSC 500. Cross listed with CMPSC 636. EECE-636-0-0909

EECE 641. Design of Digital Systems I. (3) I, II. Design of combinatorial and sequential circuits, digital controllers, computer subsystems, and peripheral interfaces. Three hours rec. a week. Pr.: EECE 444 and CMPSC 200. EECE-641-0-0909

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 EECE 641. EECE-642-0-0909

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 EECE 557. EECE-645-0-0909

EECE 646. Fault Diagnosis in Digital Systems. (3) On sufficient demand. Hazards, fault detection in combinatorial 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. EECE-646-0-0909

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-647-0-0909

EECE 649. Digital Computer Systems Design I. (3) I, II. Conventional computer hardware organization. Hardware implementation of instructional sets and addressing modes. I/O devices, interfaces, and control. Three hours rec. a week. Pr.: EECE 641. EECE-649-0-0909

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-659-0-0909

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-661-0-0909

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, EECE 502. EECE-662-1-0909

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, CMPSC 211. EECE-663-0-0909

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.: CMPSC 535. EECE-670-1-0909

EECE 681. Wind Engineering. (3) II. Wind characteristics, turbine performance, synchronous and asynchronous electrical loads, siting, economics, open-air testing, rectifiers, and inverters. Three hours rec. a week. Pr.: ME 512; and EECE 525 or EECE 519. EECE-681-0-0909

EECE 682. Energy Conversion II. (3) On sufficient demand. Continuation of EECE 581. Three hours rec. a week. Pr.: EECE 581. EECE-682-0-0909

EECE 685. Electric-Energy Systems Engineering I. (3) I. A comprehensive study of the network aspects of existing electric-energy systems in the steady state. Vector-matrix descriptions and computer solutions are emphasized. Three hours rec. a week. Pr. or conc.: EECE 581. EECE-685-0-0909

EECE 686. Electric-Energy Systems Engineering II. (3) II. A comprehensive study of the systems control and operational aspects and the transient behavior of existing electric-energy systems. Vector-matrix description and computer solutions are emphasized. Three hours rec. a week. Pr.: EECE 685. EECE-686-0-0909

EECE 690. Problems in Electrical and Computer Engineering. (Var.) I, II, S. EECE-690-3-0909

EECE 695. Solid-State Engineering. (3) I. Elastic, thermal, electric, and magnetic properties of crystals and metals; conduction in metals and semiconductors; solid state devices. Three hours rec. a week. Pr.: EECE 525, EECE 557, and CHE 350. EECE-695-0-0909

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 EECE 525. EECE-696-1-0909

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. Cross-listed with ME 730. EECE-730-0-0909

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-731-1-0909

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-736-0-0909

EECE 741. Digital Computer Systems Design II. (3) II. Study of alternate computer hardware structures. Engineering trade-offs in implementation of alternate instruction sets and computing structures. Design of memory hierarchies, including cache, and associative-memory techniques. Hardware implementation of program structures. Three hours rec. a week. Pr. or conc.: EECE 649. EECE-741-0-0909

EECE 747. Digital Signal Processing Laboratory. (2) II. Analog signal digitization; demonstration of aliasing problems; spectral analysis of digital signals using Fourier and other signal representation techniques; digital filtering problems—lowpass, bandpass, notch, etc.; application examples related to biomedical and speech data. Six hours lab a week. Pr.: CMPSC 211 and EECE 647. EECE-747-1-0909

EECE 758. Electromagnetic Theory II. (3) On sufficient demand. Continuation of EECE 557. Three hours rec. a week. Pr.: EECE 557. EECE-758-0-0909

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-771-0-0909

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-772-0-0909

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-773-1-0909

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-791-0-0909

Graduate credit

EECE 828. Advanced Topics in Instrumentation. (3) On sufficient demand.

Selected topics related to transducer design and characterization, noise reduction in measurement systems, special purpose data acquisition systems. Three hours rec. a week. Pr.: EECE 628. EECE-828-0-0909

EECE 830. Advanced Systems Theory. (3) II. State space description and analysis of continuous and discrete time dynamic systems including optimal control solutions. Both linear and nonlinear systems are considered. Three hours rec. a week. Pr.: EECE 530 or ME 640. EECE-830-0-0909

EECE 840. Computer Engineering Methods for Analysis, Simulation, and Design. (3) I. Computer-aided and numerical techniques applicable to problems in electrical and computer engineering. Emphasis is on implementation of these techniques on the computer. Three hours rec. a week. Pr.: EECE 512. EECE-840-0-0909

EECE 841. Advanced Topics in Computer Engineering. (3) On sufficient demand. Selected topics related to modern developments in computer system design. Special hardware features in computer system design. Special hardware features and structures appearing in larger computer systems or networks. Methods for describing computing hardware. Three hours rec. a week. Pr.: EECE 741. EECE-841-0-0909

EECE 855. Advanced Topics in Electromagnetic Theory. (3) On sufficient demand. Mathematical development of electromagnetic wave theory. Three hours rec. a week. Pr.: EECE 758. EECE-855-0-0909

EECE 861. Noise Theory. (3) I. Study of noise phenomena and measurement; the representation of noise by statistical parameters, the noise factor of undesired noise sources, and the measurement applications of noise generators. Three hours rec. a week. Pr.: EECE 512. EECE-861-0-0909

EECE 863. Signal Detection Theory. (3) I. A study of optimum signal detection principles for analog and digital communication over the linear additive noise channel. Includes series representations for random signals and the derivation of minimum mean square error (MMSE) receivers for AM and FM and maximum likelihood (ML) receivers for FSK, MSK, and M-Ary PSK. Three hours rec. a week. Pr.: EECE 861. EECE-863-0-0909

EECE 865. Information Theory. (3) II. Information as a measure of uncertainty, zero-memory and Markov sources, coding of information sources, channels and mutual information, reliable transmission via unreliable channels, error correcting

codes. Three hours rec. a week.
Pr.: EECE 661. EECE-865-0-0909

EECE 866. Transform Processing of Digital Signals. (3) II. Orthogonal transforms in digital signal processing with emphasis on one- and two-dimensional signals, generalized Wiener filtering, feature selection in pattern recognition, and elements of adaptive filtering techniques. Three hours rec. a week. Pr.: EECE 861. EECE-866-0-0909

EECE 867. Digital Image Processing. (3) I. Basic concepts and techniques of image formation, representation, analysis, restorations, enhancement, coding, segmentation, and description. Object recognition using shape descriptors and syntactic techniques. Image processing applications in remote sensing, computer vision, and medical diagnosis. Three hours rec. a week. Pr.: EECE 512. EECE-867-9-0909

EECE 868. Advanced Digital Filtering. (3) II. Advanced treatment of the theory, design, and implementation of digital filters; use of digital filters to process random signals. Three hours rec. a week. Pr.: EECE 647 and EECE 861. EECE-868-0-0909

EECE 881. Advanced Topics in Electric Energy Systems. (3) On sufficient demand. Subjects of current interest such as computer methods, distribution and transmission systems, systems planning and economics, extra high voltage transmission, exotic power sources. May be repeated. Three hours rec. a week. Pr.: EECE 686. EECE-881-0-0909

EECE 890. Advanced Electrical Theory. (Var.) I, II. For advanced study in specialized areas by M.S. students. Pr.: M.S. student. EECE-890-3-0909

EECE 897. Research in Electrical Engineering. (Var.) I, II, S. Special research problems in electrical engineering. Pr.: Consent of instructor. EECE-897-4-0909

EECE 898. Master's Report. (Var.) I, II, S. Topics selected with approval of major professor and department head. EECE-898-4-0909

EECE 899. Master's Thesis. (Var.) I, II, S. Topics selected with approval of major professor and department head. EECE-899-4-0909

EECE 931. Advanced Topics in Control Theory. (3) On sufficient demand. Study of advanced topics in optimal, time-varying, and stochastic control theory, or other recent developments in the control systems area. May be repeated. Three hours rec. a week. Pr.: EECE 830. EECE-931-0-0909

EECE 962. Advanced Topics in Communications. (3) On sufficient demand. Selected topics related to the design and performance analysis of communication systems. Topics may include advanced modulation techniques, optimum receiver design, nonlinear channels, multipath analysis, diversity systems, and others. Three hours rec. a week. Pr.: EECE 861. EECE-962-0-0909

EECE 967. Advanced Topics in Digital Signal Processing. (3) On sufficient demand. Selected topics related to adaptive digital filtering techniques; special purpose hardware for digital filtering; two-dimensional signal processing and classification. Three hours rec. a week. Pr.: EECE 866 or EECE 868. EECE-967-0-0909

EECE 971. Advanced Topics in Bioengineering. (3) On sufficient demand. Study of complex physiological system simulation and analysis techniques, modern experimental and clinical electronic bioinstrumentation systems. Topics selected according to graduate student's interests. May be repeated. Three hours rec. a week. Pr.: EECE 771 or EECE 772. EECE-971-0-0909

EECE 999. Dissertation Research. (Var.) I, II, S. Topics selected with approval of major professor and department head. EECE-999-4-0909

Engineering Technology

Head to be selected

Professors Chung,* Erickson,* and Lindholm;* Associate Professors Dawes, DeVault, Hoppe, A. Matthews, and Wilson; Assistant Professors Delker and Hightower.

Area coordinators

Computer engineering technology
D. Delker

Electronic engineering technology
W. Dawes

Industrial engineering technology
J. DeVault

Mechanical engineering technology
F. J. Hoppe

Nuclear reactor technology
R. Hightower

Engineering technology (ET)

Bachelor of science in engineering technology
126 semester hours required for graduation

Engineering technology is a rapidly growing program which offers excellent career opportunities to young men and women. 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 which are 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; 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.

Core courses (64 hours)

Communications (11)		
ENGL 100	English Composition I	3
ENGL 120	English Composition II	3
ENGL 415	Written Communication for Engineers	3
SPCH 105	Public Speaking IA	2

Physical science (12)		
CHM 210	Chemistry I	4
PHYS 113	General Physics I	4
PHYS 114	General Physics II	4

Mathematics and statistics (15)		
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
(IET students substitute STAT 350 for STAT 320.)		

Engineering technology (10)		
ME 212	Engineering Graphics I	2
IE 372	Computers and Data Processing ...	2
ET 415	Computer Applications in Engineering Technology	2
ET 431	Electrical Circuit Technology I	4
(CPT students take CMPSC 200 and CMPSC 211 in place of IE 372.)		

PE 101	Concepts in Physical Education	1
ECON 110	Economics I	3

Humanities or social science electives 12
(IET students must take ECON 120 as a humanity or social science electives.)

Computer engineering technology

See Errata at end of Index.

This program develops capabilities in digital computer technology. Emphasis is on analog and digital circuits and their relationship to computing. Through work in computer science, the student has an opportunity to develop a complementary working knowledge in computer architecture, languages, and algorithms.

Area of specialization (62 hours)

Required courses (48)		
CMPSC 211	FORTAN Laboratory for Engineering Majors	1
CMPSC 207	PASCAL Language Lab	2
CMPSC 300	Algorithms and Data Structures ...	3
CMPSC 305	Computer Organization and Programming I	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 541	Electronic Design Lab	2
ET 542	Electric Motors and Controls	4
MATH 551	Applied Matrix Theory	3
ME 560	Engineering Economics	3
Technical electives		11-9
Management electives		3-5

Electronic engineering technology

This program is designed to provide 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)

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

Industrial engineering technology

**See Errata at end of Index.*

For young men and women interested in a career in manufacturing, the production management program provides excellent preparation. The curriculum emphasizes management, work measurement, production economics, plant layout, and quality control, all of which are important for the industrial fabrication of consumer products.

Area of specialization (62 hours)

Required courses (50)

ACCTG 211	Financial Accounting	3
ACCTG 221	Managerial Accounting	3
AGE 680	Principles of Occupational Safety and Health Management	3
CE 231	Statics A	3
ET 410	Properties of Engineering Materials	2
ET 411	Properties of Engineering Materials Lab	1
ET 540	Industrial Microprocessing	3
IE 241	Production Processes	3
ET 341	Manufacturing Processes	2
ET 443	Quality Assurance	2
ET 444	Motion and Time Study	2
ET 445	Factory Layout	2
IE 501	Industrial Management	3
IE 502	Industrial Management II	3
MANGT 421	Production Management	3
MANGT 530	Industrial and Labor Relations	3
ME 217	Engineering Graphics II	3
ME 560	Engineering Economics	3
STAT 351	Business and Economic Statistics II	3

Technical electives	9
Free electives	3

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)

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
ME 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)

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

Courses in engineering technology

Undergraduate credit

ET 341. Manufacturing Processes. (2) II, in odd years. Treats the effect of processes on material properties such as plastics, castings, welding, machinery, hot and cold forming, machineability testing, and production analysis of automatic and semiautomatic machine tools. One hour rec. and three hours lab a week. Pr.: IE 241. ET-341-1-0925

ET 410. Properties of Engineering

Materials. (2) I, II. Engineering requirements of materials: mechanical, thermal, electrical, and biological properties and behavior of materials. Two hours rec. a week. Pr.: CHM 110 or CHM 210, PHYS 113. ET-410-0-0925

ET 411. Properties of Engineering

Materials Lab. (1) I, II. Laboratory experiments supplementing ET 410. Pr. or conc.: ET 410. ET-411-1-0925

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 lab a week. Pr.: MATH 100 and 150, IE 372 or CMPSC 200 with a language lab. ET-415-1-0925

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-430-1-0925

ET 431. Electrical Circuit Technology I.

(4) I, II, S. 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-431-1-0925

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.: IE 372. ET-436-1-0925

ET 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 ET 441 is urged. Three hours rec. a week. Pr.: PHYS 113 or 115, BIOCH 120 or CHM 190, MATH 210 or 205. ET-440-0-0925

ET 441. Introduction to Food Engineering Technology Lab. (1) I. Laboratory experiments supplementing ET 440. Three hours lab a week. Pr. or conc.: ET 440. ET-441-1-0925

ET 443. Quality Assurance. (2) I, in odd years. Quality assurance considering product design, statistical process control, and product reliability. Two hours rec. a week. Pr.: Junior standing or above and STAT 350. ET-443-0-0925

ET 444. Motion and Time Study. (2) II, in even years. Concepts of an industrial society; the design process; aids in job design; recommended design procedures; determination of the time for a task; implementation of the design. One hour rec. and two hours lab a week. Pr.: Junior standing or above. ET-444-1-0925

ET 445. Factory Layout. (2) I, in even years. Design of a production system including consideration of material handling, building noise, illumination, and interior climate. One hour rec. and three hours lab a week. Pr.: IE 241 and ET 444. ET-445-1-0925

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-480-0-0925

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-481-0-0925

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-482-0-0925

ET 498. Problems in Engineering Technology. Credit arranged. I, II, S. Pr.: Approval of instructor. ET-498-3-0925.

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. ET-499-4-0925

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 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-512-0-0925

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 CHM 210, PHYS 113. ET-514-0-0925

ET 521. Water Treatment Technology. (3) I, in odd years. Application of water treatment technology to design, operation, and monitoring in the water treatment industry. Emphasis is on process understanding through field trips and laboratory experience. Two hours rec. and three hours lab a week. Pr. or conc.: CE 563. ET-521-1-0925

ET 522. Air Pollution Control Technology. (2) II, in even years. An introduction to air pollution control, including federal regulations, meteorology, and damages from air pollution. Control techniques for particulate and gaseous pollutants and automobile exhausts are covered. Two one-hour lec. a week. Pr. or conc.: ET 514. ET-522-0-0925

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, ET 537. Pr. or conc.: ENGL 415. ET-531-3-0925

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-532-1-0925

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-533-1-0925

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-534-1-0925

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-536-1-0925

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-537-1-0925

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, ET 536, and ET 537. ET-538-1-0925

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-539-1-0925

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-540-1-0925

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, ET 531, and ET 536. ET-541-1-0925

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 ET 536. ET-542-1-0925

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-543-0-0925

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.: ME 511. ET-560-1-0925

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-561-0-0925

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-562-1-0925

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-563-1-0925

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, ET 514, ET 532. ET-569-1-0925

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-583-0-0925

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-584-0-0925

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-585-0-0925

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-586-0-0925

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. ET-640-1-0925

Industrial Engineering

Doris Grosh,* Acting Head

Professors D. Grosh,* Hwang,* Konz,* Lee,* and Tillman;* Associate Professors L. Grosh,* Willems, and Wilson; Assistant Professors Currie, Kramer, and McCright; Emeritus: Professor Hansen; Adjunct Professor Amos.

Undergraduate study

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 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.

Graduate study

Major work is offered leading to the degrees master of science and doctor of philosophy with special emphasis on modern quantitative solution of industrial problems. Course work and research may be conducted in human factors, operations research, manufacturing engineering, and engineering management.

Ergonomics—Ergonomics (human factors) is the study of work. The basic sciences of physics, psychology, and physiology are applied in job design to fit the machine to the man—rather than fit the man to the machine. Subtopics include inspection, heat stress, cold stress, illumination, noise, toxicology, biomechanics, and workstation design.

Operations research—The study of operations research deals with building decision models which may be mathematical, computer simulation, or statistical with which a business concern or organization

optimizes its decision making within a set of constraints. More recent work in multiple objective and multiple attribute decision making is stressed.

Manufacturing engineering—Manufacturing engineering treats the efficient use of machine tools and processes in the manufacture of discrete parts. Emphasis is on modern techniques such as CAD/CAM and computer control of machine tools as well as the use of the computer to collect and analyze data for control of the shop floor. The interface between the machine tool, a handling device such as a robot, and the part are essential parts of this program.

Engineering management—The program blends the basic engineering background with accounting, marketing, finance, operations research, and the behavioral sciences. This degree is of particular interest to engineers who do not have a B.S. in industrial engineering and want to broaden their backgrounds in management. Several strong supporting minors are available in the College of Engineering and College of Arts and Sciences.

Prerequisite to graduate work in these fields is the completion of an undergraduate curriculum in engineering or science which satisfies the major areas required in the undergraduate industrial engineering curriculum at Kansas State University.

Undergraduate students from other scientific disciplines such as mathematics, chemistry, physics, and computer science are encouraged to consider the possibility of a graduate degree in industrial engineering.

Facilities and equipment for advanced study and research are extensive and majors in the department have access to the university computing center. Durland and Seaton Hall each contain a University remote-computing laboratory that is connected directly to the University's ITEL AS/5 computing system. In addition there is a microcomputer laboratory in Durland Hall.

Industrial engineering (IE)

Bachelor of science in industrial engineering
133 hours required for graduation
Accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology

Freshman

Fall semester		
ENGL 100	English Composition I*	3
MATH 220	Analytic Geometry and Calculus I ..	4
CHM 210	Chemistry I	4
ECON 110	Economics I	3
IE 015	Engineering Assembly	0
Humanities or social science elective		3
		17

Spring semester

ENGL 120	English Composition II*	
or		
Elective**		3
MATH 221	Analytic Geometry and Calculus II	4
CHM 230	Chemistry II	4

IE 120	Introduction to Industrial Engineering	2
IE 372	Computers and Data Processing ...	2
PE 101	Concepts in Physical Education	1
IE 015	Engineering Assembly	0
		16

Sophomore**Fall semester**

PHYS 213	Engineering Physics I	5
MATH 222	Analytic Geometry and Calculus III	4
ACCTG 211	Financial Accounting	3
IE 241	Production Processes	3
Humanities or social science elective	.....	3
IE 015	Engineering Assembly	0
		18

Spring semester

PHYS 214	Engineering Physics II	5
MATH 240	Elementary Differential Equations	4
Humanities or social science electives	.....	4
ME 212	Engineering Graphics I	2
IE 373	Computer Applications in Industrial Engineering	2
IE 015	Engineering Assembly	0
		17

Junior**Fall semester**

STAT 510	Introduction to Probability and Statistics I	3
IE 551	Industrial Ergonomics	3
IE 530	Industrial Project Evaluation	3
IE 571	Introduction to Operation Research I	3
Engineering sciences	.....	4
IE 015	Engineering Assembly	0
		16

Spring semester

IE 501	Industrial Management	3
IE 541	Statistical Quality Control	3
Technical electives	.....	6
Engineering sciences	.....	4
IE 050	Industrial Plant Studies	0
IE 015	Engineering Assembly	0
		16

Senior**Fall semester**

IE 553	Production Planning and Inventory Control	3
ENGL 415	Written Communication for Engineers*	3
SPCH 421	Technical Speaking	3
Humanities or social science elective	.....	3
Engineering sciences	.....	3
Technical electives	.....	3
IE 015	Engineering Assembly	0
		18

Spring semester

IE 554	Industrial Facilities Layout and Design	3
Technical electives	.....	9
Engineering sciences	.....	3
IE 015	Engineering Assembly	0
		15

*English Composition II is optional if prerequisites for Written Communication for Engineers (ENGL 415) are met from English Composition 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).

**This is a free elective if English Composition (ENGL 120) is not required.

Technical electives must be selected from the approved departmental list to ensure 32 hours of engineering science and 16 hours of engineering design.

A total of 14 hours of engineering sciences is required. These must include one course in each area: materials, mechanics, circuits, and thermodynamics.

Manufacturing engineering option

The Department of Industrial Engineering has an option in manufacturing engineering which 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 based manufacturing. The graduates from this program will have a strong background in the use of computers in all phases of manufacturing as well as the impact of other recent developments such as robots and lasers. The first two years are the same as the basic industrial engineering program. The last two years are as follows:

133 hours required for graduation

Junior**Fall semester**

STAT 510	Introduction to Probability and Statistics I	3
IE 551	Industrial Ergonomics	3
IE 530	Industrial Project Evaluation	3
IE 571	Introduction to Operations Research I	3
IE 015	Engineering Assembly	0
Engineering sciences	.....	4
		16

Spring semester

IE 501	Industrial Management	3
IE 541	Statistical Quality Control	3
IE 552	Production Process Engineering	3
IE 050	Industrial Plant Studies	0
IE 015	Engineering Assembly	0
Technical elective	.....	3
Engineering sciences***	.....	4
		16

Senior**Fall semester**

IE 553	Production Planning and Inventory Control	3
ENGL 415	Written Communication for Engineers	3
IE 621	Numerical Control of Machine Tools	3
SPCH 421	Technical Speaking	3
IE 015	Engineering Assembly	0
Engineering sciences***	.....	3
Humanities or social science elective	.....	3
		18

Spring semester

IE 554	Industrial Facilities Layout and Design	3
IE 550	Tool Engineering	3
CE 533	Mechanics of Materials	3
IE 015	Engineering Assembly	0
Technical elective	.....	3
Engineering sciences	.....	3
		15

*English Composition II is optional if prerequisites for Written Communication for Engineers (ENGL 415) are met from English Composition 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).

**This humanities and social science elective may be replaced by a free elective if English Composition II (ENGL 120) is not required.

Technical electives must be selected from the approved departmental list.

A total of 14 hours of engineering sciences is required. These must include one in each area: materials, mechanics, circuits, and thermodynamics.

Major electives approved list:

STAT 511	Introductory Probability and Statistics II	3
IE 502	Industrial Management II	3
IE 550	Tool Engineering	3
IE 552	Production Process Engineering	3
IE 562	Computer-Aided Manufacturing	3
IE 572	Introduction to Operations Research II	3
IE 573	Industrial Simulation	3
IE 580	Manufacturing Systems Design and Analyses	3
IE 621	Numerical Control of Machine Tools	3
IE 625	Work Environments	3
IE 671	Automated Factory Concepts	3
IE 672	Robotic Applications	3
IE 685	Principles of Manufacturing Information Systems	3

Courses in industrial engineering Undergraduate credit

IE 015. Engineering Assembly. (0) I, II. Presentation by students of abstracts and reviews of articles in the journals of their respective societies or in the technical press of their profession, and reports of engineering projects, industrial experiences, and original investigations conducted by the student branches of the professional engineering societies. Occasionally, two or more of these individual groups unite for lectures by practicing engineers and by members of the engineering and University faculties. One hour of lec. a week; sophomore, junior, and senior years. IE-015-0-0913

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. IE-050-2-0913

IE 120. Introduction to Industrial Engineering. (2) II. A survey of functions in the industrial organization including management, organization, work design, personnel; quality, inventory, and production control; and ancillary activities. Two hours rec. a week. IE-120-0-0913

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. Pr.: Engineering student or consent of instructor. IE-241-1-0913

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-372-1-0913

IE 373. Computer Applications in Industrial Engineering. (2) 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.: IE 372 or a previous course in computers. IE-373-1-0913

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. IE-499-4-0913

Undergraduate and graduate credit in minor field

IE 501. Industrial Management. (3) I, II. Basic functions in an industrial organization and their interrelationships; management considerations involving product, process, plant, and personnel. Three hours rec. a week. Pr.: Sophomore standing or consent of instructor. IE-501-0-0913

IE 502. Industrial Management II. (3) I. Job analysis and evaluation, selection, training, and other considerations for employees from the industrial engineering standpoint. Three hours rec. a week. Pr.: Junior standing in engineering. IE-502-0-0913

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-530-0-0913

IE 533. Interior Ergonomics. (3) I, II. Factors influencing the human use of interior spaces. Design for health, safety, performance, comfort, and pleasantness. Emphasis on human characteristics, evaluation, and environmental effects. Three hours rec. a week. Pr.: Junior standing or above. IE-533-0-0913

IE 541. Statistical Quality Control. (3) II. 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 510 or equiv. IE-541-0-0913

IE 550. Tool Engineering. (3) II. A survey of the function of tooling and the tool-making process as applied to production of goods. Topics range through the mechanics of material removal, machinability of materials, work holders, dies, fixtures, and tool material selection; the mechanics of the tool material involved and design problems. Two hours rec. and three hours lab a week. Pr.: IE 241. IE-550-1-0913

IE 551. Industrial Ergonomics. (3) I. Process analysis and charting; principles of motion economy and ergonomics; work stations and environments; biomechanics; micromotion analysis; and an introduction to standard data systems. Two hours rec. and three hours lab a week. Pr.: IE 241 or consent of instructor. IE-551-1-0913

IE 552. Production Process Engineering. (3) II. Advanced production techniques, an introduction to production machinery and controls, including numerical control processes. Two hours rec. and three hours lab a week. Pr.: IE 372 and EECE 519. IE-552-0-0913

IE 553. Production Planning and Inventory Control. (3) I. Principles, techniques, and applications of production planning and control and inventory control. Three hours rec. a week. Pr.: IE 373 and MATH 222. IE-553-0-0913

IE 554. Industrial Facilities Layout and Design. (3) II. Comprehensive design of an industrial production system; integration of the undergraduate industrial engineering courses. Two hours rec. and three hours lab a week. Pr.: Senior standing. IE-554-1-0913

IE 562. Computer-Aided Manufacturing. (3) I. Concepts in CAM, integrated control of machine tools, and transport devices with production control. Concepts of CAM and automated assembly in a small lot production environment. Two hours lec. and three hours lab a week. Pr.: IE 241, IE 552. IE-562-1-0913

IE 571. Introduction to Operations Research I. (3) I, II. Formulation of the linear programming model and solution by graphical, algebraic, and simplex techniques. Sensitivity analysis using dual-simplex method. The transportation and assignment models and critical path method. Three hours rec. a week. Pr.: IE 373 and MATH 222. IE-571-0-0913

IE 572. Introduction to Operations Research II. (3) II. Further optimization techniques, including elementary treatment of non-linear programming and dynamic programming. The queueing model. Three hours rec. a week. Pr.: IE 571 and STAT 510. IE-572-0-0913

IE 573. Industrial Simulation. (3) II. Introduction to modeling of industrial processes using digital simulations. The effect of simulation languages on modeling concepts will be stressed. Three hours rec. a week. Pr.: IE 372 and STAT 510. IE-573-0-0913

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-575-0-0913

IE 580. Manufacturing Systems Design and Analysis. (3) I. Comprehensive design and analysis of a manufacturing system; integration of the undergraduate industrial engineering and manufacturing engineering option courses. Two hours rec. and three hours lab a week. Pr. or conc.: IE 551 and IE 553. IE-580-1-0913

Undergraduate and graduate credit

IE 601. Introduction to Systems Management. (3) I, II. Taught off campus at Fort Leavenworth only. 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, using optimization theory, finite mathematics, and statistical techniques. Three hours rec. a week. Pr.: MATH 222 and consent of instructor. IE-601-0-0913

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, IE 571, or consent of instructor. IE-603-0-0913

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 241, IE 372. IE-621-1-0913

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.: Senior standing in engineering. IE-625-0-0913

IE 651. Standard Data Systems. (3) I. 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.: IE 372. IE-651-0-0913

IE 652. Ergonomics. (3) I, II. Taught off campus at Fort Leavenworth only. 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. Three hours rec. a week. Pr.: MATH 222 and consent of instructor. IE-652-0-0913

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 553 and IE 573. IE-671-0-0913

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 552 or EECE 632. IE-672-1-0913

IE 685. Principles of Manufacturing Information Systems. (3) I. 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 241, IE 553. IE-685-0-0913

IE 751. Applied Decision Theory. (3) I, II. Bayes theorem, Bayesian estimators, utility, loss function and risk, minimax strategies, elementary game theory. Pr.: STAT 511 or STAT 770. IE-751-0-0913

Graduate credit

IE 801. Problems in Industrial Engineering. (Var.) I, II, S. Pr.: Graduate standing. IE-801-3-0913

IE 805. Engineering Administration. (3) I. Engineering administration: organization; factors in decision-making. Three hours rec. a week. Pr.: IE 501. IE-805-1-0913

IE 811. Advanced Production and Inventory Control. (3) I. Analytical and mathematical methods of making decisions on production, inventories, human resources, and shipping in modern industrial plants. Three hours rec. a week. Pr.: IE 553 or consent of instructor. IE-811-0-0913

IE 830. Applied Fuzzy Set Theory. (3) I. The emphasis will be on application. Topics covered are elementary fuzzy set theory, fuzzy measure, possibility theory, fuzzy linear programming and other fuzzy optimization techniques, fuzzy linguistics and expert systems, fuzzy production and

inventory control, and fuzzy operations research models. Three hours rec. a week. Pr.: STAT 510. IE-830-0-0913

IE 842. Reliability Theory I. (3) I. The mathematics of reliability theory. The hazard function. Calculation of the failure density and mean life for series, parallel systems, and various types of standby systems. Hypotheses tests on mean life. Life testing with censoring. Three hours rec. a week. Pr.: STAT 511 or equiv. IE-842-0-0913

IE 843. Reliability Theory II. (3) II. Maintenance and repair models, availability, using Laplace transforms and Markovian analysis. Basics of Bayesian decision theory with applications to reliability theory. Three hours rec. a week. Pr.: IE 842. IE-843-0-0913

IE 850. Ergonomics (Human Factors) Engineering I. (3) I. The design and analysis of applied experimental research on human behavior as applied to engineering systems. An experimental project. Two hours rec. and three hours lab a week. Pr.: STAT 702 or STAT 703. IE-850-0-0913

IE 865. Simulation of Industrial and Management Systems. (3) II. Simulating industrial management systems on computers using Monte Carlo techniques and simulation languages. Numerical methods related to simulation. Three hours rec. a week. Pr. or conc.: STAT 511 or consent of instructor. IE-865-0-0913

IE 872. Industrial Forecasting Techniques and Applications. (3) I. The problems of model construction for industrial forecasting. The application of least squares, regression, exponential smoothing, and adaptive fitting in solving industrial engineering problems. Three hours rec. a week. Pr.: STAT 511 or 705. IE-872-0-0913

IE 873. Industrial Systems Analysis. (Var.) II. Analysis and synthesis of automatic control systems with application to machines and processes and industrial management systems. A study of optimal control, stability, and sensibility of industrial management systems. Pr. or conc.: IE 572. IE-873-0-0913

IE 874. Operations Research I. (3) II, S. A study of the methods of operations research including formulation of models and derivation of solutions by various optimization techniques. Introduction to deterministic models and techniques, including optimization techniques, sequencing and replacement, linear programming, geometric programming, and dynamic programming. Three hours rec. a week. Pr. or conc.: IE 572. IE-874-0-0913

IE 881. Linear Programming. (3) II. Development of the theory of linear programming and related topics including simplex method, duality theory, integer programming, transportation methods, and stochastic linear programming. Application to industrial problems and the use of computer solutions are emphasized. Three hours rec. a week. Pr.: IE 571. IE-881-0-0913

IE 892. Graduate Seminar in Industrial Engineering. (1) I, II. Maximum total: three credit hours. Presentation and discussion of papers on industrial engineering subjects. One two-hour seminar a week. IE-892-0-0913

IE 898. Master's Report. (Var.) I, II, S. Topics selected with approval of major professor and department head. IE-898-4-0913

IE 899. Master's Thesis. (Var.) I, II, S. Topics selected with approval of major professor and department head. IE-899-4-0913

IE 950. Human Factors. (3) II. The design and analysis of experimental research on human behavior as applied to systems with emphasis on nonphysical tasks. An experimental project. Three hours rec. a week. Pr.: STAT 702 or 703. IE-950-0-0913

IE 971. Industrial Queueing Processes. (3) I, II. Introduction to the queueing process and theory of queues; analysis of single and multistation queues; application to production, materials handling, inventory, and maintenance systems. Three hours rec. a week. Pr.: STAT 510. IE-971-0-0913

IE 975. Operations Research II. (3) I. A continuation of IE 874. Introduction to stochastic models and techniques including queueing theory, simulation, nonlinear programming, calculus of variations, maximum principle, and forecasting. Three hours rec. a week. Pr.: IE 874, STAT 770. IE-975-0-0913

IE 976. Scheduling Theory. (3) I, II. Project scheduling, assembly line balancing, shop scheduling, basic structure, measures of performance, combinatorial and statistical aspects. Various approaches to the analysis of shop scheduling. Three hours rec. a week. Pr.: Consent of instructor. IE-976-0-0913

IE 982. Nonlinear Programming. (3) I, II. Study of nonlinear models and their solution. Topics covered are nonlinear programming including Kuhn-Tucker theory, quadratic programming, separable programming, geometric programming, gradient and search methods, quasi-linearization, and invariant imbedding. Three hours rec. a week. Pr.: STAT 510. IE-982-0-0913

IE 983. Dynamic Programming. (3) I, II. A study of the optimization of multistage decision processes based on the application of the principle of optimality. Stochastic and deterministic models are developed. Three hours rec. a week. Pr.: STAT 510. IE-983-0-0913

IE 990. Advanced Topics in Operations Research. (Var., 6 maximum) I, II, S. Study of topics related to operations research not covered in other courses. Selected according to the interests and needs of graduate students. May be repeated. Pr.: Consent of instructor. IE-990-0-0913

IE 991. Multiple Criteria Decision Making. (3) I, II. Decision processes for problems involving multiple conflicting criteria; multiple attribute decision making; multiple objective decision making, and group decision making under multiple criteria. Various methods/approaches for different problems are discussed. Three hours rec. a week. Pr.: IE 571 and 874. IE-991-0-0913

IE 999. Dissertation Research. (Var.) I, II, S. Topics selected with approval of major professor and department head. IE-999-0913

Mechanical Engineering

Allen C. Cogley,* Head

Professors Appl,* Azer,* Ball,* Cogley,* Gorton,* Gowdy,* Huang,* Kipp,* Lindholm,* Miller,* Thompson,* Turnquist,* and Walker;* Associate Professors Beck,* Eggeman,* Fenton,* Hayter,* and Jones;* Assistant Professors Krishnaswami,* Swenson,* and White; Emeriti: Professors Brainard, Crank, Duncan, Flinner, Helander, Messenheimer, Nesmith, Pauli, and Wood.

Undergraduate study

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.

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 humanistic 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 the new mechanical engineering graduate the experience and confidence to move quickly into a productive and satisfying career.

Because of the broad and fundamental nature of the undergraduate curriculum, mechanical engineering provides an excellent background for careers in such fields as law, medicine, social services, urban design, and business management.

The electives in the curriculum provide the opportunity for students to develop their own special interests. Students with clear career objectives may be permitted to substitute appropriate courses for some of the required courses.

Graduate study

Major work is offered leading to the master of science and doctor of philosophy degrees. Prerequisite to major graduate work in the field of mechanical engineering is the completion of a four-year curriculum substantially equivalent to that required of undergraduates in mechanical engineering at Kansas State University. A student, particularly at the doctorate level, in addition to major studies is expected to develop strength in the physical sciences and mathematics by taking course work in those fields deemed appropriate by his or her supervisory committee.

Advanced work and research are offered in heat transfer, thermodynamics, air conditioning, energy conversion, automatic control, fluid and gas dynamics, environmental engineering, computer-aided engineering, engineering design, kinematics, and vibrations. Laboratory facilities and basic instrumentation are available for experimental work in these areas. Graduate students also have access to a large variety of computers and the various engineering laboratories and shops.

Many research and teaching assistantships and free-grant fellowships are available to graduate students.

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	English Composition I*	3
MATH 220	Analytic Geometry and Calculus I	4
SPCH 105	Public Speaking IA	2
Humanities or social science elective		3
		16

Spring semester

CHM 230	Chemistry II	4
Humanities or social science elective		3
MATH 221	Analytic Geometry and Calculus II	4
IE 241	Production Processes	3
ME 212	Engineering Graphics I	2
		16

Sophomore

Fall semester

ECON 110	Economics I	3
MATH 222	Analytic Geometry and Calculus III	4
PHYS 213	Engineering Physics I	5
IE 372	Computers and Data Processing	2
ME 217	Engineering Graphics II	3
		17

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
		17

Junior

Fall semester

CE 533	Mechanics of Materials	3
EECE 519	Electric Circuits and Control	4
ME 513	Thermodynamics I	3
ME 512	Dynamics	3
ENGL 415	Written Communication for Engineers*	3
PE 101	Concepts in Physical Education	1
		17

Spring semester

EECE 589	Circuits and Machines Lab	2
ME 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
		17

Senior

Fall semester

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
		17

*English Composition II is optional if prerequisites for Written Communication for Engineers (ENGL 415) are met from English Composition 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; automatic controls. Electives must be selected to ensure that a minimum of 16 design and 16 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.

Spring semester

ME 563	Machine Design II	3
ME 575	Mechanical Engineering Design Lab	3
Technical electives		9
Humanities or social science elective		3
		18

Courses in mechanical engineering 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. Three hours lab and one hour rec. a week. Pr.: Plane geometry. ME-212-1-0910

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. Five hours lab and one hour rec. a week. Pr.: ME 212. ME-217-1-0910

ME 390. Topics in Mechanical Engineering. (Var.) I, II, S. Topics selected in consultation with instructor. Intended for interdisciplinary studies or innovative studies in mechanical engineering. Pr.: Consent of instructor. ME-390-0-0910

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 IE 372. ME-400-0-0910

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. ME-499-4-0910

Undergraduate and graduate credit in minor field

ME 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. Credit for this course shall not be applied toward any engineering degree except the engineering technology degree. Three hours rec. a week. Pr.: CE 231, MATH 211. ME-511-0-0910

ME 512. Dynamics. (3) I, II, S. 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, MATH 222. ME-512-0-0910

ME 513. Thermodynamics I. (3) I, II, S. Properties of the pure substance. The first and second laws of thermodynamics. Three hours rec. a week. Pr.: PHYS 213; MATH 222. ME-513-0-0910

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-523-0-0910

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-533-0-0910

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 513, EE 519. Pr. or conc.: ME 400. ME-535-1-0910

ME 540. Modeling and Analysis of Dynamic Systems. (3) I, II. Application of physical laws, mathematical methods, and computers to development and interpretation of models for physical systems of engineering interest. Emphasis is on the methods of modeling rather than the systems modeled. Examples will be taken from all areas of engineering. Three hours rec. a week. Pr.: PHYS 214, MATH 240, ME 512. ME-540-0-0910

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-560-0-0910

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, ME 533. ME-563-0-0910

ME 571. Fluid Mechanics. (3) I, II, S. 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-571-0-0910

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-527-0-0910

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, ME 563. ME-575-1-0910

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 ME 571. ME-583-1-0910

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-620-0-0910

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-622-0-0910

ME 628. Aerodynamics I. (3) II. 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, MATH 240. ME-628-1-0910

ME 631. Aircraft and Missile Propulsion. (3) I. Analysis of aircraft and missile propulsion systems; fundamentals of jet propulsion including rocket engines. Three hours rec. a week. Pr.: ME 523, ME 571, MATH 240. ME-631-0-0910

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-633-0-0913

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-640-0-0910

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-645-1-0910

ME 650. Introduction to Computer-Aided Design. (3) I, II. 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, senior standing in engineering. ME-650-0-0910

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, MATH 240. ME-656-0-0910

ME 675. Optimal Mechanical Design. (3) II. 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, senior standing in engineering. ME-675-0-0910

ME 680. Solar Energy Thermal Processes. (3) II. Fundamentals of solar radiation, its measurement, and techniques for predicting its magnitude; an introduction to the heat transfer involved in solar collectors; modeling techniques for flatplate and focusing-collector systems; storage system performance; an overview of solar energy thermal systems such as solar heating and cooling; solar system economics. Three hours rec. a week plus periodic laboratory experiments. Pr. or conc.: ME 573. ME-680-0-0910

ME 699. Problems in Mechanical Engineering. (Var.) I, II, S. Pr.: Approval of department head. ME-699-3-0910

ME 713. Advanced Thermodynamics I. (3) I. Application of the laws of thermodynamics to unsteady-flow processes; processes involving friction; available and unavailable portions of various forms of energy; the concept of flux mass, energy, available energy, and entropy. Three hours rec. a week. Pr.: ME 523, ME 571, MATH 240. ME-713-0-0910

ME 715. Gas Dynamics. (3) II. Properties of compressible fluids, subsonic and supersonic flow, steady and nonsteady motion, with emphasis on one-dimensional flow. Three hours rec. a week. Pr.: MATH 240, ME 523, ME 571. ME-715-0-0910

ME 716. Intermediate Dynamics. (3) II. General vector principles of the dynamics of particles and rigid bodies; applications to orbital calculations, gyrokinematics, and rocket performance; introduction to the energy methods of advanced dynamics. Three hours rec. a week. Pr.: ME 512, MATH 240. ME-716-0-0910

ME 718. Introduction to the Theory of Continuous Media. (3) I. Analysis of strain, motion, and stress; fundamental laws; constitutive equations; applications to fluid, elastic, and plastic media. Three hours rec. a week. Pr.: ME 512, MATH 240. ME-718-0-0910

ME 719. Engineering Acoustics I. (3) I. In odd years. An introduction to engineering acoustics and its application. Laboratory-type demonstrations include the measurement and control of sound and noise. Three hours rec. a week. Pr.: MATH 240, ME 512, or CE 530. ME-719-0-0910

ME 720. Intermediate Fluid Mechanics. (3) I. An introduction to the general analytical relations of fluid flow, viscous flow, turbulence, boundary-layer theory; applications. Three hours rec. a week. Pr.: ME 571, MATH 240. ME-720-0-0910

ME 722. Environmental Engineering II. (3) I. 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-722-0-0910

ME 725. Combustion. (3) I. Dynamics and thermodynamics of combustion processes; solid, liquid, and gaseous fuels. Three hours rec. a week. Pr.: ME 573. ME-725-0-0910

ME 728. Aerodynamics II. (4) I. Compressibility phenomena, power requirements, airplane performance; stability and control. Three hours rec. and three hours lab a week. Pr.: ME 628. ME-728-1-0910

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 712. Cross-listed with EECE 730. ME-730-0-0910

ME 732. Robotic System Analysis. (3) I. 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-732-0-0910

ME 735. Geometric Modeling. (3) I. 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. Cross listed with CMPSC 735.

Pr.: ME 650 or CMPSC 636 or EECE 636. ME-735-0-0910

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-736-0-0910

ME 738. Experimental Stress Analysis. (3) II. 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-738-1-0910

ME 746. Random Vibration. (3) I, in even years. Theory of random processes and application to random vibration of mechanical systems. Three hours rec. a week. Pr.: ME 656. ME-746-0-0910

ME 756. Machine Vibrations II. (3) II. 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-756-0-0910

ME 757. Kinematics. (3) I. 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-757-0-0910

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-760-0-0920

ME 762. Finite Elements. (3) II. 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-762-0-0910

Graduate credit

ME 813. Advanced Thermodynamics II. (3) II. Kinetic theory and statistical thermodynamics, with emphasis on transport properties and engineering applications. Selected topics from classical thermodynamics. Pr.: ME 523, ME 573, or consent of instructor. ME-813-0-0910

ME 819. Engineering Acoustics II. (3) II, in odd years. A study of the generation, propagation, and reproduction of sound, with applications to the transmission and reduction of sound in materials and structures, and the design of acoustic enclosures and filters. Three hours rec. a week. Pr.: ME 718, ME 719, or ME 756. ME-819-0-0910.

ME 822. Theory of Elasticity. (3) On sufficient demand. Stress, strain, equations of equilibrium and compatibility, strain-displacement relations for general coordinates; problems in plane stress and plane strain; applications to three-dimensional problems; propagation of elastic waves; complex variables and variational methods. Three hours rec. a week. Pr.: ME 718. ME-822-0-0910

ME 831. Boundary Layer Theory. (3) II. The development and solution of various laminar boundary layer problems involving momentum, heat, and mass transfer for a compressible viscous fluid. Three hours rec. a week. Pr.: ME 573. ME-831-0-0910

ME 860. Engineering Analysis II. (3) II. Continuation of Engineering Analysis I. Emphasis placed on continuous systems. Three hours rec. a week. Pr.: ME 760 or consent of instructor. ME-860-0-0910

ME 862. Plasticity. (3) On sufficient demand. Elastic-plastic and fully-plastic problems of trusses, beams, and bars in torsion; unrestricted and contained plane strain; limit analysis. Three hours rec. a week. Pr.: ME 718, ME 736, or ME 822. ME-862-0-0910

ME 890. Laboratory Investigations in Mechanical Engineering. (Var.) I, II, S. Pr.: Approval of department head. ME-890-4-0910

ME 898. Master's Report. (Var.) I, II, S. Topics selected with approval of major professor and department head. ME-898-4-0910

ME 899. Master's Thesis. (Var.) I, II, S. Topics selected with approval of major professor and department head. ME-899-4-0910

ME 916. Advanced Topics in Mechanical Engineering. (Var.) I, II, S. A course reserved for study of current topics in mechanical engineering. Particular subjects which may be included are: air conditioning, automatic controls, biomedical engineering, energy conversion, engineering design, environmental engineering, fluid and gas dynamics, heat transfer, kinematics, thermodynamics, and vibrations. Topics announced when offered. Pr.: Consent of instructor. ME-916-0-0910

ME 935. Heat Conduction in Solids. (3) I. General differential equation of heat conduction and methods of solution for two-dimensional steady-rate transient

heat flow, periodic heat flow, and internal heat sources. Three hours rec. a week. Pr.: ME 573. ME-935-0-0910

ME 942. Convection Heat Transfer. (3) II. Energy and momentum equations in convective heat transfer, laminar and turbulent thermal boundary layers, steady and nonsteady convection problems. Three hours rec. a week. Pr.: ME 573. ME-942-0-0910

ME 943. Radiation Heat Transfer. (3) I, in odd years. Basic theories of thermal radiation, shape factors; exact and approximate solutions of integral equations for radiation heat transfer between solid surfaces with absorbing or nonabsorbing medium. Three hours rec. a week. Pr.: ME 573. ME-943-0-0910

ME 947. Boiling Heat Transfer. (3) I, in alternate years. Principles of boiling heat transfer and thermal hydraulics of two-phase flow; computational methods; design and analysis applications. Three hours rec. a week. Pr.: NE 847 or ME 942. Cross-listed with NE 947. ME-947-0-0910

ME 999. Dissertation Research in Mechanical Engineering. Ph.D. level. (Var.) I, II, S. Pr.: Approval of department head and major professor. ME-999-4-0910

Nuclear Engineering

N. Dean Eckhoff,* Head

Professors Donnert,* Eckhoff,* Faw,* Merklin,* Mingle,* Shultis,* and Simons;* Assistant Professor Hightower.

Undergraduate study

The curriculum leading to the B.S. in nuclear engineering prepares students for professional positions in industry, government, and private practice. Through technical electives, the student may organize a program suited to particular needs and interests. The student may elect a program leading to specialized engineering practice or to postgraduate study in engineering, science, medicine, or law.

Graduate study

Major work is offered leading to the degrees master of science in nuclear engineering and doctor of philosophy in engineering.

Applicants for graduate status are expected to hold the bachelor's degree with adequate preparation in mathematics and physical sciences. Programs of study will be arranged with a proper balance of subject matter from other fields to meet the needs of individual students.

Laboratory facilities: 250 kilowatt TRIGA Mark II reactor with pulsing capability to 250,000 kilowatts. Co-60 sources; neutron activation analysis laboratory with multi-

channel analyzers, gamma-ray spectrometers, high-speed printers, plotters, and magnetic tape recorders; nuclear instrumentation laboratory with lab stations containing digital logic systems, instrumentation modules for pulse analysis and systems timing, dual-beam oscilloscopes, pulse and wave form generators; radioisotope application laboratory with instructional equipment for radiation detection and analysis; and thermoluminescent dosimeter systems; a radiation standards laboratory; shock-tube laboratory with instrumentation for studies of combustion kinetics, molecular rate processes, and transient thermal and hydraulic phenomena; combustion laboratory with a flat flame diagnostic system; an analytical laboratory with gas chromatographs, atomic absorption spectrometers, a Cary-14 spectrophotometer, a DU-spectrophotometer, a spinning band distillation column, a mass spectrometer, and a zone refiner; applied optics laboratory with high-power argon ion laser and associated apparatus used in Doppler velocimetry, Raman scattering, and holographic interferometry studies of heat, mass, and momentum transport phenomena. Other: graphite diffusion assembly, gamma irradiator, an auto- and cross-correlation noise analysis system, digital microcomputers, and analog computers.

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	English Composition I	3
CHM 210	Chemistry I	4
MATH 220	Analytic Geometry and Calculus I . .	4
PE 101	Concepts in Physical Education . . .	1
ECON 110	Economics I	3
		17

Spring semester

NE 120	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
		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
		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
		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
		16

Spring semester

NE 512	Principles of Radiation Detection	3
NE 520	Neutron and Particle Interactions I	2
ME 571	Fluid Mechanics	3
NE 550	Radiation Protection Engineering	3
Technical elective		3
Humanities or social science elective		2
		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
		17

Spring semester

NE 694	Nuclear Reactor Thermal Design	3
NE 696	Nuclear Systems Design	3
NE 697	Nuclear Engineering Design	2
NE 648	Reactor Operations Laboratory II	2
Technical electives		7
		17

*English Composition II is optional if prerequisites for Written Communication for Engineers (ENGL 415) are met from English Composition I. If necessary, English Composition II may be substituted for three 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.

Courses in nuclear engineering**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-110-0-0920

NE 120. Engineering Computational

Techniques. (2) II. Application of electronic calculators, digital computers, and graphical methods to the solution of engineering problems. One hour lec. and three hours lab a week. Pr.: MATH 220 or MATH 225. NE-120-0-0920

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 or 226. NE-415-0-0920

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. NE-499-4-0920

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-500-0-0920

NE 501. Introduction to Nuclear Engi-

neering. (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-501-0-0920

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, PHYS 213. NE-505-0-0920

NE 512. Principles of Radiation Detec-

tion. (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-512-1-0920

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, CHE 352. NE-515-0-0920

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. NE-520-0-0920

NE 550. Radiation Protection Engineer-

ing. (3) II. Principles of radiation protection. Radiation shielding, radiation dosimetry, and regulatory aspects of radiation protection. Special applications in nuclear plant design. Three hours rec. a week. Pr.: NE 505. NE-550-0-0920

Undergraduate and graduate credit**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-620-3-0920

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-630-0-0920

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. Cross-listed with PHYS 635. Pr.: PHYS 532 or EECE 557, and PHYS 621. NE-635-0-0920

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-647-1-0920

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, NE 630. NE-648-1-0920

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, NE 520. NE-675-0-0920

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. or conc.: NE 630. NE-693-0-0920

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-694-0-0920

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-696-0-0920

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-697-0-0920

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-750-0-0920

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-761-0-0920

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-762-1-0920

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-772-0-0920

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-774-0-0920

NE 799. Special Topics in Nuclear Engineering. (Var.) On sufficient demand. Topical material of importance in nuclear engineering, such as controlled thermonuclear reactions, numerical analysis, Monte Carlo methods in radiation transport, effects of nuclear explosions, etc. Pr.: Consent of head of department. NE-799-3-0920

Graduate credit

NE 806. Neutronics. (3) I. Particle transport, theories of diffusion, numerical analysis of diffusion, transient core analysis. Three hours rec. a week. Pr.: NE 630. NE-806-0-0920

NE 810. Graduate Problems in Nuclear Engineering. (Var.) I, II, S. Specific studies in advanced problems in various phases of nuclear engineering. Pr.: Graduate standing and consent of head of department. NE-810-4-0920

NE 847. Nuclear Power Engineering. (3) II. Advanced techniques in thermal-hydraulic analysis as applied to nuclear power reactors, including computational methods used for conduction and convection heat transfer. Three hours rec. a week. Pr.: ME 573 or equiv. NE-847-0-0920

NE 851. Nuclear Engineering Laboratory. (2) I, S. On demand. Design of experiments for the TRIGA nuclear reactor. Six hours lab a week. Pr.: NE 630 and NE 648. NE-851-1-0920

NE 860. Advanced Topics in Nuclear Engineering. (Var.) I, II, S. A presentation of various special topics covering advanced nuclear engineering specialties. Pr.: Graduate standing and consent of head of department. NE-860-0-0920

NE 890. Nuclear Engineering Colloquium. (1) I, II. Presentation and discussion of progress reports on research, special problems, and outstanding publications in nuclear engineering and related fields. Pr.: Graduate standing in nuclear engineering. NE-890-0-0920

NE 899. Master's Thesis. (Var.) I, II, S. Topics selected with approval of major professor and department head. NE-899-4-0920

NE 947. Boiling Heat Transfer. (3) I. Alternate years. Principles of boiling heat transfer and thermal hydraulics of two-phase flow; computational methods; design and analysis applications. Three hours rec. a week. Pr.: NE 847 or ME 942 or equiv. Cross-listed with ME 947. NE-947-0-0920

NE 998. Selected Advanced Topics in Nuclear Engineering. (Var.) II, on sufficient demand. Current topics of interest in nuclear engineering at an advanced level, such as controlled thermonuclear reactions, numerical analysis, Monte Carlo methods in radiation transport, etc. Pr.: Consent of department head. NE-998-3-0920

NE 999. Dissertation Research. (Var.) I, II, S. Topics selected with approval of major professor and department head. NE-999-4-0920

Faculty

AKINS, RICHARD GLENN, Prof. of Chemical Engineering (1963). BS 1957, MS 1958, U. of Louisville; PhD 1962, Northwestern U. (*)

AMOS, JOHN M., Adjunct Prof., Industrial Engineering (1987). BS 1956, MS 1957, Kansas St. U.; PhD 1960, Ohio St. U.

APPL, FREDRIC CARL, Prof. of Mechanical Engineering (1960). BS 1954, MS 1955, PhD 1958, Carnegie-Mellon U. (*)

AZER, NAIM ZAKI, Prof. of Mechanical Engineering; Assoc., Inst. for Environmental Research (1958). BS 1950, MS 1954, U. of Alexandria, Egypt; PhD 1959, U. of Illinois. (*)

BALL, HERBERT DEAN, Prof. of Mechanical Engineering (1958). BS 1952, MS 1958, U. of Nebraska; PhD 1972, Kansas St. U. (*)

BARNES, PHILIP L., Asst. Prof. of Agricultural Engineering (1980). BS 1974, U. of Wyoming; MS 1977, PhD 1980, Texas A & M.

BATES, HERBERT TEMPLETON, Prof. Emeritus of Chemical Engineering (1958). BS 1935, Iowa St. U.; MS 1938, Virginia Poly. Inst.; PhD 1941, Iowa St. U.; Professional Engineer, 1959.

BAUGHER, EARL EUGENE, Assoc. Prof. of Agricultural Engineering (1967). BS 1958, MS 1964, Kansas St. U.

BECK, B. TERRY, Assoc. Prof. of Mechanical Engineering (1979). BS 1971, MS 1974, PhD 1978, Oakland U. (*)

BEST, CECIL HAMILTON, Prof. of Civil Engineering (1961). BS 1955, MS 1956, PhD 1960, U. of California; Professional Engineer, 1962. (*)

BISSEY, CHARLES R., Prof. of Architectural Engineering and Construction Science (1969). BS 1957, Colorado St. U.; MArch 1961, Kansas St. U.; Professional Engineer, 1979. (*)

BLACK, RICHARD D., Assoc. Prof. of Extension Agricultural Engineering (1982). BS 1952, MS 1953, PhD 1961, U. of Illinois.

BLACKMAN, MERRILL, Assoc. Prof. of Architectural Engineering and Construction Science (1965, 1969). BS 1949, Kansas St. U.; Registered Architect, 1955; Professional Engineer, 1949.

BRAINARD, BOYD BERTRAND, Prof. Emeritus of Mechanical Engineering (1923). BS 1922, U. of Colorado; SM 1931, MIT; Professional Engineer, 1945.

BURTON, CHARLES L., Prof. of Architectural Engineering, Construction Science (1970). BS 1963, Kansas St. U.; MS 1975, U. of Kansas; Professional Engineer, Kansas, 1970. (*)

CARPENTER, KENNETH H., Prof. of Electrical Engineering (1986). BS 1961, MS 1962, Kansas St. U.; PhD 1966, Texas Christian U. (*)

CHANDRA, SATISH D.V., Asst. Prof. of Electrical and Computer Engineering (1984). BE 1970, Bangalore U., India; ME, Indian Inst. of Sci., India; MS 1980, PhD 1984, Auburn U. (*)

CHANG, CHENG S., Adjunct Prof. of Agricultural Engineering (1979). BS 1960, National Taiwan U.; MS 1966, Mississippi St. U.; PhD 1970, North Carolina St. U. (*)

CHUNG, DO SUP, Prof. of Agricultural Engineering (1965). BS 1958, Purdue U.; MS 1960, PhD 1966, Kansas St. U. (*)

CLACK, ROBERT WYNANDUS, Adjunct Prof. of Nuclear Engineering (1955). BS 1943, U.S. Naval Academy; Professional Engineer, 1956.

CLARK, STANLEY JOE, Prof. of Agricultural Engineering; Ag. Exp. Sta. (1966). BS 1954, MS 1959, Kansas St. U.; PhD 1966, Purdue U.; Professional Engineer, 1969. (*)

COGLEY, ALLEN, Prof. and Head, Mechanical Engineering (1987). BS 1962, Iowa St.; MS 1964, U. of Virginia; PhD 1968, Stanford U.

CONVERSE, HARRY, Adjunct Assoc. Prof. in Agricultural Engineering (1971). BS 1946, MS 1947, Kansas St. U.

COOPER, PETER B., Prof. of Civil Engineering (1966). BS 1957, MS 1960, PhD 1965, Lehigh U.; Professional Engineer, 1969. (*)

COTTOM, MELVIN CLYDE, Asst. Prof. of Electrical and Computer Engineering (1955). BS 1945, MS 1948, U. of Kansas; Professional Engineer in Kansas, 1947; in Missouri, 1952. (*)

COULSON, STEPHEN J., Temporary Dir., Engineering Computer Center (1985). BS 1965, Kansas St. U.

CRANK, ROBERT EUGENE, Prof. Emeritus of Mechanical Engineering (1947). BS 1947, MS 1950, Kansas St. U.; Professional Engineer, 1949.

CURRIE, KENNETH R., Asst. Prof., Industrial Engineering (1987). BS 1978, MS 1986, West Virginia U.

DAHL, ROBERT E., Prof. and Head, Architectural Engineering and Construction Science (1976). BS 1951, MS 1954, Kansas St. U.; Professional Engineer. (*)

DAWES, WILLIAM H., Assoc. Prof. of Engineering Technology (1978). BS 1969, MS 1972, PhD 1974, Kansas St. U.

DELKER, DAVID G., Asst. Prof. of Engineering Technology (1984). AT 1973, KTI; BS 1977, MS 1979, Oklahoma St. U.

DEVAULT, JAMES E., Assoc. Prof. of Engineering Technology (1985). BS 1970, MS 1971, Michigan Tech. U.; MS 1977, U. of Michigan.

DEVORE, JOHN J., Asst. Prof. of Electrical and Computer Engineering (1982). BS 1971, MS 1973, PhD 1984, Kansas St. U.

DOLLAR, JOHN PAUL, Assoc. Prof.; Asst. Dean (1960). BS 1956, MS 1966, Kansas St. U.

DONNERT, HERMANN JAKOB ANTON, Prof. of Nuclear Engineering (1966). PhD 1951, Leopold-Franzens U., Austria. (*)

DUNCAN, ALLEY H., Prof. Emeritus of Mechanical Engineering (1942). BS 1937, MS 1949, Kansas St. U.; Professional Engineer, 1948.

DYER, RUTH A., Asst. Prof. of Electrical and Computer Engineering (1983). BS 1973, MS 1975, Kansas St. U.; PhD 1980, U. of Kentucky. (*)

DYER, STEPHEN A., Assoc. Prof. of Electrical and Computer Engineering (1983). BS 1973, MS 1974, PhD 1977, Kansas St. U. (*)

ECKHOFF, N. DEAN, Prof.; Head, Nuclear Engineering; Dir. of Center for Energy Studies (1961). BS 1961, MS 1963, PhD 1968, Kansas St. U.; Professional Engineer, 1978. (*)

ECKHOFF, STEPHEN R., Assoc. Prof. of Agricultural Engineering (1983). BS 1975, Illinois Wesleyan U.; MS 1977, PhD 1983, Purdue U. (*)

EDGAR, JAMES H., Asst. Prof. of Chemical Engineering (1988). BS 1981, U. of Kansas; MS 1982, PhD 1987, U. of Florida.

EGGEMAN, GEORGE WAYNE, Assoc. Prof. of Mechanical Engineering (1978). BS 1962, U. of Missouri at Rolla; MS 1968, PhD 1972, U. of Illinois at Urbana; Professional Engineer, 1962.

ERICKSON, LARRY EUGENE, Prof. of Chemical Engineering (1964). BS 1960, PhD 1964, Kansas St. U. (*)

FAIRBANKS, GUSTAVE EDMUND, Prof. Emeritus of Agricultural Engineering; Ag. Exp. Sta. (1941). BS 1941, MS 1950, Kansas St. U.; Professional Engineer, 1948. (*)

FAN, LIANG-TSENG, Prof.; Head, Chemical Engineering; Dir., Inst. for Systems Design and Optimization; Assoc., Inst. for Environmental Research (1958). BS 1951, National Taiwan U.; MS 1954, Kansas St. U.; MS 1958, PhD 1957, West Virginia U. (*)

FAW, RICHARD EARL, Prof. of Nuclear Engineering; Dir. of Nuclear Reactor Facility (1962). BS 1959, U. of Cincinnati; PhD 1962, U. of Minnesota; Professional Engineer, 1970. (*)

FENTON, DONALD L., Assoc. Prof., Mechanical Engineering (1986). BS 1969, Kansas St. U.; MS 1970, PhD 1974, U. of Illinois.

FLINNER, ARTHUR ORAN, Prof. Emeritus of Mechanical Engineering (1929). BS 1929, MS 1934, Kansas St. U.; SM 1937, MIT; Professional Engineer, 1937.

FORSYTH, PENNY J., Temp. Instr. (1984). BS 1966, Michigan St. U.

FOWLER, EDDIE R., Assoc. Prof. of Electrical and Computer Engineering (1962). BS 1957, MS 1965, Kansas St. U.; PhD 1969, Oklahoma St. U. (*)

FUNK, KENT, Research Asst. of Agricultural Engineering (1985). BS 1984, Kansas St. U.

GALLAGHER, RICHARD RAY, Prof. of Electrical and Computer Engineering; Assoc., Inst. for Environmental Research (1968). BS 1964, MS 1966, PhD 1968, Iowa St. U. (*)

GLASGOW, LARRY A., Assoc. Prof. in Chemical Engineering (1978). BS 1972, MS 1974, PhD 1977, U. of Missouri at Columbia.

GODDARD, JAMES F., Assoc. Prof. of Architectural Engineering and Construction Science (1972). BSBC 1969, Kansas St. U.; MS 1972, U. of Florida.

GOODMAN, ALLAN P., Instr. in Architectural Engineering (1977). BArch 1967, Kansas St. U.; Registered Architect, Kansas, 1970.

GORDON, DWIGHT W., Instr., Electrical and Computer Engineering (1987). BS 1981, Susquehanna U.; MS 1982, Kansas St. U.

GORTON, ROBERT LESTER, Prof. of Mechanical Engineering; Assoc., Inst. for Environmental Research (1960). BS 1953, Louisiana Polytechnic Inst.; MS 1960, Louisiana St. U.; PhD 1966, Kansas St. U.; Professional Engineer, 1953. (*)

GOWDY, KENNETH K., Assoc. Dean and Prof. of Mechanical Engineering (1957). BS 1955, MS 1961, Kansas St. U.; PhD 1965, Oklahoma St. U.; Professional Engineer. (*)

GROSH, DORIS LLOYD, Prof. and Acting Head of Industrial Engineering (1965). BS 1946, U. of Chicago; MS 1949, PhD 1969, Kansas St. U. (*)

GROSH, LOUIS E., Prof. of Industrial Engineering (1965). BS 1944, Louisiana St. U.; BS 1947, MS 1949, PhD 1954, Purdue U. (*)

HAFT, EVERETT EUGENE, Prof. of Electrical and Computer Engineering (1961). BS 1947, MS 1951, PhD 1955, U. of Wisconsin; Professional Engineer in Wisconsin, 1952. (*)

HAGAN, ROBERT C., Adjunct Prof. in Nuclear Engineering (1978). BS 1962, U. of Kansas; MS 1970, PhD 1974, U. of Virginia.

HANSEN, CARL ULLMAN, Asst. Prof. Emeritus of Industrial Engineering (1957). BS 1936, Kansas St. U.; MS 1961, U. of Nebraska; Professional Engineer, 1961.

HAQUE, EKRAMUL, Asst. Prof. of Agricultural Engineering (1979). BS 1964, Bangladesh U. of Engineering and Technology; MS 1969, Purdue U.; PhD 1978, Kansas St. U. (*)

HARMS, BRIAN K., Asst. Prof. of Electrical and Computer Engineering (1985). BS 1980, MS 1981, PhD 1985, Kansas St. U. (*)

HARNER, JOSEPH P., Asst. Prof. of Agricultural Engineering (1983). BS 1979, MS 1981, PhD 1983, Virginia Poly. Inst. and St. U.

HAYTER, RICHARD B., Assoc. Prof.; Dir. of Kansas Industrial Extension Service; Dir. of Engineering Extension; Asst. Dir. of Cooperative Extension; Asst. Dir. of Energy Extension (1980). BS 1965, South Dakota St. U.; MS 1973, PhD 1975, Kansas St. U.

HEBER, ALBERT J., Assoc. Prof. of Agricultural Engineering (1984). BS 1978, MS 1979, South Dakota St. U.; PhD 1984, U. of Nebraska-Lincoln.

HELANDER, LINN, Prof. Emeritus of Mechanical Engineering (1935). BS 1915, U. of Illinois; Professional Engineer, 1941.

HIGHTOWER, RAY E., Asst. Prof. of Nuclear Engineering; Asst. Dean (1961). BS 1964, Kansas St. U.

HOBSON, LELAND STANFORD, Prof. Emeritus of Mechanical Engineering (1946). BS 1927, Kansas St. U.; Professional Engineer, 1946.

HODGES, TEDDY OMAR, Prof. of Architectural Engineering and Construction Science (1959). BS 1950, Texas A & M; MS 1951, Iowa St. U.; PhD 1959, Michigan St. U.; Professional Engineer in Iowa, 1952; Professional Engineer in Kansas, 1974. (*)

HOLMES, ELWYN SPRUIELL, Prof. Emeritus of Extension Agricultural Engineering (1966). BS 1943, MS 1953, Texas A & M.

HONSTEAD, WILLIAM HENRY, Prof. Emeritus of Chemical Engineering; Dir., Executive VP, Kansas St. U. Research Foundation (1943). BS 1939, MS 1946, Kansas St. U.; PhD 1956, Iowa St. U.; Professional Engineer, 1948. (*)

HOPPE, FREDERICK J., Assoc. Prof. of Engineering Technology (1984). BS 1950, U. of Washington; MS 1972, U. of Missouri, K.C.; Professional Engineer, 1963.

HU, KUO-KUANG, Prof. of Civil Engineering (1968). Graduation, 1956, Taiwan Provincial Taipei Inst. of Tech.; MS 1966, PhD 1969, Kansas St. U. (*)

HUANG, CHI-LUNG, Prof. of Mechanical Engineering (1964). BS 1954, National Taiwan U.; MS 1960, U. of Illinois; Doctor of Engineering 1964, Yale U. (*)

HUMMELS, DONALD RAY, Prof. and Head of Electrical and Computer Engineering (1970). BS 1967, MS 1968, PhD 1969, Arizona St. U. (*)

HUNT, ORVILLE DON, Prof. Emeritus of Electrical and Computer Engineering (1923). BS 1923, Washington St. U.; MS 1930, Kansas St. U.; Professional Engineer, 1947.

HWANG, CHING-LAI, Prof. of Industrial Engineering; Assoc., Inst. for Environmental Research (1964). BS 1953, National Taiwan U.; MS 1960, PhD 1962, Kansas St. U. (*)

JEPSEN, RICHARD LOUIS, Prof. Emeritus of Extension Agricultural Engineering (1963). BS 1950, MS 1963, Kansas St. U.; EEd 1974, North Carolina St. U.

JOHNSON, GARY LEE, Assoc. Prof. of Electrical and Computer Engineering (1966). BS 1961, MS 1963, Kansas St. U.; PhD 1966, Oklahoma St. U.; Professional Engineer, 1973. (*)

JOHNSON, WILLIAM H., Prof. Emeritus, Agricultural Engineering (1970). BS Agriculture, BS Agricultural Engineering 1948, MS 1953, Ohio St. U.; PhD 1960, Michigan St. U.; Professional Engineer in Ohio, 1970. (*)

JOHNSTON, KENNETH K., Instr. of Architectural Engineering, Construction Science (1983). BS 1961, Kansas St. U.

JONES, BYRON WAYNE, Assoc. Prof. of Mechanical Engineering; Dir., Inst. for Environmental Research (1978). BS 1971, Kansas St. U.; MS 1973, PhD 1975, Oklahoma St. U.; Professional Engineer, 1977. (*)

KIPP, JOHN EDWARD, Prof. of Mechanical Engineering; Assoc., Inst. for Environmental Research (1959). BS 1951, MS 1955, U. of Kansas; PhD 1968, Oklahoma St. U.; Professional Engineer, 1960. (*)

KIRMSE, PHILIP GEORGE, Prof. of Mathematics; Prof. of Engineering (1942). BS 1939, MS 1944, PhD 1958, U. of Minnesota; Professional Engineer, 1961. (*)

KNOSTMAN, HARRY DANIEL, Assoc. Prof. of Civil Engineering (1957). BS 1955, MS 1961, Kansas St. U.; PhD 1966, U. of Colorado; Professional Engineer, 1959. (*)

KOELLIKER, JAMES K., Prof. of Civil Engineering (1973). BS 1967, Kansas St. U.; MS 1969, PhD 1972, Iowa St. U.; Professional Engineer, 1972. (*)

KOEPSSEL, WELLINGTON WESLEY, Prof. Emeritus of Electrical and Computer Engineering (1964). BS 1944, MS 1951, U. of Texas; PhD 1960, Oklahoma St. U.; Professional Engineer in Texas, 1952; Professional Engineer in Kansas, 1974. (*)

KONZ, STEPHAN ANTHONY, Prof. of Industrial Engineering; Assoc., Inst. for Environmental Research (1964). BS 1956, MBA 1956, U. of Michigan; MS 1960, St. U. of Iowa; PhD 1964, U. of Illinois (*)

KRAMER, BRADLEY A., Asst. Prof. of Industrial Engineering (1985). BS 1980, MS 1981, PhD 1985, Kansas St. U.

KRISHNASWAMI, PRAKASH, Asst. Prof. of Mechanical Engineering (1984). BS 1978, Indian Inst. of Tech., Madras; MS 1979, St. U. of New York; PhD 1983, U. of Iowa.

KUHLMAN, DENNIS K., Assoc. Prof. of Extension Agricultural Engineering (1976). BS 1970, MS 1975, Kansas St. U.; Professional Engineer, 1981.

KYLE, BENJAMIN GAYLE, Prof. of Chemical Engineering (1958). BS 1950, Georgia Inst. of Tech.; MS 1955, PhD 1958, U. of Florida. (*)

LAI, FANG-SHYONG, Adjunct Assoc. Prof. of Chemical Engineering (1975). BS 1965, National Taiwan U.; MS 1966, U. of Notre Dame; PhD 1974, Kansas St. U. (*)

LAMB, ROBERT O., Asst. Prof., Civil Engineering (1986). BS 1966, U. of Wyoming; MS 1981, PhD 1985, Iowa St. U.; Professional Engineer, 1970.

LARSON, GEORGE HERBERT, Prof. Emeritus of Agricultural Engineering; Ag. Exp. Sta. (1939). BS 1939, MS 1940, Kansas St. U.; PhD 1955, Michigan St. U.; Professional Engineer, 1947.

LEAGUE, RICHARD, Research Assoc. of Mechanical Engineering (1985). BSME, AGE 1983, Kansas St. U.; MSME 1985, Virginia Poly. Tech.

LEE, E. STANLEY, Prof. of Industrial Engineering (1966). BS 1953, Ordnance Engineering Col., China; MS 1957, North Carolina St. Col.; PhD 1962, Princeton U. (*)

LENHERT, DONALD HOWARD, Prof. of Electrical and Computer Engineering (1966). BS 1956, Kansas St. U.; MS 1958, Syracuse U.; PhD 1966, U. of New Mexico; Professional Engineer, 1973. (*)

LIN, ALBERT N., Asst. Prof. of Civil Engineering (1984). BS 1978, U. of Missouri; MS 1979, PhD 1982, California Inst. of Tech.; Professional Engineer, 1986. (*)

LINDHOLM, JOHN C., Prof. of Mechanical Engineering (1960). BS 1949, Kansas St. U.; MS 1957, U. of Kansas; PhD 1961, Purdue U.; Professional Engineer, 1954. (*)

LINDLY, EDWIN CURGUS, Prof. of Civil Engineering and Architectural Engineering (1949). BS 1942, Oklahoma St. U.; MS 1949, Purdue U.; MS 1957, Kansas St. U.; PhD 1964, Iowa St. U.; Professional Engineer, 1950. (*)

LIPPER, RALPH IDEN, Prof. Emeritus of Agricultural Engineering; Ag. Exp. Sta. (1964). BS 1941, MS 1950, Kansas St. U.; Professional Engineer, 1953.

LOONEY, MICHAEL C., Instr.; Video Specialist (1983). AA 1976, Dodge City Comm. Col.

LUCAS, MICHAEL S. P., Prof. of Electrical and Computer Engineering (1968). MS 1962, PhD 1964, Duke U. (*)

MANGES, HARRY LEO, Prof. of Agricultural Engineering; Ag. Exp. Sta. (1956). BS 1949, MS 1959, Kansas St. U.; PhD 1969, Oklahoma St. U.; Professional Engineer, 1960. (*)

MANINGAT, JOSEPHINE I., Temp. Instr., Industrial Engineering (1987). BS 1976, Adamson U.; MS 1981, DeLasalle U.; MS 1985, Kansas St. U.

MATHEWS, ALEXANDER P., Assoc. Prof. of Civil Engineering (1979). BS 1966, U. of Madras-India; MS 1968, U. of Rhode Island, Kingston; PhD 1975, U. of Michigan, Ann Arbor; Professional Engineer, 1977.

MATTHEWS, JOHN CARTER, Prof. of Chemical Engineering (1962). BS 1959, DSc 1965, Washington U. (*)

MAYO, MICHAEL G., Instr. in Architectural Engineering and Construction Science (1981). BArch 1977, MBA 1979, Kansas St. U.; Registered Architect, 1980.

McCAHON, CYNTHIA S., Instr. of Industrial Engineering (1985). BS 1978, Purdue; MSIE 1980, Kansas St. U.

McCORMICK, FRANK JAMES, Prof. Emeritus of Civil Engineering (1939). BS 1927, MS 1931, Iowa St. U.; Professional Engineer, 1944.

McCRIGHT, PAUL R., Asst. Prof., Industrial Engineering (1987). BS 1971, Texas Tech. U.; MS 1973, Arizona St. U.; PhD 1987, Stanford U.

MERKLIN, JOSEPH FREDERICK, Prof. of Nuclear Engineering (1967). BS 1957, Manhattan Col. of New York; PhD 1963, U. of Minnesota. (*)

MESSENHEIMER, ALVA ERNEST, Assoc. Prof. Emeritus of Mechanical Engineering (1942). BS 1924, Kansas St. U.; Professional Engineer, 1948.

MILLER, PAUL LEROY, Prof., Mechanical Engineering; Assoc., Inst. for Environmental Research (1958). BS 1957, MS 1961, Kansas St. U.; PhD 1966, Oklahoma St. U.; Professional Engineer, 1962. (*)

MINGLE, JOHN O., Prof. of Nuclear Engineering and Exec. VP, KSU Research Foundation (1960). BS 1953, MS 1958, Kansas St. U.; PhD 1960, Northwestern U.; JD Law 1980, Washburn U. (*)

MORCOS, MEDHAT M., Asst. Prof., Electrical and Computer Engineering (1986). BS 1966, MS 1978, Cairo U.; PhD 1984, U. of Waterloo.

MORSE, REED FRANKLIN, Prof. Emeritus of Civil Engineering (1923). BA 1921, Cornell Col.; BS 1923, Iowa St. U.; MS 1933, Kansas St. U.; PhD 1941, Cornell U.; Professional Engineer, 1939.

MUNGER, HAROLD HAWLEY, Assoc. Prof. Emeritus of Applied Mechanics (1939). BS 1939, MS 1941, Kansas St. U.; Professional Engineer, 1941.

MURPHY, JAMES PATRICK, Assoc. Prof. of Extension Agricultural Engineering, State Leader (1979). BS 1968, MS 1970, Kansas St. U.; Professional Engineer, 1972.

NESMITH, DWIGHT ALVIN, Assoc. Prof. Emeritus of Mechanical Engineering (1948). BS 1948, Northwestern U.; MS 1952, Kansas St. U.; Professional Engineer, 1962.

OARD, DARRELL L., Research Asst. of Agricultural Engineering (1972). BS 1968, Emporia St. U.

PACEY, DAVID A., Asst. Prof. of Engineering Technology (1978). BS 1974, MS 1979, Kansas St. U.; Professional Engineer, 1981.

PAHWA, ANIL, Asst. Prof. of Electrical and Computer Engineering (1983). BS 1975, Birla Inst. of Tech.; MS 1979, U. of Maine; PhD 1983, Texas A & M. (*)

PAULI, ROSS IRWIN, Asst. Prof. Emeritus of Mechanical Engineering (1947). BA 1941, Westmar Col.; MS 1947, Pittsburg St. U.

PETERSON, DAVID W., Instr., Architectural Engineering and Construction Science (1987). BS 1981, U. of Wyoming.

POWELL, G. MORGAN, Assoc. Prof., Natural Resource Engineer, Extension Agricultural Engineering (1977). BS 1965, Kansas St. U.; MS 1967, U. of Missouri; PhD 1973, Utah St. U.

RATHBONE, DONALD E., Dean; Prof. of Electrical and Computer Engineering (1973). BS 1951, Purdue U.; MS 1956, Northwestern U.; PhD 1962, U. of Pittsburgh; Professional Engineer. (*)

ROBINSON, M. JOHN, Adjunct Prof. in Nuclear Engineering (1978). BS 1960, MS 1962, PhD 1965, U. of Michigan.

RUSSELL, EUGENE R., Prof. of Civil Engineering (1974). BSCE 1958, U. of Missouri, Rolla; MS 1965, Iowa St. U.; PhD 1974, Purdue U.; Professional Engineer, 1962. (*)

RYS, ANDRZEJ, Asst. Prof. of Electrical and Computer Engineering (1983). BS 1976, MS 1978, Technical U. of Wroclan, Poland; PhD 1983, Texas Tech. U. (*)

SCHLUP, JOHN R., Asst. Prof. of Chemical Engineering (1983). BS 1975, Kansas St. U.; PhD 1981, California Inst. of Tech.

SCHROCK, MARK DAVID, Asst. Prof. of Agricultural Engineering (1973). BS 1969, Kansas St. U.; MS 1971, U. of Illinois; PhD 1978, Kansas St. U. (*)

SHULTIS, J. KENNETH, Prof. of Nuclear Engineering (1969). BASc 1964, U. of Toronto; MS 1965, PhD 1968, U. of Michigan (*)

SIMONS, GALE G., Prof. of Nuclear Engineering; Dir. of Neutron Activation Analysis Lab (1977). BS 1962, MS 1965, PhD 1969, Kansas St. U. (*)

SLOCOMBE JOHN W., Asst. Prof. of Agricultural Engineering (1985). BS 1977, MS 1979, Kansas St. U.; PhD 1981, Iowa St. U.

SMITH, BOB LEE, Prof. of Civil Engineering (1948). BS 1948, MS 1953, Kansas St. U.; PhD 1963, Purdue U.; Professional Engineer, 1953. (*)

SNELL, ROBERT ROSS, Prof. and Head, Civil Engineering (1957). BS 1954, MS 1960, Kansas St. U.; PhD 1963, Purdue U.; Professional Engineer, 1959. (*)

SPILLMAN, CHARLES KENNARD, Prof. of Agricultural Engineering; Ag. Exp. Sta. (1969). AS 1958, Vincennes U.; BS 1960, MS 1963, U. of Illinois; PhD 1968, Purdue U. (*)

STEICHEN, JAMES M., Assoc. Prof. of Agricultural Engineering; Ag. Exp. Sta. (1978). BS 1970, PhD 1974, Oklahoma St. U.; Professional Engineer. (*)

STEVENSON, PAUL NELSON, Assoc. Prof. Emeritus of Agricultural Engineering (1957). BS 1948, U. of Missouri; MS 1957, Iowa St. U.

SWARTZ, STUART ENDSLEY, Prof. of Civil Engineering (1968). BS 1959, MS 1962, PhD 1968, Illinois Inst. of Tech.; Professional Engineer, 1970. (*)

SWENSON, DANIEL V., Asst. Prof. of Mechanical Engineering (1986). BS 1972, Kansas St. U.; MS 1978, Carnegie-Mellon U.; PhD 1986, Cornell U.

TENEYCK, GEORGE ROBERT, Assoc. Prof. of Agricultural Engineering; Superintendent, Sandyland Experiment Field (1964). BS 1951, MS 1970, Kansas St. U.

THIERSTEIN, GERALD, Assoc. Prof. of Agricultural Engineering (1984). BS 1957, MS 1963, Kansas St. U.

THOMPSON, J. GARTH, Prof. of Mechanical Engineering (1971). BS 1960, Brigham Young U.; MS 1962, PhD 1967, Purdue U. (*)

THORSON, I. EUGENE, Prof. Emeritus of Architectural Engineering and Construction Science (1948). BS 1940, U. of Washington; Professional Engineer 1948, Washington and Kansas.

TILLMAN, FRANK AUBREY, Prof. of Industrial Engineering; Assoc. Dir., Inst. for Systems Design and Optimization (1965). BS 1960, MS 1961, U. of Missouri; PhD 1965, St. U. of Iowa. (*)

TURNQUIST, RALPH OTTO, Prof. of Mechanical Engineering (1959). BS 1952, MS 1961, Kansas St. U.; PhD 1965, Case Inst. of Tech. (*)

WAKABAYASHI, ISAAC, Instr. in Electrical and Computer Engineering (1955). BS 1954, U. of California.

WALAWENDER, WALTER P., Prof. of Chemical Engineering (1969). BA 1963, Utica Col. of Syracuse U.; MS 1967, PhD 1969, Syracuse U. (*)

WALKER, HUGH SANDERS, Prof. of Mechanical Engineering; Assoc. Dir., Inst. for Computational Research in Engineering (1964). BS 1957, MS 1960, Louisiana St. U.; PhD 1965, Kansas St. U.; Professional Engineer, Louisiana 1958, Kansas 1975. (*)

WARD, JOSEPH EVANS, JR., Prof. Emeritus of Electrical and Computer Engineering (1940). BS 1937, The U. of Texas; MS 1940, U. of Illinois; Professional Engineer, 1948.

WATERS, CLARENCE E., Instr., Architectural Engineering and Construction Science (1986). BS 1978, Kansas St. U.

WENDLING, LEO THEODORE, Prof. Emeritus of Extension Agricultural Engineering (1947). State Leader 1969; BS 1947, MS 1956, Kansas St. U.

WHITE, WARREN N., JR., Asst. Prof. of Mechanical Engineering (1985). BS 1974, Tulane U.; MS 1977, Rensselaer U.; PhD 1985, Tulane U.

WILLEMS, A. E., Assoc. Prof. of Industrial Engineering (1979). BS 1950, McPherson Col.; MS 1962, Kansas St. U.; EdD 1970, Utah St. U.

WILLIAMS, WAYNE WATSON, Prof. of Civil Engineering (1965). BS 1951, MS 1953, Iowa St. U.; Professional Engineer. (*)

WILSON, C. CARL, Assoc. Prof. of Industrial Engineering (1977). BS 1959, U. of Toronto; MS 1962, 1965, U. of Michigan; Professional Engineer, 1960, Toronto.

WOOD, JOE NATE, Prof. Emeritus of Mechanical Engineering (1936). BS 1936, St. U. of Iowa; Professional Engineer, 1948.

YOUNG, STEVEN C., Asst. Prof. of Agricultural Engineering (1985). BS 1977, Clemson U.; MS 1981, Auburn U.

Human Ecology

Barbara S. Stowe, Dean
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 Jean Sego, Assistant to the Dean for
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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 which enhance human productivity and well-being.

Professional objectives are met through programs in four departments: Clothing, Textiles, and Interior Design; Foods and Nutrition; Hotel, Restaurant, Institution Management and Dietetics; and Human Development and Family Studies. Students may also enroll in general human ecology programs which prepare them for careers in cooperative extension, home economics education, or mass communications.

The bachelor of science degree is offered in each area of specialization and in general human ecology. The master of science degree is offered by each department. Two doctoral programs lead to the Ph.D.

The College of Human Ecology offers activities and experiences which enhance professional study. These include field study (see department descriptions, below), participation in professional organizations and activities, and career placement.

All programs of study are accredited by professional agencies.

Degree programs

All undergraduate programs of study lead to a bachelor of science degree. The programs are listed on the chart and described on the following pages.

Entering students who are undecided about a specific major may enroll in general human ecology. (See option I under the General Human Ecology Program.) The program provides an opportunity for students to consider the many alternatives available before they choose a college major. Students who enroll in general human ecology will work with special advisors to select courses that will enable them ultimately to enter the degree program of their choice.

General Requirements

Bachelor of science degree requirements

Each degree offered by the College of Human Ecology includes a minimum of 35 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 125-131 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 physical education; an area of specialization, in a specific field of human ecology; supporting courses; at least six 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 KSU departments.

Basic curriculum requirements are listed below. See specific program descriptions for details.

General education courses (35 hours minimum)

Communications (8-9)		
ENGL 100	English Composition I	3
ENGL 120	English Composition II	3
SPCH 105	Public Speaking IA	2
or		
SPCH 106	Public Speaking I	3
Social science (6)		
ECON 110	Economics I	3
PSYCH 110	General Psychology	3
Quantitative studies (6-7)		
MATH 100	College Algebra	3
Statistics; CMPSC 110 or computer science at 200 level or above, or HDFS 320 or math course(s) with college math pr.		
		3-4
PE 101	Concepts in Physical Education	1

Additional requirements (18-39 hours)

Five areas of humanities, social sciences, biological sciences, physical sciences, and quantitative studies shall be represented in general education and/or supporting courses. (One area, not represented in supporting courses, shall include 8 to 12 credit hours, with two courses in sequence, plus one additional course.)

(See specific option/program.)

Human ecology courses

At least six hours representing two different areas in the College of Human Ecology, outside the professional area as defined by the degree program.* Areas shall be differentiated by course number alpha prefixes. (see specific option/program).

Professional and supporting courses (46-86 hours)

(See specific option/program.)

*This does not apply to B.S. in human ecology or B.S. in human ecology and mass communications, or B.S. in vocational home economics education since the professional areas contain courses from at least three departments.

Unrestricted electives (0-22 hours)
 (See specific option/program.)

Total hours for graduation 125-131

Transfer programs

Careful planning enables a student to transfer courses from another college or university which will apply toward specific degree requirements at KSU. A student who plans to transfer should contact the College of Human Ecology Dean's Office to verify the transferability of courses as soon as possible.

Beginning work in apparel design, dietetics, and interior design at Emporia State University has been designed to articulate with the degree programs at Kansas State University.

The courses listed below may be transferred to the College of Human Ecology, although not all courses are required for every major. A list of required courses for each major is available from the college dean's office.

Courses required in all human ecology majors:	Credit hours*
English composition	6
Public Speaking	2-3
General psychology	3
Macroeconomics	3
College Algebra or higher level math (see specific program)	3
Transferable courses; some may apply as electives if not required for specific major:	
American government or political science	3-6
Sociology	3-6
Civilization or world history	3-6
Approved literature or modern language	6
Design I	2
Drawing I	2
College algebra	3
General chemistry	5
Organic chemistry	5
Biology (with lab)	4
Human growth and development (life span)**	3
Food preparation and meal management	4-6
Nutrition***	3
Socio-economics of clothing or Clothing and Society	3
Clothing construction	3
Family relations****	3
Child development****	3
Textiles (with lab)****	3

*Credit hours given above apply to courses at KSU. 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 131 hours are required for graduation from the KSU 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 230 after transferring to KSU.

***Students planning for degrees in foods and nutrition, dietetics, or home economics education should take FN 502, Principles of Nutrition, after transferring to KSU.

****Must be offered through a human ecology/home economics department for students majoring in vocational home economics education.

Programs/majors	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
Consumer affairs	Bachelor of science in consumer and family economics	Human development and family studies
Dietetics Coordinated undergraduate 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 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 and industry	Bachelor of science in food science and industry	Foods and nutrition and the College of Agriculture
Food science	Bachelor of science in foods and nutrition	Foods and nutrition
General human ecology	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
Housing and equipment	Bachelor of science in consumer and family economics	Clothing, textiles, and interior design
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
Vocational home economics education	Bachelor of science in vocational home economics education	General human ecology

*Dual degrees are awarded through the College of Arts and Sciences.

Program Options

Honors programs

Undergraduate. 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 their individual programs of study which include honors courses, seminars, and independent study.

Dual degree programs

Kansas State University. Students interested in combining two degree programs must complete a minimum 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. Contact the dean's office for more information.

The College of Human Ecology participates in the intercollegiate programs in women's studies and gerontology, described elsewhere in this catalog under Intercollegiate Programs.

Kansas independent colleges. The College of Human Ecology cooperates with Kansas independent colleges in a unique program which allows students to prepare for human ecology/home economics-related professions in the United States and abroad. A student entering the program will complete the first two or two and one-half years at a cooperating independent college and a minimum of two semesters of intensive human ecology study at Kansas State University. The student will then return to the independent college for the final semester. The student completing this program will receive a B.A. degree in liberal arts from the independent college

and a B.S. degree from the College of Human Ecology at Kansas State University.

Graduate study

Excellent opportunities for graduate study are available for the student who wishes to continue beyond the bachelor of science degree. All departments in the College of Human Ecology, as well as home economics education, offer the master of science degree. Two doctoral degree programs are available: the Ph.D. in foods and nutrition; and the Ph.D. in human ecology, an interdepartmental degree with areas of emphasis in textiles and apparel, marriage and family therapy, family life education and consultation, life span human development, or institution management.

Graduate research and teaching assistantships are available to qualified students. Application forms and additional information can be obtained from the dean, College of Human Ecology, 119 Justin Hall, Manhattan, Kansas 66506.

Placement

The College of Human Ecology cooperates with the Career Planning and Placement Center to help students locate employment opportunities in their chosen fields.

Field study opportunities

Each department in the College of Human Ecology 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 provide guidance and supervision during the field experience. The length of time devoted to a field study experience varies from one or two weeks to a complete semester. Some programs provide students with a salary while completing field experiences.

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
Apparel Design Collective
Family Economics
Foods and Nutrition
Home Economics Education
Human Ecology Association
KSU Hospitality Management Society
KSU Student Chapter of the American
Association of Textile Chemists and
Colorists
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 KSU Student Human Ecology Association, an affiliate of the American Home Economics Association, is open to all students in the College of Human Ecology.

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 honor societies, Phi Upsilon Omicron and Omicron Nu.

The Family Center

Stephan Bollman, Director

The Family Center provides applied educational experiences for graduate and undergraduate students of the College of Human Ecology while offering educational outreach programs for individuals and families of Kansas.

The center is supported by departments within the college and offers educational programs and consultation 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, parent education, family financial counseling, and nutritional education and consultation.

Located north of Justin Hall, the center is easily available to the students, faculty, and community.

Clothing, Textiles, and Interior Design

Mary Don Peterson, Head

Professors Burke and Reagan;* Associate Professors Boschetti, McCullough,* and Peterson;* Assistant Professors Annis,* Corbin, Deegan,* Huck, Minshall, Munson,* and Villasi;* Instructors Cannon, Eldringhoff, McComas, and Rueschhoff; Emeriti: Professors Brockman,* Slinkman, and Tucker; Associate Professors Agan,* Hill,* H. Howe,* J. Howe, and Lienkaemper;* 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.

Undergraduate study

Programs leading to a bachelor of science degree are: apparel and textile marketing, apparel design, housing and equipment, interior design, and textiles. Students are encouraged to participate in field experiences to further understanding of their chosen profession.

Facilities include well equipped studios and laboratories for interior design, housing, household equipment, apparel design and construction, and textile analysis. An extensive historic textile 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 production and design centers across the country. Student chapters of two professional organizations, the American Society of Interior Designers (ASID) and the American Association of Textile Chemists and Colorists (AATCC), offer students opportunities for leadership and involvement.

Graduate study

Programs leading to the master of science degree are offered in functional and protective apparel, apparel and textile marketing, historic textiles and costume, interior design, preservation of historic interiors, social/psychological aspects of clothing, textile conservation, and textile science. Individual programs of study are planned to meet the personal and professional needs of each student.

The Department of Clothing, Textiles, and Interior Design participates in the graduate program for the Ph.D. in human ecology with a specialization in textiles and apparel.

Undergraduate programs

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 (41-47 hours)

ENGL 100	English Composition I	3
ENGL 120	English Composition II	3
SPCH 105	Public Speaking IA	2
	or	
SPCH 106	Public Speaking I	3
ECON 110	Economics I	3
PSYCH 110	General Psychology	3
SOCIO 211	Introduction to Sociology	3
ECON 120	Economics II	3

Approved economics course at 500 level or above . . .	3
(if STAT 350 and 351 are not taken)	
HIST 102 Western Civilization: The Modern Era	3
Biological science elective	3-4
CHM 110 General Chemistry	5
STAT 350 Business and Economics Statistics I and	3
STAT 351 Business and Economics Statistics II	3
(if approved economics course at 500 level or above is not taken)	
MATH 100 College Algebra	3
CMPSC 200 Fundamentals of Computer Programming and	2
CMPSC 206 BASIC Language Lab	2
or	
CMPSC 110 Introduction to Personal Computers	3
or	
HDFS 320 Microcomputers in Human Services and the Home	3
PE 101 Concepts in Physical Education	1
Professional courses (44-45 hours)	
CT 330 Clothing and Society	3
CT 4-- Clothing or textile elective	3
CT 150 Principles of Clothing Construction	3
ID 240 Interior Design Studio I	3
or	
CT 220 Fundamentals of Apparel Design and Production	3
CT 230 Apparel and Textile Marketing	3
CT 260 Textiles	3
CT 395 Visual Merchandising	3
CT 430 Professional Development of Apparel and Textile Marketing	1
CT 450 Apparel and Textile Marketing Field Experience	5
or	
MKTG 541 Retailing	3
and	
MKTG 542 Sales Management	3
CT 435 Apparel and Textile Promotion	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 650 Clothing and Textile Study Tour	1
Supporting courses (26 hours)	
HDFS 230 Introduction to Human Development	3
FEC 400 Family Economics	3
ART 100 Design I	2
ACCTG 211 Financial Accounting	3
MANGT 420 Management Concepts	3
MKTG 400 Marketing	3
MANGT 531 Personnel and Wage Administration	3
or	
PSYCH 560 Industrial Psychology	3
JMC 320 Principles of Advertising	3
or	
JMC 512 Introduction to Public Relations	3
MKTG 450 Consumer Behavior	3
or	
PSYCH 545 Consumer Psychology	3
Unrestricted electives	7-14
Total for graduation	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 (44-47 hours)

ENGL 100	English Composition I	3
ENGL 120	English Composition II	3
SPCH 105	Public Speaking IA	2
or		
SPCH 106	Public Speaking I	3
ECON 110	Economics I	3
ECON 120	Economics II	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 and	3
PHYS 103	The Physical World I Lab	1
or		
CHM 110	General Chemistry	5
MATH 100	College Algebra	3
CMPSC 200	Fundamentals of Computer Programming	2
CMPSC 206	BASIC Language Lab	2
PE 101	Concepts in Physical Education	1
Professional courses (62 hours)		
CT 330	Clothing and Society	3
CT 150	Principles of Clothing Construction	3
CT 220	Fundamentals of Apparel Design and Production	3
CT 230	Apparel and Textile Marketing	3
CT 260	Textiles	3
CT 300	Advanced Clothing Construction	3
CT 315	Fashion Drawing and Illustration	3
CT 400	Tailoring	3
CT 410	Theory of Pattern Design I	3
CT 420	Design by Draping	3
CT 485	Problems in Apparel Design	1
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 740	Historic Fabric Design	3
ART 100	Design I	2
ART 190	Drawing I	2
ART 200	Design II	2
ART 210	Drawing II	2
ART 225	Figure Drawing I	2

Supporting courses (15 hours)

Take two from the following courses:

HDFS 230	Introduction to Human Development	3
or		
HDFS 350	Family Relationships and Sex Roles	3
FEC 400	Family Economics	3
FN 132	Basic Nutrition	3
or		
FN 133	Food for Man	3
Take a minimum of nine hours 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 420	Management Concepts	3
MANGT 530	Industrial and Labor Relations	3
MANGT 630	Labor Relations Law	3
MKTG 400	Marketing	3
MKTG 450	Consumer Behavior	3

PSYCH 560	Industrial Psychology	3
Unrestricted electives		4-7
Total for graduation		128

Housing and equipment

Bachelor of science in consumer and family economics

In the housing and equipment program, students elect the professional specialization which best suits their interests and needs. Specializations include community planning, housing counseling, real estate, house planning, and kitchen design.

General education courses (37-38 hours)

ENGL 100	English Composition I	3
ENGL 120	English Composition II	3
SPCH 105	Public Speaking IA	2
or		
SPCH 106	Public Speaking I	3
ECON 110	Economics I	3
PSYCH 110	General Psychology	3
BIOL 198	Principles of Biology	4
MATH 100	College Algebra	3
STAT 320	Elements of Statistics	3
Humanities electives		3

Students concentrating in housing are required to take:

POLSC 520	State and Local Government	3
SOCIO 211	Introduction to Sociology	3
SOCIO 530	Population and Human Ecology	3

Students concentrating in household equipment are required to take:

CHM 110	General Chemistry	5
PHYS 115	Descriptive Physics	4
PE 101	Concepts in Physical Education	1

Human Ecology (12 hours)

CT 330	Clothing and Society	3
or		
ID 101	Design for Contemporary Living	3
FEC 400	Family Economics	3
FN 132	Basic Nutrition	3
or		
FN 133	Food for Man	3
or		
FN 502	Principles of Nutrition	3
HDFS 230	Introduction to Human Development	3
or		
HDFS 350	Family Relationships and Sex Roles	3

Professional and supporting courses (40-42)

FEC 405	Personal and Family Finance	3
FEC 420	Housing	3
FEC 440	Home Appliance Design and Evaluation	3
FEC 460	Family Resource Management Theory and Application	3
FEC 660	Kitchen and Utility Area Planning	3
FEC 700	Families in the American Economy	3
or		
FEC 605	Consumers and the Market	3
HDFS 350	Family Relationships and Sex Roles (if not taken previously)	3
or		
HDFS 650	The Family	3

Professional courses for household equipment or housing* 19-21

Students concentrating in household equipment are required to take:

BIOL 220	Bacteriology and Man	3
CT 260	Textiles	3
FEC 650	Consumer Product Safety	3
FEC 740	Advanced Household Equipment	3
FN 300	Food Preparation and Meal Management	4

JMC 275	News and Feature Writing	3
Students concentrating in housing are required to take:		
FEC 415	Consumer Law	3
FEC 625	Consumer and Energy Issues in Housing	3
FEC 700	Families in the American Economy**	3
or		
FEC 605	Consumers and the Market**	3
FEC 720	Housing Requirements of Families	3
PLAN 315	Introduction to Planning	3
PLAN 750	Housing Programs and Policies	3
SOCIO 531	Urban Sociology	3
Professional electives		18*
Unrestricted electives		15-18
Total hours for graduation		125

*Selected in consultation with faculty advisor.

**If not taken as a supporting course.

Interior design

Bachelor of science in interior design

The interior design program provides students with the technical skills necessary to translate a design concept into three-dimensional reality. Special emphasis is placed on the design of total space to meet human needs. Considerations include space planning, selection and specification of interior materials, environmental systems (i.e., lighting, heating, cooling, ventilation, and plumbing), structural components of buildings, and the creation of working, specification, and bid/construction documents. Students also study the history of interior design, communication and public relations, and business. Supervised field experiences are encouraged. The interior design program is accredited by FIDER (Foundation for Interior Designer Education and Research).

General education courses (40-43 hours)

ENGL 100	English Composition I	3
ENGL 120	English Composition II	3
SPCH 105	Public Speaking IA	2
or		
SPCH 106	Public Speaking I	3
ECON 110	Economics I	3
PSYCH 110	General Psychology	3
Social science elective		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
Physical science elective		3-4
MATH 100	College Algebra	3
CMPSC 200	Fundamentals of Computer Programming	2
CMPSC 20-	Computer Language Lab	2
PE 101	Concepts in Physical Education	1

Professional courses (55-57 hours)

ID 240	Interior Design Studio I	3
ID 260	Interior Design Graphics	3
ID 320	History of Interior Design I	3
ID 340	Interior Design Studio II	3
ID 360	History of Interior Design II	3
ID 435	Interior Design Systems	3
ID 440	Interior Design Studio III	3
ID 460	Interior Design Practices and Procedures	3
ID 540	Interior Design Studio IV	3
ID 640	Interior Design Studio V	3
ID 650	Contemporary Homes	3

ID 740	Historic Fabric Design	3
or		
ID 760	Historic Preservation	3
ID 751	Designing for Exceptional Needs ...	3
ID 780	Interior Design Seminar	2
ART 100	Design I	2
ART 190	Drawing I	2
ART 200	Design II	2
Take two art courses from the following list:		
ART 230	Sculpture I	2
ART 260	Design in the Crafts	2
ART 265	Ceramics I	2
ART 270	Metalsmithing and Jewelry	2
ART 275	Weaving	2

Take two art courses from the following list:

ART 205	Graphic Design Techniques	2
ART 215	Design III	2
ART 220	Watercolor I	2
ART 245	Painting I	2
ART 565	Ceramics II	3
ART 620	Watercolor II	3
ART 645	Sculpture II	3

Supporting courses (29 hours)

HDFS ---	Human development and family studies	3
FEC 660	Kitchen and Utility Area Planning	3
or		
FEC ---	Family economics elective	3
CT 260	Textiles	3
ARCH 301	Appreciation of Architecture	3

Take 11 hours from the following list:

LAR 204	Landscape Architecture Delineation Techniques	2
ID 600	Interior Design Field Experience ...	4
CT 395	Visual Merchandising	3
HORT 325	Indoor Plants and Flowers	2
ENDV 220	Theory of Environmental Design I ..	2
ENDV 651	Preservation Principles and Methods	3
PLAN 630	Computer Application in Planning and Design	1-3

Take two courses from the following list:

ACCTG 211	Financial Accounting	3
FINAN 552	Real Estate	3
MKTG 400	Marketing	3
MKTG 450	Consumer Behavior	3
MKTG 541	Retailing	3
JMC 512	Introduction to Public Relations ...	3

Unrestricted electives

Total for graduation

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	English Composition I	3
ENGL 120	English Composition II	3
SPCH 105	Public Speaking IA	2
or		
SPCH 106	Public Speaking I	3
ECON 110	Economics I	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 and	4
CHM 230	Chemistry II and	4
CHM 271	Chemical Analysis	4
or		
CHM 220	Chemical Principles I and	5
CHM 250	Chemical Principles II	5
CMPSC 200	Fundamentals of Computer Programming	2
CMPSC 20-	Computer Language Lab	2
STAT 320	Elements of Statistics	3
PE 101	Concepts in Physical Education	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 746	Textile Dyeing and Printing	4
CT 747	Textile Finishes	3
CT 756	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 350	General Organic Chemistry and ...	3
CHM 351	General Organic Chemistry Lab ...	2

or		
CHM 531	Organic Chemistry I and	3
CHM 532	Organic Chemistry Lab	2

Supporting courses (28 hours)

FN 132	Basic Nutrition	3
FEC 400	Family Economics	3
CT 330	Clothing and Society	3
MATH 100	College Algebra	3

or

MATH ---	200 level or above	3
PHYS 115	Descriptive Physics	4
ID 740	Historic Fabric Design	3

Take three courses from the College of Business Administration

Unrestricted electives

Total for graduation

Program II: Textile Chemistry

Professional Courses (41-43 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 756	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
FEC 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		9-15
Total for graduation		125

Courses in clothing and textiles

Undergraduate credit

CT 150. Principles of Clothing Construction. (3) I, II. Clothing selection; pattern alteration and fitting techniques; construction methods as applied to woven and knitted fabrics. Six hours lab a week. CT-150-1-1303

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-220-0-1303

CT 230. Apparel and Textile Marketing. (3) II. Overview of the processes involved in the marketing of fashion goods. CT-230-0-1303

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-260-1-1303

CT 300. Advanced Clothing Construction. (3) II. Advanced techniques and experimentation with diverse fabrics; construction of a couture garment; principles of constructing men's wear. Six hours lab a week. Pr.: CT 150; and CT 260 or conc. enrollment. CT-300-1-1303

CT 315. Fashion Drawing and Illustration. (3) I. In-depth study of the fashion figure and fashion drawing; fundamental fashion layout; development and organization of a design portfolio. Six hours lab a week. Pr.: ART 225 or conc. enrollment; and CT 220. CT-315-1-1303

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-330-0-1303

CT 350. Fiber Science. (3) II. Introduction to structures and properties of fibers, including polymer science. Pr.: MATH 100 and CHM 350. CT-350-0-1303

CT 395. Visual Merchandising. (3) I, II. Basic principles and techniques of merchandising display; experience through cooperation with retail stores. Pr.: ART 100. CT-395-1-1303

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-400-1-1303

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 150. CT-410-1-1303

CT 420. Design by Draping. (3) I. Principles and techniques of design by draping in muslin and fashion fabric. Six hours lab a week. Pr.: CT 300 and CT 410. CT-420-1-1303

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-430-0-1303

CT 435. Apparel and Textile Promotion. (3) II. Promotion of fashion merchandise including advertising, display, special events, and public relations. Pr.: CT 230; CT 395; and JMC 320 or JMC 515. CT-435-0-1303

CT 450. Apparel and Textile Marketing Field Experience. (5) I. Supervised work experience in a retail establishment. Pr.: CT 230, CT 430, ACCTG 211, junior or senior in CT option, 2.0 cumulative GPA, and 2.0 GPA in professional courses. CT-450-2-1303

CT 485. Problems in Apparel Design. (Var.) I, II, S. Independent study. Pr.: Consent of instructor. CT-485-3-1303

CT 499. Problems in Clothing and Textiles. (Var.) I, II, S. Independent study. Pr.: Consent of instructor. CT-499-3-1303

Undergraduate and graduate credit in minor field

CT 500. Intermediate Apparel Design. (3) I. 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. Study and application of computer-aided apparel design. Six hours lab a week. Pr.: ART 200, CT 315, 420, 515; CMPSC 200, 206. CT-500-1-1303

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-515-1-1303

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-525-1-1303

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-536-0-1303

CT 540. Advanced Apparel Design. (3) II. Analysis of high fashion from origin of the haute couture to contemporary designers; use of inspiration sources for executing original design solutions; final presentation of design portfolio; advanced study of computer-aided design software as it relates to apparel design. Six hours lab a week. Pr.: CT 500. CT-540-1-1303

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-545-0-1303

CT 570. Textiles for Merchandising. (3) I. Properties of fibers, yarns, fabrics, finishes, and dyes; emphasis on end-use performance of textiles. Pr.: CT 260. CT-570-1-1303

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-600-1-1303

CT 620. Textile Yarn and Fabrics. (3) II. Technological, structural, and functional aspects of yarns and fabrics. Pr.: CT 260. CT-620-0-1303

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 ART 196; or HIST 101. CT-630-0-1303

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-631-0-1303

CT 650. Clothing and Textiles Study Tour. (1-2) Alternate II, S. Supervised off-campus tour of facilities where textile products are designed, manufactured, tested, marketed, exhibited, and/or conserved. Pr.: CT 260 and six hours clothing and textiles. CT-650-2-1303

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 CT 420. CT-710-1-1303

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-715-1-1303

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.: CHEM 110, 190; and CT 620 or ID 680. CT-730-1-1303

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-741-0-1303

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 191 or CHM 351. CT-742-0-1303

CT 743. Textile Yarns. (3) I, in alternate years. Structure and performance of multifilament, spun, simple, and complex yarns. Pr.: CT 260; CHM 190 or CHM 350; and junior standing. CT-743-0-1303

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 four hours lab a week. Pr.: CT 742. CT-746-1-1301

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 742. CT-747-1-1303

CT 750. Experimental Textiles. (Var.) On sufficient demand. Individual investigation into textile research. Pr.: CT 742. CT-750-1-1303

CT 756. Physical Analysis of Textiles. (3) I. Theory and application of serviceability, wear, abrasion, shrinkage, porosity, and other physical components to fabric testing. One hour rec. and six hours lab a week. Pr.: CT 742. CT-756-1-1303

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-760-0-1303

CT 765. Chemical and Optical Analysis of Textiles. (3) II. Application of organic chemistry and optical analysis to fibers,

dyes, and finishes. One hour rec. and six hours lab. Pr.: CT 742; and CHM 191 or CHM 351. CT-765-1-1303

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 six hours. Pr.: Twelve hours in clothing and textiles and consent of department head. CT-770-2-1303

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-780-3-1303

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. CT-785-3-1303

Graduate credit

CT 820. Textiles and the Thermal Environment. (1-3) II, S, in alternate years. Fundamentals of textile insulation, its measurement and prediction for different types of textile products; the study and measurement of human response to thermal environmental factors and textile insulation. Pr.: CT 260; and STAT 702 or 703. CT-820-0-1303

CT 825. Advanced Historic Textiles. (3) I, alternate years. Analysis of the interaction of technology with worldwide historic textile designs from prehistoric to modern times (1900). Laboratory assessment of design production through fiber, yarn, fabric, finishing, and tools used in each area. Two hours lec., two hours lab a week. Pr.: ID 680. CT-825-1-1303

CT 831. Experimental Clothing Construction. (2-3) I, alternate S. Recent developments in clothing construction, utilizing experimental projects and innovative methods. Six hours lab a week. Pr.: Six hours of clothing and textiles. CT-831-1-1303

CT 835. Textile and Apparel Economics. (3) I. Analysis of the fiber, textile, and apparel industries. Issues in the production and distribution of textile products with emphasis on international trade and government involvement. Pr.: ECON 120, and six hours in clothing and textiles at 400 level or above. CT-835-0-1303

CT 840. Family Consumption of Textile Products. (3) II. Factors that affect family consumption of apparel, draperies, upholstery, floor coverings, wall coverings, and other textile products; changes in textile consumption patterns over the life cycle. Textile product characteristics, end-use performance, quality evaluation,

and maintenance. Pr.: MKTG 540 or FEC 605. CT-840-0-1303

CT 845. Clothing and Human Behavior. (3) II, alternate years. Analysis of the effects of the psychological, cultural, and social aspects of clothing upon human behavior. Pr.: CT 330 and six hours of clothing and textiles. CT-845-0-1303

CT 850. Clothing and Textile Literature. (2) II, alternate S. Critical review of current literature with implications for future research; analysis of research methodologies. Pr.: A graduate level course in statistics and six hours in the field. CT-850-3-1303

CT 855. Readings in Clothing and Textiles. (1-2) I, II, S. Directed reading and study of selected topics in clothing and textiles. Pr.: CT 850. CT-855-3-1303

CT 860. Contemporary Topics in Clothing and Textiles. (2-3) I, alternate S. Analysis of social and environmental factors related to clothing and textiles. May be taken more than one semester with consent of student's advisory committee. Pr.: Eight hours of credit basic to field. CT-860-0-1303

CT 865. Historic Costume and Textile Collection Management. (2) II, alternate years. Collection policy development, registration, and cataloging of historic costume and textile collections, physical processing of objects, and usage of collections. One hour lec. and two hours lab a week. Pr.: CT 631, 730, ID 680. CT-865-1-1303

CT 898. Master's Report. (1 or 2) I, II, S. Written report to meet the requirements for the degree master of science. Subject chosen in consultation with major instructor. Pr.: Consent of department head. CT-898-4-1303

CT 899. Master's Thesis Research in Clothing and Textiles. (Var.) I, II, S. Research in clothing or textiles for the master's thesis. Pr.: Consent of major professor. CT-899-4-1303

CT 980. Professional Development Seminar. (3) II, in alternate years. Current research, topics, and issues relevant to professionals in clothing and textiles. Pr.: CT 851. CT-980-0-1303

CT 990. Dissertation Proposal Seminar. (1) I, II. Presentation and discussion of proposals for dissertation research. Pr.: Six hours of statistics, three hours of research design or methods, and consent of major professor. CTID-990-0-1303.

CT 999. Dissertation Research in Clothing and Textiles. (Var.) I, II, S. Research in clothing or textiles for the doctoral dissertation. Pr.: Consent of major professor. CT-999-4-1303

Courses in family economics**Undergraduate credit**

FEC 420. Housing. (3) I, II. Socioeconomic aspects of housing, focusing on decisions made at the family, community, and national levels. Topics include finance, energy, space requirements, and special groups. Two hours lec. and two hours lab a week. Pr.: Sophomore standing. FEC-420-1-1304

FEC 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; lab demonstrates application of principles. Two hours lec. and three hours lab a week. FEC-440-1-1302

FEC 499. Problems in Family Economics. (Var.) I, II, S. Independent study. Pr.: Consent of instructor. FEC-499-3-1304

Undergraduate and graduate credit

FEC 625. Consumer and Energy Issues in Housing. (3) I, S. An examination of current housing issues including conditions, regulations, finance, and policy as they relate to the consumer. Pr.: SOCIO 211, ECON 110, and FEC 420. FEC-625-0-1304

FEC 630. Household Equipment Theory. (3) I, S. Analytical study of appliance design, performance, and evaluation concepts for application in consumer decision-making. Not open to students with credit in FEC 440. Six hours rec. and lab a week. Pr.: Four hours lab science course. FEC-630-1-1302

FEC 650. Consumer Product Safety. (3) I. Evaluation of measures that assure consumer public of safe products, consumer recourse, business protection and responsibility, methods of surveillance, investigation, and reporting. Pr.: Ten hours of 400 or higher level courses in engineering or home economics. FEC-650-0-1304

FEC 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.: FEC 460 or ID 240 or ARCH 261. FEC-660-1-1302

FEC 670. Field Study in Family Economics. (Var.) I, II, S. Supervised experiences with community action programs and consumer services in industry and government agencies. May be taken more than one semester. Pr.: FEC 400 and FEC 460. FEC-670-2-1304

FEC 680. Seminar in Family Economics. (1-3) I, II, S. A review of research literature; trends in the field of family economics; the contribution of the field to the family and community. Pr.: Senior or graduate standing. FEC-680-0-1304

FEC 720. Housing Requirements of Families. (3) II. Housing needs and requirements of families as influenced by social norms, societal values, family activities and preferences, and economic and political constraints. Pr.: FEC 420. FEC-720-0-1304

FEC 740. Advanced 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.: FEC 440, PHYS 115, and senior or graduate standing. FEC-740-1-1304

FEC 780. Problems in Family Economics. (Var.) I, II, S. Individual investigation in standards of living and family expenditures; housing and household equipment; time and motion study; and use of family resources. Pr.: Consent of instructor. FEC-780-3-1304

Graduate credit

FEC 825. Social Effects of the Housing Environment. (3) II. A critical analysis of the literature on the social influences on the family and the individual attributable to the nature of the housing and neighborhood environment. Alternative physical determinist and socio-cultural interpretations are developed. Pr.: FEC 420 and STAT 702 or STAT 703. FEC-825-0-1304

FEC 840. Experimental Methods in Household Equipment. (2) I. In alternate years. Philosophy of household equipment evaluation and experimentation; emphasis upon instrumentation, selection of variables, and data analysis. Pr.: A course in statistics and FEC 740. FEC-840-1-1302

FEC 894. Readings in Family Economics. (1-3) I, II. Selected review of literature in family economics, housing, consumer finance, consumer economics, home management, household equipment, consumer product safety, and the consumer movement. Pr.: FEC 400 or FEC 700; six hours of social science; and consent of department head. May be taken more than once. FEC-894-3-1304

FEC 899. Research in Family Economics. (Var.) I, II, S. Individual research problems which may form the basis for the master's thesis. Pr.: Consent of instructor. FEC-899-4-1304

FEC 920. Housing Economics. (3) II, S. Analysis of economic research related to consumer and government decisions about housing, including financing, regulation, subsidy programs, energy conservation, and choice of characteristics. Pr.: ECON 520, course in statistics, and two courses in housing, urban economics, or planning. FEC-920-0-1304

FEC 999. Research in Family Economics. (Var.) I, II, S. Pr.: Consent of major professor. FEC-999-4-1304

Courses in interior design**Undergraduate credit**

ID 101. Design for Contemporary Living. (3) I. Development of critical awareness of the application of principles of design in contemporary living. ID-101-0-1399

ID 240. Interior Design Studio I. (3) I, II. Aesthetic, social, and functional aspects of the home and its furnishings. Six hours studio a week. Pr.: ART 100. ID-240-1-1399

ID 260. Interior Design Graphics. (3) I, II. Development of graphic communication skills used by interior designers. Six hours studio a week. ID-260-1-1399

ID 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. ID-320-0-1399

ID 340. Interior Design Studio II. (3) I, II. Introduction to design process. Emphasis on space planning and selection of materials and furnishings within living environment. Six hours studio a week. Pr.: ART 190; ID 260 or equiv.; and ID 240. ID-340-1-1399

ID 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. ID-360-0-1399

ID 435. Interior Design Systems. (3) I, II. Analysis of lighting, heating, ventilating, acoustics, and air conditioning systems in residential interior design; principles, performance requirements, and components related to aesthetic, functional, and behavioral interior planning; relationship among the systems, properties, methods, techniques, and materials in interior design. Pr.: ID 340 or conc. enrollment. ID-435-0-1399

ID 440. Interior Design Studio III. (3) I, II. Interior design problem solving in residential interiors. Graphic and verbal presentation of solutions. Six hours studio a week. Pr.: ID 340. ID-440-1-1399

ID 460. Interior Design Practices and Procedures. (3) II. Professional ethics and business practices; sources, materials, and construction methods used in home furnishings and residential interiors. Pr.: ID 340 or conc. enrollment. ID-460-0-1399

ID 499. Problems in Interior Design. (Var.) I, II, S. Independent study. Pr.: Consent of instructor. ID-499-3-1399

Undergraduate and graduate credit in minor field

ID 500. Intermediate Interior Design Studio. (3) S. Problem solving in design of living environments using graphic communication techniques. May substitute for Interior Design Studios, ID 440, ID 540, or ID 640. Students should plan to substitute this course for the next level studio in sequence. Pr.: ID 340. ID-500-1-1399

ID 540. Interior Design Studio IV. (3) I. Analysis, organization, and development of multifunctional interior spaces within living environments. Establishment of design priorities evolving from data gathering and problem solving techniques. Six hours studio a week. Pr.: ID 440; and ID 650 or conc. enrollment. ID-540-1-1399

Undergraduate and graduate credit
ID 600. Interior Design Field Experience. (4) Supervised work experience. Pr.: Senior standing, 2.2 cumulative GPA and 2.5 GPA in professional area, and consent of department head. ID-600-2-1399

ID 640. Interior Design Studio V. (3) II. A study of human needs encountered in the total design of residential interiors; field measurements, shop drawings, supportive business procedures. Six hours studio a week. Pr.: ID 440. ID-640-1-1399

ID 650. Contemporary Homes. (3) I. Residential interior living environments explored in an ecological, behavioral, and cultural context. Pr.: ID 340. ID-650-0-1399

ID 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. ID-680-0-1399

ID 751. Designing for Exceptional Needs. (3) II. Problems encountered in designing interiors for children, handicapped, aged, and the confined. Pr.: ID 440. ID-751-0-1399

ID 760. Historic Preservation and Restoration of Interiors. (3) I. Principles, guidelines, and qualities of preservation and restoration of interiors. Research and application. Pr.: ID 320 and 360; or CT 630 and 631; or PDP 250 and 251. ID-760-0-1399

ID 780. Interior Design Seminar. (2-3) I, II, alternate S. Analysis of current developments in the field. May be taken more than one semester with a maximum of six credit hours. Pr.: Eight hours of credit basic to

field and consent of instructor. ID-780-0-1399

ID 782. Problems in Interior Design. (Var.) I, II, S. Problems planned with the student to meet particular needs. Pr.: Consent of instructor. ID-782-3-1399

Graduate credit
ID 800. Interior Design Studio VI. (3) I, II, S. Advanced studio experiences in residential interior environments. May be repeated with a maximum of six hours applied toward a graduate degree. Pr.: ID 540 or 640; and ID 751 or conc. enrollment, or ID 760 or conc. enrollment. ID-800-1-1399

ID 820. Readings in Interior Design. (2) I, II, S. Directed study in current problems of interior design. Pr.: ID 440. ID-820-3-1399

ID 899. Research in Interior Design. (Var.) I, II. Research which may form the basis for the master's thesis. Pr.: Graduate standing. ID-899-4-1399

Foods and Nutrition

Jane Raymond Bowers,* Head
Professors Bowers,* Fryer,* Reeves,* Setser,* and Zayas;* Adjunct Professors Lookhart* and Ranhotra;* Associate Professors Clarke,* Grunewald,* Harbers,* Holcomb,* Smith,* and Stone;* Assistant Professor Lang; Adjunct Assistant Professor Higgins; Instructors Dray and Freund; Emeriti: Professors Caul,* Harrison,* 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.

Undergraduate study
The Department of Foods and Nutrition offers three programs leading to a bachelor's 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 Physical Education and Leisure Studies. Students earn a B.S. in foods and nutrition and a B.S. in physical education.

Students in all programs gain valuable experience by completing field experiences with community health agencies, the food industry, or consumer communication businesses. Students may also meet the

academic requirements for membership in the American Dietetic Association (ADA).

Graduate study
The department offers the master of science and Ph.D. degrees. Graduates work in industry as sensory scientists, directors of food product development and sensory evaluation, senior food scientists, managers of quality assurance and test kitchens, directors of consumer services, and technical representatives; in hospitals and community organizations as dietitians or nutrition consultants; in universities and colleges as teachers and researchers; and in government agencies as extension specialists, nutritionists, and nutrition education coordinators.

Research facilities include two sensory evaluation laboratories, human metabolic suite, a nutrition research animal laboratory accredited by the AAALAC (American Association for Accreditation for Laboratory Animal Care), and several well equipped food and chemical laboratories.

Fellowships as well as research and teaching assistantships are available to qualified students.

Undergraduate programs 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 (59-61 hours)		
ENGL 100	English Composition I	3
ENGL 120	English Composition II	3
SPCH 105	Public Speaking IA	2
	or	
SPCH 106	Public Speaking I	3
PSYCH 110	General Psychology	3
ECON 110	Economics I	3
SOCIO 211	Introduction to Sociology	3
PHILO 130	Introduction to Ethics	3
Humanities elective	.....	3
BIOCH 201	Elementary Biochemistry	3
BIOL 198	Principles of Biology	4
BIOL 220	Bacteriology and Man	3
BIOL 240	Human Body	6
CHM 110	General Chemistry	5
CHM 190	Elementary Organic Chemistry	3
CHM 191	Elementary Organic Chemistry Lab	2
MATH 100	College Algebra	3
	or	
MATH 220	Analytic Geometry and Calculus I	4

STAT 330	Elementary Statistics for Social Science	3
STAT 340	Biometrics I	3
CMPSC 110	Introduction to Personal Computers	3
HDFS 320	Microcomputers in Human Services and the Home	3
PE 101	Concepts in Physical Education	1
Professional courses (44 hours)		
FN 133	Food for Man	3
FN 300	Food Preparation and Meal Management	4
FN 301	Trends in Food Products	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 635	Nutrition and Exercise	3
HDFS 655	Community Health Programs	3
FN 680	Seminar in Foods and Nutrition	2
FN 700	Community Nutrition	3
FN 706	Practicum in Community Nutrition	3
FN 712	Diet Therapy	3
HRIMD 440	Fundamentals of Quantity Food Production	5
Supporting courses (15 hours)		
EDAF 315	Educational Psychology	3
FEC 400	Family Economics	3
HDFS 230	Introduction to Human Development	3
MANGT 420	Management Concepts	3
PE 335	Physiology of Exercise	3
Unrestricted electives		
Total hours for graduation		

Food science and industry

Science option—joint program with College of Agriculture and College of Human Ecology

Bachelor of science in food science and industry

See the College of Agriculture section of the catalog for a description of this program.

Food science

Bachelor of science in foods and nutrition

Food scientists are concerned with all aspects of the food industry, from processing 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, sensory analysis, or a particular food commodity area. 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.

General education courses (60-71 hours)

ENGL 100	English Composition I	3
ENGL 120	English Composition II	3
SPCH 105	Public Speaking IA	2
SPCH 106	Public Speaking I	3
ECON 110	Economics I	3

PSYCH 110	General Psychology	3
SOCIO 211	Introduction to Sociology	3
Humanities elective		3
BIOL 198	Principles of Biology	4
BIOL 555	Microbiology	5
BIOL 520	Microbiology of Food	4
MATH 110	College Algebra	3
MATH 210	Technical Calculus I	3
MATH 220	Analytic Geometry and Calculus I ..	4
STAT 320	Elementary Statistics	3
STAT 330	Biometrics	3
PE 101	Concepts in Physical Education	1

Choose one of the following areas of emphasis:

1. Consumer communications area (17 hours)

CHM 110	General Chemistry	5
CHM 190	Elementary Organic Chemistry	3
CHM 191	Elementary Organic Chemistry Lab ..	2
BIOCH 201	Elementary Biochemistry	3
PHYS 115	Descriptive Physics	4

2. Technical area (26 hours)

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 Lab	2
BIOCH 521	General Biochemistry	3
BIOCH 522	General Biochemistry Lab	2
PHYS 113	General Physics I	4

Professional courses (27 hours)

FN 300	Food Preparation and Meal Management	4
FN 301	Trends in Food Products	3
FN 501	Food Science	3
FN 502	Principles of Nutrition	3
FN 680	Seminar in Foods and Nutrition	2
FN 790	Food Research Techniques	3
ASI 305	Fundamentals of Food Processing ..	3

Take 6 hours from foods processing electives:

ASI 361	Meat Processing	2
ASI 502	Principles of Dairy Food Processing ..	3
ASI 671	Meat Selection and Utilization	3
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

Students emphasizing consumer communications area are required to take:

1. Consumer communications area (26 hours)

FN 612	Principles of Food Product Development	3
FN 616	Principles of Food Demonstration ..	3
EDCI 318	Instructional Media and Technology	2
ENGL 516	Written Communications for the Sciences	3
JMC 250	Agricultural Journalism	3
JMC 320	Principles of Advertising	3
JMC 512	Public Relations	3
MKTG 400	Marketing	3
MKTG 450	Consumer Behavior	3
FN elective		3

Students emphasizing technical area are required to take:

2. Technical area (19 hours)

ET 400	Introduction to Food Engineering Technology	4
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Take 15 additional hours (including 9 hours FN) from sensory analysis and nutrition-related courses listed below, from food processing electives, or from consumer communications area

Sensory analysis

FN 612	Principles of Food Product Development	3
FN 620	Sensory Analysis of Foods	3
FN 760	Fundamentals of Food Flavor Analysis	3

PSYCH 480	Fundamentals of Perception and Sensation	3
PSYCH 570	Psychobiology	3
STAT 703	Statistics for Natural Scientists	3
Nutrition		
BIOL 240	Structure and Function of Human Body	6
FN 610	Nutrition Throughout the Life Cycle	3

Supporting courses (6 hours)

FEC 650	Consumer Product Safety	3
HDFS or HRIMD elective		3

Unrestricted electives

Total hours for graduation

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	English Composition I	3
ENGL 120	English Composition II	3
SPCH 105	Public Speaking IA	2
SPCH 106	Public Speaking I	3
PSYCH 110	General Psychology	3
ECON 110	Economics I	3
SOCIO 211	Introduction to Sociology	3
Humanities		3
BIOL 198	Principles of Biology	4
BIOL 240	Human Body	6
BIOL 555	Microbiology	5
MATH 150	Trigonometry*	3
MATH 220	Analytic Geometry and Calculus I ..	4
PHYS 113	General Physics I	4
PHYS 114	General Physics II	4
PE 101	Concepts in Physical Education	1

*If taken in high school, substitute computer science, statistics, or higher mathematic course (3-4 hours)

Professional courses (30 hours)

FN 300	Food Preparation and Meal Management	4
FN 301	Trends in Food Products	3
FN 501	Food Science	3
FN 502	Principles of Nutrition	3
FN 610	Nutrition Throughout the Life Cycle	3
FN 680	Seminar in Foods and Nutrition	2
FN 700	Community Nutrition	3
FN 710	Bionutrition	3
FN 712	Diet Therapy	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 230	Introduction to Human Development	3
FN 352	Concepts of Personal Health	3
FEC 400	Family Economics	3
FEC 650	Consumer Product Safety	3

Unrestricted electives	11-13
Total hours for graduation	125

Nutrition and exercise sciences

Bachelor of science in foods and nutrition
Bachelor of science, physical education
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 Physical Education and Leisure Studies. 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 (ADA) by including two specified requirements in their course work. Those interested in becoming registered dietitians (R.D.) 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 courses (31-36 hours)

ENGL 100	English Composition I	3
ENGL 120	English Composition II	3
SPCH 105	Public Speaking IA	2
	or	
SPCH 106	Public Speaking I	3
PSYCH 110	General Psychology	3
ECON 110	Economics I	3
SOCIO 211	Introduction to Sociology	3
Additional courses as specified in the General Requirements Section for Arts and Sciences		
Humanities (four courses from below)		11-12
Fine arts (1 course)		
Philosophy (1 course)		
Western heritage (1 course)		
Literary or rhetorical arts (1 course)		
Additional social science course (1 course)		3
International studies overlay (1 course)		0-3

Supporting courses (38-39 hours)

BIOL 198	Principles of Biology	4
BIOL 240	Human Body	6
BIOL 555	Microbiology	5
CHM 110	General Chemistry	5
CHM 190	Elementary Organic Chemistry	3
CHM 191	Elementary Organic Chemistry Laboratory	2
BIOCH 201	Elementary Biochemistry	3
PHYS 115	Descriptive Physics	4
MATH 100	College Algebra	3
	or	
MATH 220	Analytic Geometry and Calculus I ..	4
STAT 320	Elements of Statistics	3
	or	
STAT 330	Elementary Statistics for the Social Sciences	3

Nutrition science (35-38 hours)

FN 300	Food Preparation and Meal Management	4
FN 301	Trends in Food Products	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 635	Nutrition and Exercise (if not taken as PE 635 below)	0-3

FN 680	Seminar in Foods and Nutrition	2
FN 700	Community Nutrition	3
FN 706	Practicum in Community Nutrition	3
FN 712	Diet Therapy	3
HRIMD 440	Fundamentals of Quantity Food Production	5

Exercise science (30-33 hours)

PE 101	Concepts in Physical Education	1
PE 206	Professional Orientation	1
PE 320	Motor Development and Learning ..	3
PE 325	History and Philosophy of Physical Education	3
PE 330	Kinesiology	3
PE 335	Physiology of Exercise	3
PE 340	Social-Psychological Dimensions of Physical Activity	3
PE 376	First Aid and CPR	1
PE 561	Adapted Physical Education	3
PE 635	Nutrition and Exercise (if not taken as FN 635 above)	0-3
PE 710	Measurement and Evaluation of Physical Education	3
PE 755	Adult Exercise Programs	3
PE 759	Exercise Testing and Prescription ..	3

Unrestricted electives

Total hours for graduation

Courses in foods and nutrition

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, home economics education, or home economics extension. FN-132-0-1306

FN 133. Food for Man. (3) I. Food production, distribution, significance, and consumption. Nutritional status of world population and local, national, and international programs for improvement of nutritional status. FN-133-1-1306

FN 300. Food Preparation and Meal Management. (4) I, II. 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-300-1-1306

FN 301. Trends in Food Products. (3) II. Current trends in utilization, consumption, preservation, and market forms of various foods. Food laws, regulation, additives, labeling, and packaging. Pr.: ECON 110. FN-301-0-1306

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-352-0-1306

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. FN-499-3-1306

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 190 and 191, or 350 and 351, or 531 and 532; and FN 300. FN-501-1-1306

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 190 and 191, or 350 and 351, or 531 and 532; and BIOL 198. FN-502-1-1306

FN 510. Nutrition for Elementary and Middle Level Teachers. (2-3) I. Nutrition information related to contemporary nutrition concerns and applied to the evaluation of diets and nutrition education resources. Pr.: Senior standing. FN-510-0-1306

FN 513. Applied Normal Nutrition. (3) I, II. Principles of normal nutrition applied in the hospital and community to the care of children, adults, and the aged. Professional role of dietitians and techniques of communication. Two credits recitation, one credit of supervised experience. Pr.: FN 610, FN 712, HRIMD 510, and consent of instructor. Taught in Wichita. FN-513-2-1306

FN 514. Nutrition in Medical Science. (6) I, II. Principles of therapeutic nutrition applied in the care of children, adults, and the aged. Three credits rec. and three credits of supervised experience. Pr.: FN 610, FN 712, HRIMD 510, and consent of instructor. Taught in Wichita. FN-514-2-1306

FN 515. Nutritional Care of Patients. (6) I, II. Supervised experience in the nutritional care of children, adults, and the aged. One credit rec. and five credits of supervised experience. Pr.: FN 610, FN 712, HRIMD 510, and consent of instructor. Taught in Wichita. FN-515-2-1306

FN 520. Topics in Foods and Nutrition. (1-3) On sufficient demand. May be taken more than once for a maximum of six hours. Pr.: Junior standing and consent of instructor. FN-520-0-1306

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 three credits. Pr.: FN 501, FN 502, and consent of instructor. FN-600-2-1306

FN 603. 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-603-0-1306

FN 610. Nutrition Throughout the Life Cycle. (3) I, II. 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-610-0-1306

FN 612. Principles of Food Product Development and Control. (3) II. Food product concept, feasibility, and evaluation. Pr.: FN 501. FN-612-0-1306

FN 616. Principles of Food Demonstration. (3) II. Fundamentals in food demonstrations used by the teacher, home economics agent, and commercial demonstrator. Six hours lab a week. Pr.: FN 132 or 502; and FN 501. FN-616-1-1306

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 FN 502; and PE 335. Cross-listed with College of Arts and Sciences; see PE 635. FN-635-0-1306

FN 655. Community Health Programs. (3) I. 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-655-0-1306

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-680-0-1306

FN 681. Health for Elementary Teachers. (3) S, on sufficient demand. To assist the prospective and/or practicing teacher in developing instructional strategies and resources for use in promoting health education for a healthy life style in the elementary school setting. Pr.: FN 352 and senior standing. FN-681-0-1306

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 603 or 610. FN-700-0-1306

FN 702. Nutrition in Developing Countries. (3) I. 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 603 or 610. FN-702-0-1306

FN 706. Practicum in Community Nutrition. (3) I, II, S. Supervised experience in community nutrition agencies. Pr.: FN 700 and consent of instructor. FN-706-2-1306

FN 710. Bionutrition. (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-710-0-1306

FN 712. Diet Therapy. (3) I, II. Dietary modifications for pathological conditions. Pr.: FN 502; BIOCH 201 or 521; and BIOL 240 or AP 530 or BIOL 526. FN-712-0-1306

FN 718. Physical Health and Aging. (3) 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 BIOL 310; HDFS 510. FN-718-0-1306

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, FN 501. FN-720-0-1306

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-721-1-1306

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 BIOCH 200 or 521. FN-750-0-1306

FN 760. Fundamentals of Food Flavor Analysis. (3) I. In alternate years. Flavor perception considered from both the human senses of taste, feeling, and smell and the chemical and physical attributes of food; practical bases for reliable sensory measurement. One hour lec. and six hours lab a week. Pr.: CHM 190 or 350 or 550; and FN 501. FN-760-1-1306

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-780-3-1306

FN 782. Topics in Foods and Nutrition. (1-3) On sufficient demand. May be taken more than once for a maximum of six hours. Pr.: Senior standing and consent of instructor. FN-782-0-1306

FN 790. Food Research Techniques. (3) I. Fundamental principles of food quality evaluation and development of an independent research problem. Pr.: FN 501. FN-790-1-1306

Graduate credit

FN 811. Advances in Foods. (1-3) S. Recent developments and concerns related to foods. Pr.: FN 501 and consent of instructor. FN-811-0-1306

FN 813. Advances in Nutrition. (1-3) S. Recent developments and concerns related to nutrition. Pr.: FN 502 and consent of instructor. FN-813-0-1306

FN 816. Application of Food Flavor Analysis. (2) II. On sufficient demand. Application of flavor panel analysis to food research problems. One hour lec. and two hours lab a week. Pr.: FN 760. FN-816-1-1306

FN 817. Nutrition and Aging. (2-3) S. Nature of aging process, nutritional requirements, food habits, and effect of nutrition on the rate of biological aging. Pr.: Six hours of nutrition, BIOL 240 or 526, or AP 530; and BIOCH 521. FN-817-0-1306

FN 818. Fundamentals of Meat Processing and Preparation. (1-2) S. On sufficient demand. Inspection, grading, processing, and preparation in relation to chemical and physical characteristics, costs, safety, quality, and palatability of red meat. Pr.: FN 501 and conc. enrollment in ASI 818. FN-818-1-1306

FN 880. Graduate Seminar in Foods and Nutrition. (1) II. Discussion of investigations in foods and nutrition. May be taken four semesters for credit. Pr.: FN 790 and 610. FN-880-0-1306

FN 898. Master's Report. (Var.) I, II, S. Survey in depth of the literature. FN-898-4-1306

FN 899. Master's Thesis. (Var.) I, II, S. Research in area of specialization. FN-899-4-1306

FN 905. Lipids in Food Systems. (2) S. In alternate years. Physical and chemical characteristics of lipids with emphasis on their behavior and function in food systems. Pr.: BIOCH 521 and FN 720. FN-905-0-1306

FN 906. Proteins in Food Systems. (2) S. In alternate years. Behavior and function of plant, animal, and nonconventional proteins in food systems. Pr.: BIOCH 521 and FN 720. FN-906-0-1306

FN 907. Food Dispersions. (2) I. In alternate years. Properties of food dispersions: food sols, food gels, emulsions, and foams including batters and doughs. Pr.: FN 720. FN-907-0-1306

FN 908. Carbohydrates in Food Systems. (2) I. In alternate years. Properties and functions of sugars, and starches, and characteristics of edible plant tissues and pigments. Pr.: FN 720. FN-908-0-1306

FN 910. Advanced Nutrition: Carbohydrates and Lipids. (2) II. In alternate years. Nutritional roles and metabolism of carbohydrates and lipids in normal and abnormal physiological states. Pr.: BIOCH 521, BIOL 526, and FN 710. FN-910-0-1306

FN 911. Advanced Nutrition: Proteins and Amino Acids. (2) I. In alternate years. Nutritional roles and metabolism of proteins and amino acids. Functions, protein quality assessment, digestion and absorption, hormonal regulation, requirements, and interrelationships with other nutrients. Pr.: BIOCH 521, BIOL 526, and FN 710. FN-911-0-1306

FN 912. Advanced Nutrition: Minerals. (2) I. In alternate years. Nutritional roles and metabolism of minerals. Functions, biological availability, hormonal regulation, requirements, deficiency and toxicity signs, and interrelations with other nutrients. Pr.: BIOCH 521, BIOL 526, and FN 710. FN-912-0-1306

FN 913. Advanced Nutrition: Vitamins. (2) II. In alternate years. Nutritional roles and metabolism of vitamins. Functions, requirements, antivitamins, and deficiency and toxicity signs. Pr.: BIOCH 521, BIOL 526, and FN 710. FN-913-0-1306

FN 981. Food Science Colloquium. (1) I. Discussion of investigations in food science. Attendance required of all graduate students in food science. Maximum of two hours may be applied toward an M.S. degree or four hours toward a Ph.D. degree. FN-981-0-1306

FN 999. Research in Foods and Nutrition. (Var.) I, II, S. Three hours a week for each hour of credit. Pr.: Consent of instructor. FN-999-4-1306

General Human Ecology

Professors Moxley and Stowe; Instructors Jackson, Pence, and Segó.

The general human ecology areas combine courses in human ecology with a specialty in vocational home economics education, extension, mass communication, or other supporting area of the student's choice. Programs are cooperatively planned by faculty from the Cooperative Extension Service, home economics education, journalism and mass communication, and the College of Human Ecology dean's office.

Graduate programs

The graduate program for the Ph.D. in human ecology includes specializations in: textiles and apparel, marriage and family therapy, family life education and consultation, life span human development, and institution management.

Home economics education. See College of Education section of this catalog.

General human ecology

Bachelor of science in human ecology

Degree programs in general human ecology allow students to integrate knowledge from apparel and textiles, interior design, housing, human development, family studies, family economics, and foods and nutrition. For students with interests in human ecology who wish to defer the selection of a major, programs of study in general human ecology afford the greatest flexibility in course selection.

General education (41-44 hours)

ENGL 100	English Composition I	3
ENGL 120	English Composition II	3
SPCH 105	Public Speaking IA	2
or		
PSCH 106	Public Speaking I	3
ECON 110	Economics I	3
PSYCH 110	General Psychology	3
SOCIO 211	Introduction to Sociology	3
Humanities elective minimum		6
BIOL 198	Principles of Biology	4
CHM 110	General Chemistry	5
or		
PHYS 101	The Physical World I	3
and		
PHYS 103	The Physical World I Lab	1
MATH 100	College Algebra	3
STAT 320	Elements of Statistics	3
or		
STAT 330	Elements of Statistics for Social Sciences	3
or		
STAT 350	Business and Economics Statistics	3
CMPSC ---	Computer science elective	3-4
PE 101	Concepts of Physical Education	1

Human ecology courses (51 hours)

CT 330	Clothing and Society	3
FEC 400	Family Economics	3
FEC 405	Personal and Family Finance	3
or		
FEC 460	Family Resource Management	3
FEC 420	Housing	3
FN 132	Basic Nutrition	3
or		
FN 502	Principles of Nutrition	3
HDFS 230	Introduction to Human Development	3
HDFS 350	Family Relations and Sex Roles	3
HDFS 510	Human Development and Aging	3
ID 101	Design for Contemporary Living	3

Human ecology electives (24 hours)
Select in consultation with advisor.

Choose 12 hours from the following:

CT 150	Principles of Clothing Construction	3
CT 220	Fundamentals of Apparel Design	3
CT 230	Apparel and Textile Marketing	3
CT 260	Textiles	3
FN 301	Trends in Food Products	3
FN 352	Concepts of Personal Health	3
HDFS 235	Infants and Toddlers	3
HDFS 272	Helping Relationship	3
ID 240	Interior Design Studio I	3

Choose 12 hours human ecology electives, 300 level or higher.

Supporting courses (15 hours)

In consultation with advisor choose 15 hours, 300-level or higher, in areas other than human ecology.

Unrestricted electives 16-19

Total for graduation 126

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 needs and interests. In human ecology they 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 choose advertising, journalism, public relations, radio-TV, or a general program.

General education (39-44 hours)

ENGL 100	English Composition I	3
ENGL 120	English Composition II	3
SPCH 105	Public Speaking IA	2
or		
SPCH 106	Public Speaking I	3
ECON 110	Economics I	3
PSYCH 110	General Psychology	3
SOCIO 211	Introduction to Sociology	3
POLSC 110	Introduction to Political Science	3
or		
POLSC 325	U.S. Politics	3
Humanities elective minimum*		3
MATH 100	College Algebra	3
STAT 320	Elements of Statistics	3
or		
STAT 330	Elements of Statistics for Social Sciences	3
or		
STAT 350	Business and Economic Statistics	3
or		
CMPSC 200	Fundamentals of Computer Programming and	2
CMPSC 20-	Computer Language Lab	2
or		
CMPSC 110	Introduction to Personal Computers	3

Biological sciences minimum** 3-4
Physical sciences minimum** 3-5

One area, either social sciences, humanities, biological sciences, physical sciences, or quantitative studies, that is not represented in supporting courses must include two courses in sequence plus one additional course. Neither ECON 110 nor PSYCH 110 may be used to meet this requirement. Minimum 3

PE 101 Concepts in Physical Education 1

*Two-hour courses are not acceptable in humanities.

**A laboratory course is required in either biological or physical sciences.

Professional courses 45-54

Human ecology courses 15-18

Area of concentration in: CTID, HRIMD, HDFS, FEC, or FN

Journalism and mass communications courses (30-36 hours)

In consultation with your advisor, select one of the options listed below:

1. Journalism

JMC 235	Introduction to Mass Communication	3
JMC 275	News and Feature Writing	3

JMC 600	Public Affairs Reporting	3
JMC 665	Law of Mass Communications	3
JMC 300	Editing and Design and	3
JMC 380	Advanced News and Feature Writing and	3
JMC 480	Advanced Editing and Design	3
	or	
JMC 240	Audio I and	3
JMC 330	Broadcast News Writing and	3
JMC 320	RTV Performance	3

*Electives in journalism and mass communications 9-15

2. General

JMC 235	Introduction to Mass Communication	3
JMC 275	News and Feature Writing	3
JMC 300	Editing and Design	3
JMC 320	Principles of Advertising	3
JMC 380	Advanced News and Feature Writing	3
JMC 660	History of Journalism	3
	or	
JMC 685	The Mass Communicator: Ethics and Issues	3
JMC 665	Law of Mass Communications	3

*Electives in journalism and mass communications 9-15

3. Advertising

JMC 235	Introduction to Mass Communication	3
JMC 275	News and Feature Writing	3
JMC 320	Principles of Advertising	3
JMC 545	Advertising Media	3
JMC 555	Ad Copy and Layout	3
JMC 620	Electronic Media Advertising Sales	3
JMC 640	Seminar in Advertising Management	3
JMC 665	Law of Mass Communications	3

*Electives in journalism and mass communications 6-12

4. Public Relations

JMC 235	Introduction to Mass Communication	3
JMC 275	News and Feature Writing	3
JMC 300	Editing and Design	3
JMC 380	Advanced News and Feature Writing	3
JMC 515	Fundamentals of Public Relations ..	3
JMC 635	Public Relations Techniques	3
JMC 642	Seminar in Advertising Management	3
JMC 665	Law of Mass Communications	3
JMC 550	Mass Communications Internship	1-3
	or	
JMC 644	Supervised PR Experience	1-3

*Electives in journalism and mass communications 5-11

5. Radio-TV

JMC 235	Introduction to Mass Communication	3
JMC 237	Writing for Electronic Media	3
JMC 275	News and Feature Writing	3
RTV 240	Audio I	3
RTV 250	Video I	3
RTV 490	Senior Seminar	3
Choose at least one theory course from the following list:		
JMC 560	Non-Traditional Press	3
JMC 612	Women and the Media	3
JMC 645	The Minority Press in America	3
JMC 660	History of Journalism	3
RTV 660	History of Telecommunications	3
RTV 665	Radio-Television Rules and Regulations	3
JMC 670	International Communications	3
JMC 685	The Mass Communicator: Ethics and Issues	3
JMC 730	Seminar in the Future of the Media	3

JMC 740	Colloquium in Mass Communications	3
Choose at least one of the following:		
RTV 330	Broadcast News Writing	3
RTV 620	Electronic Media Advertising Sales	3
RTV 685	Electronic Media Management	3

*Electives in journalism and mass communications 6-12

*The human ecology and mass communications degree requires a minimum of 90 credit hours outside the Department of Journalism and Mass Communications and a minimum of 30 credit hours within that department.

Supporting courses (27-28 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
FEC 400	Family Economics*	3
FN 132	Basic Nutrition*	3
Additional human ecology courses		

General and/or business administration and/or education (9-10):

EDCI 217	Introduction to the Library and	2
Political science (minimum)		
or		
Business administration (minimum)		
Additional general and/or business administration and/or education courses		

Unrestricted electives 0-15

Total for graduation 126

*If not taken as a professional course.

Vocational home economics education

Bachelor of science in vocational home economics education

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 admission into the teacher education program and successful completion of the National Teacher Examination, graduates are eligible for certification which allows them to teach home economics in Kansas secondary schools. Please see the College of Education section in this catalog for more information on eligibility requirements. Inquiries should be directed to the Center for Student and Professional Services, 13 Bluemont Hall.

General education (48-51 hours)

ENGL 100	English Composition I	3
ENGL 120	English Composition II	3
SPCH 105	Public Speaking IA	2
SPCH 106	Public Speaking I	3
ECON 110	Economics I	3
ANTH 200	Introduction to Cultural Anthropology	3
PSYCH 110	General Psychology	3
HIST 101	Western Civilization: Rise of Europe	3
	or	
HIST 102	Western Civilization: The Modern Era	3
	or	
HIST 251	History of U.S. to 1877	3
	or	

HIST 252	History of U.S. Since 1877	3
ART 100	Design I	2
Humanities electives to be selected in consultation with advisor		
CHM 110	General Chemistry	5
CHM 190	Elementary Organic Chemistry and	3
CHM 191	Elementary Organic Chemistry Lab	2
	or	
BIOCH 120	Introductory Organic and Biological Chemistry	5
BIOL 198	Principles of Biology	4
MATH 100	College Algebra	3
CMPSC 110	Introduction to Personal Computing	3
	or	
CMPSC 200	Fundamentals of Computer Programming and	2
CMPSC 206	BASIC Language Lab	2
	or	
HDFS 320	Microcomputers in Human Services and the Home	2-3
PE 101	Concepts of Physical Education	1
Additional course in computer science, statistics, or advanced mathematics		
Literature or language*		
ART 100	Design I	2

Professional human ecology courses (41 hours)

CT 150	Principles of Clothing Construction*	3
CT 260	Textiles	3
FEC 405	Personal and Family Finance	3
FEC 420	Housing	3
FEC 440	Home Appliance Design and Evaluation	3
FEC 460	Family Resource Management, Theory and Application	3
FN 300	Food Preparation and Meal Management	4
FN 502	Principles of Nutrition	3
HDFS 310	Preschool Child	3
HDFS 311	Preschool Child Lab	1
HDFS 350	Family Relationships and Sex Roles	3
HDFS 370	Parenting	3
HDFS 465	You and Your Sexuality	3
FN 501	Food Science	3
	or	
FN 352	Concepts of Personal Health	3
	or	
FEC 400	Family Economics	3
	or	
HDFS 520	The Adolescent and	2
HDFS 521	The Adolescent Lab	1

*If students quiz out of CT 150, an additional construction course is to be taken.

Professional education courses (41 hours)

EDAO 321	Exploration in Human Ecology Education	1
EDAF 215	Education Implications of Growth and Development	3
EDAF 315	Educational Psychology*	3
EDAF 323	Exceptional Students in the Secondary School*	2
EDCI 326	Core Teaching Skills and Lab*	3
EDCI 477	Middle Level/Secondary Reading* ..	2
EDAO 550	Methods of Teaching Home Economics*	2
EDCI 420	Block II Lab*	1
EDAO 621	Program Planning in Vocational Education*	3
EDCI 455	Teaching in a Multicultural Society*	1
EDAF 525	Interpersonal Relations in the School*	1
EDAO 586	Teaching Participation in the Secondary School and Professional Development Seminar*	12

*These courses are blocked in three sequential semesters; they are to be taken concurrently and are prerequisites to the subsequent designated block of courses.

EDAO 620	Principles and Philosophy of Vocational Education	3
EDCI 318	Instructional Media and Technology	2
EDAO 610	Occupational Home Economics	2
Total for graduation		131

Courses in general human ecology

Undergraduate credit

GNHE 208. Human Ecology Colloquium. (Var.) I, II, S. Special topics for human ecology majors. GNHE-208-2-1301

GNHE 385. Problem in General Human Ecology. (Var.) I, II, S. Independent study. Pr.: Consent of instructor. GNHE-385-3-1301

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. GNHE-399-0-1301

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. GNHE-780-3-1301

Graduate credit

GNHE 860. Contemporary Topics in Human Ecology. (1-4) I, II, S. Selected topics in human ecology. May be taken more than once with consent of graduate committee. Pr.: Eight hours graduate level home economics courses. GNHE-860-2-1301

GNHE 865. Field Study in Human Ecology. (1-6) II. Supervised professional human ecology experiences. May be taken more than one semester. Pr.: GNHE 860 or consent of instructor. GNHE-865-2-1301

GNHE 880. Seminar in Human Ecology. (1-3) I, II, S. Current research and trends in human ecology. May be taken more than once for credit. Pr.: Consent of instructor. GNHE-880-0-1301

GNHE 899. Research in General Human Ecology. (Var.) I, II, S. Individual research problems. Pr.: Consent of instructor. GNHE-899-4-1301

Hotel, Restaurant, Institution Management and Dietetics

Marian Spears,* Head

Professor Spears;* Associate Professors Canter and Roach;* Assistant Professors Gregoire and Partlow; Instructors Dana, Freund, Hall, Hearne, and MacLaurin; Emeriti: Professor Shugart;* Associate Professors Riggs 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.

Undergraduate study

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 clinical experiences. Graduates are eligible for active membership in The American Dietetic Association (ADA) and, upon passing a national qualifying examination, for registration as a dietitian (R.D.). The program is accredited by the Commission on Accreditation of the ADA.

Junior and senior students gain management experience in the residence halls and K-State Union foodservices on campus. Seniors also spend one semester at the KSU Dietetic Center, located at the University of Kansas School of Medicine-Wichita, where they work in UKSM-W outpatient clinics and in area hospitals.

Criteria for admission to and continuation in the program are:

1. A completed application form.
2. Two letters of reference, 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.
3. 2.5 GPA overall on a 4.0 scale.
4. A GPA of 2.7 with a minimum of C in professional courses (foods, nutrition,

foodservice management) for continuation after the junior year.

General dietetics (Program II). The program in general dietetics meets the academic requirements for membership in the ADA. Following the baccalaureate degree, students must participate in an ADA accredited internship or an Approved Preprofessional Practice Program in order to take the registration examination.

Hotel and restaurant management

Bachelor of science in hotel and restaurant management

The hotel and restaurant management 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, residence halls, and the K-State Union foodservices. The University Inn, adjacent to the KSU campus, is managed by the Conference Division of the Marriott Corporation. Students gain valuable experience in this facility under the supervision of managers and faculty supervisors.

Graduate study

The department offers the master of science degree in institution management. The following courses or their equivalents are prerequisites for admission: HRIMD 440, Fundamentals of Quantity Food Production; MANGT 420, Management Concepts; and ACCTG 211, Financial Accounting. Students without these prerequisites may be admitted to the program provisionally and are required to complete the courses concurrent with their graduate work. A Graduate Record Exam is also required for admission.

Programs of study for the master of science degree are planned according to the background and interests of the student. Approximately two-thirds of the credits earned toward the degree are from courses in the major field, and one-third from supporting courses.

Students may choose one of the following plans: a minimum of 30 hours of graduate credit, including six to eight hours for a master's thesis based on original research or two hours for a master's report; or a minimum of 36 hours of graduate credit and a comprehensive written examination.

All programs of study must include courses in statistics, computer science, and research methods. Enrollment in the

departmental graduate seminar is required during two semesters of graduate study. Students will be eligible for ADA membership and professional dietetic registration (R.D.) if they meet designated academic and experience requirements.

The Department of Hotel, Restaurant, Institution Management and Dietetics participates in the Ph.D. in human ecology, offering a specialization in institution management.

Undergraduate programs

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 department.

General education courses (56-59 hours)

ENGL 100	English Composition I	3
ENGL 120	English Composition II	3
SPCH 105	Public Speaking IA	2
	or	
SPCH 106	Public Speaking I	3
ECON 110	Economics I	3
PSYCH 110	General Psychology	3
SOCIO 211	Introduction to Sociology	3
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
	or	
BIOL 220	Bacteriology and Man	3
	or	
BIOL 555	Microbiology	5
CHM 110	General Chemistry	5
CHM 190	Elementary Organic Chemistry	3
CHM 191	Elementary Organic Chemistry Lab	2
BIOCH 201	Elementary Biochemistry	3
MATH 100	College Algebra	3
CMPSC 110	Introduction to Personal Computing	3
	or	
HDFS 320	Microcomputers in Human Services and the Home	3
STAT 320	Elements of Statistics	3
	or	
STAT 330	Elements of Statistics for the Social Sciences	3
	or	
STAT 350	Business and Economic Statistics I	3
PE 101	Concepts in Physical Education	1
	Humanities electives	3

Choose one of the professional programs: I, II.

Program I: Coordinated program in dietetics

Professional courses (61 hours)

ACCTG 211	Financial Accounting	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 712	Diet Therapy	3
HRIMD 430	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 510	Introduction to Clinical Dietetics	1

Management semester

HRIMD 482	Client and Employee Education in Dietetics	2
HRIMD 560	Management in Dietetics	9
HRIMD 670	Seminar in Dietetics	2

Clinical semester at KSU Dietetic Center, Wichita

FN 513	Applied Normal Nutrition	3
FN 514	Nutrition in Medical Science	6
FN 515	Nutritional Care of Patients	6

Supporting courses (6 hours)

Choose two of the following:

HDFS 230	Introduction to Human Development	3
HDFS 350	Family Relationships and Sex Roles	3
FEC 400	Family Economics	3
FEC 405	Personal and Family Finance	3
FN 301	Trends in Food Products	3

Unrestricted electives

2-5

Total hours for graduation 128

Program II: General dietetics

Professional courses (46 hours)

ACCTG 211	Financial Accounting	3
ASI 671	Meat Selection and Utilization	3
MANGT 420	Management Concepts	3
FN 300	Food Preparation and Meal Management	4
FN 301	Trends in Food Production	3
FN 501	Food Science	3
FN 502	Principles of Nutrition	3
FN 610	Nutrition Throughout the Life Cycle	3
FN 712	Diet Therapy	3
FN elective 600	level or above	3
HRIMD 430	Introduction to Professional Dietetic Practice	1
HRIMD 440	Fundamentals of Quantity Food Production	5
HRIMD 455	Foodservice Systems	4
HRIMD 482	Client and Employee Education in Dietetics	2
HRIMD 456	Hotel and Foodservice Purchasing	3

Supporting courses (9 hours)

Choose three of the following:

CT 330	Clothing and Society	3
HDFS 230	Introduction to Human Development	3
HDFS 350	Family Relationships and Sex Roles	3
FEC 400	Family Economics	3
FEC 405	Personal and Family Finance	3
FN 612	Principles of Food Product Development and Control	3

Unrestricted electives

11-14

Total hours for graduation 125

Hotel and restaurant management

Bachelor of science in hotel and restaurant management

The hotel and restaurant management program prepares students for managerial careers in the hospitality industry. See information earlier in this department.

General education courses (54-55 hours)

ENGL 100	English Composition I	3
ENGL 120	English Composition II	3
ENGL 516	Written Communication for the Sciences	3
SPCH 105	Public Speaking IA	2
	or	
SPCH 106	Public Speaking I	3
GEOG 100	World Regional Geography	3
ECON 110	Economics I	3
ECON 120	Economics II	3
PSYCH 110	General Psychology	3
SOCIO 211	Introduction to Sociology	3
	Humanities electives	6
CHM 110	General Chemistry	5

CMPSC 110	Introduction to Personal Computing	3
	or	
HDFS 320	Microcomputers in Human Services and the Home	3
MATH 100	College Algebra	3
STAT 350	Business and Economic Statistics I	3
BIOL 198	Principles of Biology	4
HRIMD 650	Fundamentals of Public Health and Food Safety	3
PE 101	Concepts in Physical Education	1

Professional courses (35 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 and Restaurant Management	3
HRIMD 476	Cost Controls in Hotel and Restaurant Operations	3
HRIMD 480	Management in the Hotel and Restaurant Industry	3

Professional electives (8 hours)

Select from the following:

ASI 671	Meat Selection and Utilization	3
HRIMD 240	Beverage Service in Restaurants	2
HRIMD 456	Hotel and Foodservice Purchasing	3
HRIMD 470	Seminar in Hotel and Restaurant Management	1
MANGT 531	Personnel and Wage Administration	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 230	Introduction to Human Development	3
	or	
ID 101	Design for Contemporary Living	3
ACCTG 211	Financial Accounting	3
ACCTG 221	Managerial Accounting	3
MKTG 400	Marketing	3
MANGT 420	Management Concepts	3
MANGT 530	Industrial and Labor Relations	3
FINAN 450	Business Finance	3

Unrestricted electives

6-7

Total for graduation 128

Courses in hotel, restaurant, institution management and dietetics

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-120-0-1307

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-230-0-1307

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-240-0-1307

HRIMD 320. Commercial Food Preparation and Service. (4) I, II. Principles of food preparation; presentation and service in commercial operations, table-side cookery, cooking to order, buffets, banquets; customer relations and teamwork. Three credits rec., one credit lab. Pr.: HRIMD 120 or conc. enrollment and sophomore standing. HRIMD-320-0-1307

HRIMD 430. Introduction to Professional Dietetic Practice. (1) I. A study of the dietitian's role in the nutritional care of people with emphasis on the attributes and characteristics of professional practice. Pr.: Consent of instructor. HRIMD-430-0-1307

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 rec. and six hours lab. Pr.: FN 300. HRIMD-440-1-1307

HRIMD 450. Field Experience in Dietetics and Institution Management. (1-5) I, II, S. Supervised professional experience in dietetics and institutional foodservice. May be taken more than once. HRIMD-450-2-1307

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. HRIMD-455-2-1307

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-456-0-1307

HRIMD 465. Hotel Operations. (4) 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. Two credits rec., two credits practicum. Pr. or conc.: HRIMD 230. HRIMD-465-0-1307

HRIMD 468. Hotel and Restaurant Law. (3) I. Legal aspects of operating a hotel and restaurant, rights and responsibilities of the operator, patron civil rights, governmental regulations, franchising contracts, and commercial transactions.

Pr.: HRIMD 455 or 465. HRIMD-468-0-1307

HRIMD 470. Seminar in Hotel and Restaurant Management. (1) II. Current developments and trends in hotel and restaurant management. Pr.: HRIMD 455, 465. HRIMD-470-0-1307

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-472-0-1307

HRIMD 475. Field Experience in Hotel and Restaurant Management. I, II, S. Supervised work experience in hotels or restaurants following the junior year. Pr.: HRIMD 455, 465. HRIMD-475-2-1307

HRIMD 476. Cost Controls in Hotel and Restaurant Operations. (3) I. 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 211 and HRIMD 455 or 465. HRIMD-476-0-1307

HRIMD 480. Management in the Hotel and Restaurant Industry. (3) I, II. 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-480-0-1307

HRIMD 482. Client and Employee Education in Dietetics. (2) I, II. A discussion of the dietitian's role as a facilitator and change agent with employee and/or client populations. Application of principles of learning and instructional strategies appropriate to changing behavior to meet educational objectives for dietetic practice. Pr.: HRIMD 440. HRIMD-482-0-1307

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. HRIMD-499-3-1307

Undergraduate and graduate credit
HRIMD 510. Introduction to Clinical Dietetics. (1) I, II. Supervised hospital experience in clinical dietetics. Must be taken concurrently with FN 712. Open only to students in coordinated undergraduate program in dietetics. Pr.: FN 502, BIOCH 201, BIOL 240, consent of instructor. HRIMD-510-2-1307

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., six credits practicum.

Pr.: HRIMD 455 and consent of instructor. HRIMD-560-2-1307

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-635-0-1307

HRIMD 650. Fundamentals of Public Health and Food Safety. (3) I. Organization and function of food inspection services; zoonoses as related to foods of animal origin. Three hours rec. a week. (Jointly with LM 650.) Pr.: BIOL 198 and consent of staff. HRIMD-650-0-1307

HRIMD 670. Seminar in Dietetics. (1-2) I, II. Investigation of trends and current research in dietetics. Pr.: HRIMD 455 and consent of instructor. May be taken more than once. HRIMD-670-0-1307

HRIMD 710. Readings in Institution Management. (1-3) I, II, S. Directed study of current literature in institution management and related areas. HRIMD-710-3-1307

HRIMD 720. Current Issues in Hotel, Restaurant, Institution Management and Dietetics. (1-3). Recent developments and concerns related to management of dietetic services. Pr.: HRIMD 440. HRIMD-720-0-1307

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-755-0-1307

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-780-3-1307

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. HRIMD-785-2-1307

Graduate credit

HRIMD 805. Food Production Management. (3) II. In alternate years. Production planning and controls in foodservice systems. Decision optimization and systems analysis in foodservice organizations. Consideration of various types of foodservice systems. Pr.: HRIMD 440; and HRIMD 480 or 560 or MANGT 420. HRIMD-805-0-1307

HRIMD 810. Institution Management Research Techniques. (3) I. Survey and application of research methodology in institution management. Pr.: HRIMD 440. HRIMD-810-0-1307

HRIMD 880. Resource Procurement for Foodservice Systems. (3) II. Principles of materials management and procurement of material resources for the foodservice system. Pr.: HRIMD 440; and HRIMD 480 or 560 or MANGT 420. HRIMD-880-0-1307

HRIMD 885. Seminar in Institution Management. (1) I, II, S. Developments in research related to foodservice management. Pr.: HRIMD 440. HRIMD-885-0-1307

HRIMD 890. Foodservice Administration. (3) I. Advanced study of management applied to foodservice systems. Pr.: HRIMD 440; and HRIMD 480 or 560 or MANGT 420. HRIMD-890-0-1307

HRIMD 895. Cost Controls in Foodservice Systems. (3) II. In alternate years. Review of the components of cost control systems; analysis of financial data for foodservice operations; techniques for budget planning and control. Pr.: ACCTG 260; HRIMD 440; and HRIMD 480 or 560 or MANGT 420. HRIMD-895-0-1307

HRIMD 899. Research in Institution Management. (Var.) I, II, S. Pr.: Consent of instructor and completion of at least half of course work for M.S. in institution management. HRIMD-899-4-1307

HRIMD 980. Administration of Professional Dietetics Programs. (3) I. In alternate years. An in-depth study of the development of dietetic education and influence of the professional association. Assigned observations and limited participation in administration of a coordinated dietetics program. Pr.: EDCI 843 and 9 hours of graduate courses in HRIMD. HRIMD-980-0-1307

HRIMD 985. Advances in Institution Management. (3) I. In alternate years. Analysis of selected topics and research in institution foodservice management. Pr.: HRIMD 810 and 9 additional hours of graduate courses in HRIMD. HRIMD-895-0-1307

HRIMD 990. Dissertation Proposal Seminar. (1) I, II. Presentation and discussion of proposals for dissertation research. Pr.: Six hours of statistics, three hours of research design or methods, and consent of major professor. HRIMD-990-0-1307

HRIMD 999. Research in Institution Management. (Var.) I, II, S. Pr.: Consent of major professor. HRIMD-999-4-1307

Human Development and Family Studies

John P. Murray,* Head

Professors Bollman,* Jurich,* Moxley, Murray,* and Russell;* Associate Professors Bergen,* Bradshaw, Poresky,* Scheidt,* Schumm,* Smith, Walker, and Wanska;* Assistant Professors Balk,* Barnes,* Beckham, Briggs,* Coulson, Jones, McNeil,* and Wright;* Instructors Cantrell, File, Hoover, and West; Emeriti: Professors Hoefflin,* Huyck,* Kennedy,* Long,* Morse,* and Stith;* 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.

Undergraduate study

Five programs are available at the undergraduate level. They are consumer affairs, early childhood education, 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 through the Department of Human Development and Family Studies and the Department of Curriculum and Instruction in the College of Education. Students electing this choice will have two professional teaching semesters, one at the below five-year level and one at the kindergarten through sixth-grade level.

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 Hoefflin 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 community service 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. Concurrently, students must enroll in at least two courses. 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.

Graduate study

The department offers the master of science degree in the following professional specializations: adolescence and youth, early childhood education, early childhood handicapped (in association with the Department of Administration and Foundations in the College of Education), family life education and consultation, life span human development, and marriage and family therapy. Each specialization provides the student with knowledge and skills in the research, theory, and practice of working with individuals and families. Comprehensive courses and practica enhance the students' opportunities for professional growth and development and for employment in diverse professional settings.

The Department of Human Development and Family Studies participates in the graduate program for the Ph.D. in human ecology with specializations in family life education and consultation, life span human development, and marriage and family therapy. The family life education and consultation specialization prepares students for leadership positions in educational and human service organizations and agencies. Graduates from this specialization can meet the certification requirements of the National Council on Family Relations. Life span human development is a multidisciplinary program encompassing theory and research in child and adolescent development, adult development, gerontology, and thanatology. The marriage and family therapy program at both the master and doctoral levels is the third such program in the United States to be accredited by the American Association for Marriage and Family Therapy, and enables graduates to pursue careers in teaching, research, and practice.

Undergraduate programs

Consumer affairs

Bachelor of science in consumer and family economics

This program allows 21 hours of professional electives for combinations of course work in consumer affairs, marketing, financial counseling, consumer education, business, or public service. Students prepare for a variety of consumer-related job opportunities.

General education courses (49-51 hours)

ENGL 100	English Composition I	3
ENGL 120	English Composition II	3
SPCH 105	Public Speaking IA	2
	or	
SPCH 106	Public Speaking I	3
PSYCH 110	General Psychology	3
ECON 110	Economics I	3

ECON 120	Economics II	3
MATH 100	College Algebra	3
POLSC 110	Introduction to Political Science ...	3
	or	
POLSC 325	U.S. Politics	3
SOCIO 211	Introduction to Sociology	3
STAT 330	Elementary Statistics for Social Sciences	3
CMPSC 200	Fundamentals of Computer Programming and	2
CMPSC 20-	Computer Language Laboratory ...	2
	or	
CMPSC 110	Introduction to Personal Computing	3
	or	
HDFS 320	Microcomputers in Human Services and the Home	3
Humanities*	.....	3-4
Biological sciences*	.....	3-4
Physical sciences*	.....	3-4
Social science electives	.....	6
PE 101	Concepts in Physical Education	1
Professional courses (28 hours)		
FEC 400	Family Economics	3
FEC 405	Personal and Family Finance	3
FEC 410	Consumer Relations Practicum	1
FEC 415	Consumer Law	3
FEC 420	Housing	3
FEC 440	Home Appliance Design and Evaluation	3
	or	
FEC 630	Household Equipment Theory	3
FEC 460	Family Resource Management Theory and Application	3
FEC 605	Consumers and The Market	3
FEC 700	Families in the American Economy	3
FEC 705	Financial Problems of Families	3
Professional electives****	.....	21
Supporting courses (16 hours)		
FN 132	Basic Nutrition	3
HDFS 350	Family Relationships and Sex Roles	3
Human ecology electives**	.....	10
Unrestricted electives	.....	9-11
Total hours for graduation	.....	125

*Ten hours in these three areas.

**Selected in consultation with faculty advisor.

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 (NCATE) has approved KSU'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.) Note: Students who do not adhere to the deadline schedule may have difficulties in scheduling HDFS 625, Directed Experiences in Early Childhood Education.

Transfer 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 KSU credits.
2. English Composition: Both English Composition 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. Oral Communications: SPCH 105, 106, or 109. A C grade or better is required in one of the oral communication 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 KSU credits. Probationary admission will be granted when a student has less than a 2.5 GPA attempted in all college work. 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 strongly recommended. If the test has not been completed at the time of application for admission to teacher education, it must be taken at the next administration of the test. 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 Pre-Professional Skills 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 prohibited from enrolling in laboratory courses which involve contact with children.

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.

Certification: To be eligible for certification in early childhood education the student 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 the certifying officer of Kansas State University. Students must pass the National Teachers Examination as described in the College of Education section in 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 (51 hours)

ENGL 100	English Composition I	3
ENGL 120	English Composition II	3
SPCH 105	Public Speaking IA	2
	or	
SPCH 106	Public Speaking I	3
ECON 110	Economics I	3
PSYCH 110	General Psychology	3
SOCIO 211	Introduction to Sociology	3
BIOL 198	Principles of Biology	4
MATH 100	College Algebra	3
STAT 330	Elementary Statistics for Social Science	3
Approved literature and/or language		6
Additional humanities*		7-8
Approved physical science*		3-4
Social science electives at 300 level or above		6
PE 101	Concepts in Physical Education	1

*Minimum 11 hours in these two areas

Foundation courses (34 hours)

HDFS 230	Introduction to Human Development	3
HDFS 235	Infants and Toddlers	3
HDFS 310	The Preschool Child	3
HDFS 311	The Preschool Child Lab	1
HDFS 350	Family Relationships and Sex Roles	3

HDFS 528	Exceptional Development in Early Childhood	3
HDFS 650	The Family	3
SPPAT 555	Language Development	3
FN 132	Basic Nutrition	3
FN 352	Concepts of Personal Health	3
FN 603	Maternal and Child Nutrition	3
FEC 400	Family Economics	3
CTID ---	or Elective	3
Professional courses (30 hours)		
HDFS 420	Interaction Techniques	3
HDFS 524	Early Childhood Program Models ..	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 626	Administration of Early Childhood Programs	3
HDFS 670	Parent Education	3
HDFS 625	Directed Experiences	8
PE 376	First Aid/CPR	1

Professional electives (3 hours minimum)		
Take three hours from the following:		
HDFS 300	Problems in HDFS: Preschool Lab Experiences	Var.
HDFS 320	Microcomputers in Human Services and the Home	3
HDFS 370	Parenting	3
HDFS 530	Advanced Study of Children	3
HDFS 590	Proseminar in Child and Family ...	3
HDFS 710	Child Care: Components and Issues	2-3
HDFS 728	Assessment of Young Children	3
EDAF 622	Psychology of the Exceptional Child	3
FEC 400	Family Economics	3
MANGT 202	Small Business Operations	3

Unrestricted electives	6-7
Total for graduation	125

In one discipline, social sciences or humanities, two courses in sequence plus one other course are required for graduation. Neither PSYCH 110 nor ECON 220 may be used to meet this requirement.

A minimum of nine hours in social science *other than psychology* is required for certification. ECON 110 can be counted.

A physical science elective other than math, statistics, or computer science is required for certification.

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 (48-51 hours)		
ENGL 100	English Composition I	3
ENGL 120	English Composition II	3
SPCH 105	Public Speaking IA	2
SPCh 106	or Public Speaking I	3
ECON 110	Economics I	3
PSYCH 110	General Psychology	3
SOCIO 211	Introduction to Sociology	3
Social science electives at 300 level or above		
6		
Biological science elective		
3-4		
Physical science elective		
3-4		
MATH 100	College Algebra	3

STAT 330	Elementary Statistics for Social Science	3
Literature or language elective		
3		
Philosophy or language elective		
3		
Humanities elective		
6		
PE 101	Concepts in Physical Education	1
Professional courses (67 hours)		
Human development and family studies (28 hours)		
HDFS 250	Introduction to Human Development	3
HDFS 235	Infants and Toddlers	3
HDFS 310	Preschool Child	3
HDFS 311	Preschool Child Lab	1
HDFS 350	Family Relationships and Sex Roles	3
HDFS 430	Middle Child	2
HDFS 431	Middle Child Lab	1
HDFS 465	You and Your Sexuality	3
HDFS 510	Human Development and Aging ...	3
HDFS 520	The Adolescent	2
HDFS 521	The Adolescent Lab	1
HDFS 650	The Family	3

Community services (39 hours)		
FEC 400	Family Economics	3
FN 132	Basic Nutrition	3
FN 352	Concepts of Personal Health	3
HDFS 272	Helping Relationships	3
HDFS 320	Microcomputers in Human Services and the Home	3
HDFS 580	Directed Field Experiences	8
HDFS 585	Professional Seminar	4
HDFS 670	Parent Education	3
HDFS ---	Electives	6
SOCWK 260	Introduction to Social Work	3

Unrestricted electives	7-10
Total for graduation	125

In one discipline, social sciences or humanities, two courses in sequence plus one other course are required for graduation. Neither PSYCH 110 or ECON 110 may be used to meet this requirement.

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 such as court counselor, corrections or probation officer, divorce mediator, or legislator.

General education courses (57-61 hours)		
ENGL 100	English Composition I	3
ENGL 120	English Composition II	3
ENGL 200	Intermediate Composition	3
or		
ENGL 405	Narrative Writing	3
SPCH 105	Public Speaking IA	2
SPCH 106	or Public Speaking I	3
or		
SPCH 325	Argumentation and Debate	3
PHILO 130	Introduction to Ethics	3
or		
PHILO 555	Ethical Theories	3

Two courses in one foreign language		
8-9		
or		
Three courses in literature		
9		
Humanities elective		
3		
PSYCH 110	General Psychology	3
SOCIO 211	Introduction to Sociology	3
ECON 110	Economics I	3
BIOL 198	Principles of Biology	4
Physical science elective		
3-4		
International studies (select in consultation with advisor)		
3		
MATH 100	College Algebra	3
STAT 330	Elementary Statistics for Social Science	3
ACCTG 211	Financial Accounting	3
or		
CMPSC --- Computer course at the 200 level or above		
3-4		
PHILO 110	Introduction to Formal Logic	3
PE 101	Concepts in Physical Education	1

Professional courses (46 hours)		
HDFS 230	Introduction to Human Development	3
HDFS 272	Helping Relationships	3
HDFS 310	Preschool Child	3
HDFS 311	Preschool Child Lab	1
HDFS 350	Family Relationships and Sex Roles	3
HDFS 430	Middle Child	2
HDFS 431	Middle Child Lab	1
HDFS 465	You and Your Sexuality	3
HDFS 510	Human Development and Aging ...	3
HDFS 520	The Adolescent	2
HDFS 521	The Adolescent Lab	1
HDFS 650	The Family	3
HDFS 704	Seminar in Family and Child Development: Divorce, Adoption, Foster Care: Effects on Children	3
HDFS 708	Topics in Family and Child Development: Law and Family Life Cycle	3
HIST 555	American Constitutional History ...	3
POLSC 714	Constitutional Law I	3
Human ecology electives		
6		

Supporting courses	6
(Select in consultation with advisor.)	

Unrestricted electives	12-16
Total for graduation	125

Humanities shall include two courses in sequence plus one additional course.

Physical science elective will be a course in physics, chemistry, geology, or environmental geography.

Human ecology electives must be taken from two departments other than HDFS.

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 (55-57 hours)		
ENGL 100	English Composition I	3
ENGL 120	English Composition II	3
SPCH 105	Public Speaking IA	2
or		

SPCH 106	Public Speaking I	3
ECON 110	Economics I	3
PSYCH 110	General Psychology	3
SOCIO 211	Introduction to Sociology	3
Social science electives, 400 level or above		9
MATH 100	College Algebra	3
STAT 330	Elementary Statistics for Social Science	3
BIOL 198	Principles of Biology	4
BIOL 400	Human Genetics	3
Physical sciences		3-4
Humanities		9
Liberal-general electives		3
PE 101	Concepts in Physical Education	1
Professional courses (53 hours)		
Human development and family studies (28 hours)		
HDFS 230	Introduction to Human Development	3
HDFS 235	Infants and Toddlers	3
HDFS 310	The Preschool Child	3
HDFS 311	The Preschool Child Lab	1
HDFS 350	Family Relationships and Sex Roles	3
HDFS 430	Middle Childhood	2
HDFS 431	Middle Childhood Lab	1
HDFS 465	You and Your Sexuality	3
HDFS 510	Human Development and Aging	3
HDFS 520	The Adolescent	2
HDFS 521	The Adolescent Lab	1
HDFS 650	The Family	3
Supporting courses (10 hours)		
HDFS 272	Helping Relations	3
FN 352	Concepts of Personal Health	3
CMPSC 200	Fundamentals of Computer Programming	2
CMPSC 20-	Computer Language Laboratory	2
Human ecology courses (6 hours)		
FN 132	Basic Nutrition	3
Elective from CTID, HRIMD, FEC		3
Professional electives (Select in consultation with advisor.)		9
Unrestricted electives		16-18
Total for graduation		126

One area in social science, quantitative studies, biological science, or humanities shall include two courses in sequence plus one additional course. Neither ECON 110 nor PSYCH 110 may be used to meet this requirement.

Dual degrees: 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 and knowledge in 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	English Composition I	3
ENGL 120	English Composition II	3
SPCH 105	Public Speaking IA	2
or		
SPCH 106	Public Speaking I	3
PSYCH 110	General Psychology	3
ECON 110	Economics I	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 pr. 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
PE 101	Concepts in Physical Education	1

Human development and family studies (25 hours)

HDFS 230	Introduction to Human Development	3
HDFS 310	Preschool Child	3
HDFS 311	Preschool Child Lab	1
HDFS 350	Family Relationships and Sex Roles	3
HDFS 430	Middle Childhood	2
HDFS 431	Middle Childhood Lab	1
HDFS 510	Human Development and Aging	3
HDFS 520	The Adolescent	2
HDFS 521	The Adolescent Lab	1
HDFS 650	The Family	3
HDFS 670	Parent Education	3

Human ecology supporting courses (12 hours)

FN 132	Basic Nutrition	3
FEC 400	Family Economics	3
HDFS	Elective	6

Professional courses (46 hours)

SOCWK 260	Introduction to Social Work	3
SOCWK 562	Field Placement	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
SOCIO 520	Methods of Social Research	4
SOCIO 571	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.

Courses in human development and family studies

Undergraduate credit

HDFS 230. 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. One hour lec. and two hours rec. a week. HDFS-230-0-1305

HDFS 235. Infants and Toddlers. (3) I. Prenatal and infant development from conception through age two. Study of the influences on the development and growth of the infant. HDFS-235-0-1305

HDFS 272. The Helping Relationship. (2-3) I, II. 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.: PSYCH 110 or HDFS 230. Not open to seniors. HDFS-272-0-1305

HDFS 300. Problems in Family and Child Development. (Var.) I, II, S. Independent or small group study. Pr.: Consent of instructor. HDFS-300-3-1305

HDFS 310. The Preschool Child. (3) I, II, S. On sufficient demand. Principles of development and growth of children from conception to five years of age in homes and in groups. Pr.: PSYCH 110 and sophomore standing. HDFS-310-0-1305

HDFS 311. Preschool Child Lab. (1) I, II, S. On sufficient demand. Observation of the development and guidance of children from birth to five years of age with emphasis on observation of children in groups. Open to HDFS and home economics education majors only. Conc. with HDFS 310. HDFS-311-1-1305

HDFS 315. Community Resources for Children. (3) On sufficient demand. Study of legislation, community agencies, and programs pertaining to children. Field trips arranged. Pr.: HDFS 310 and SOCIO 211. HDFS-315-0-1305

HDFS 320. Microcomputers in Human Services and the Home. (2-3) II. 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-320-1-1305

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.: Sophomore standing. HDFS-350-0-1305

HDFS 370. Parenting. (3) II. Principles and philosophies of parenting. How to establish a nurturing relationship between parents and their children. Pr.: HDFS 230. HDFS-370-0-1305

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 or consent of instructor. HDFS-420-0-1305

HDFS 430. Middle Childhood. (2) I. Developmental characteristics of middle childhood as a basis for guidance with emphasis on understanding of family and peer group relationships. To be taken conc. with HDFS 431. Pr.: PSYCH 110; and HDFS 310 or EDAF 215 or PSYCH 280. HDFS-430-0-1305

HDFS 431. Middle Childhood Lab. (1) I. Observation, recording, and evaluating out-of-school behavior of children six to twelve years of age with a focus on the helping relationship in light of developmental aspects. To be taken conc. with HDFS 430. HDFS-431-1-1305

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 230, preparatory workshop, and consent of instructor. HDFS-440-0-1305

HDFS 441. Human Development Facilitation Lab. (1) I, II. Recitation group leader for HDFS 230. Assists students in discussion and preparing group presentations; evaluates written work and course participation of students in group. Conc. HDFS 440. HDFS-441-1-1305

HDFS 465. 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.: One course in social sciences. HDFS-465-0-1305

Undergraduate and graduate credit in minor field

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 230 or PSYCH 280. HDFS-510-0-1305

HDFS 520. The Adolescent. (2) II. Focus on interpersonal processes; principles and characteristics of the helping relationship in light of developmental aspects of adolescence. Take HDFS 521 conc. Pr.: Five hours of HDFS or five hours of a combination of PSYCH and EDAF PSYCH; and junior standing. HDFS-520-0-1305

HDFS 521. The Adolescent Lab. (1) II. Observation, recording, and evaluating of out-of-school behavior of adolescents with focus on developing a helping relationship with an adolescent. Take HDFS 520 conc. HDFS-521-1-1305

HDFS 524. Early Childhood Education Program Models. (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-524-0-1305

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 and STAT 330. HDFS-528-0-1305

HDFS 530. Advanced Study of Children. (3) On sufficient demand. Behavioral characteristics and developmental processes during childhood years. Pr.: Junior standing; and HDFS 310 or EDAF 215 or PSYCH 280. HDFS-530-0-1305

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. Pr.: HDFS 310 and 311. HDFS-540-0-1305

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 311. HDFS-541-0-1305

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 311. HDFS-545-1-1305

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. HDFS-546-1-1305

HDFS 580. Directed Field Experience. (6-8) I, II, S. A block field placement in agencies in Manhattan and surrounding areas. Faculty-supervised experience in direct service to clients: individuals, groups, and communities. Weekly seminar during placement emphasizes theory underlying the practice. Pr.: SOCWK 260 and consent of instructor. HDFS-580-2-1305

HDFS 585. Professional Seminar in Family Life Education. (4) I, 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-585-0-1305

HDFS 590. Proseminar in Child and Family. (1-3) On sufficient demand. Review of specific issues or topics affecting children and/or families. Pr.: Junior standing and consent of instructor. HDFS-590-0-1305

Undergraduate and graduate credit
HDFS 625. Directed Experiences in Early Childhood Education. (8) I, II, S. Participation in a preschool program; planning, instruction, evaluation. Prearrangement and consent of instructor required. Pr.: HDFS 537 and 538 and full admission into teacher education. HDFS-625-2-1305

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 family and child development. HDFS-626-0-1305

HDFS 650. The Family. (2-3) I, S. Consideration of the family throughout the family life cycle; developmental tasks at each stage. Present-day resources available for strengthening American families. Pr.: HDFS 350. HDFS-650-0-1305

HDFS 652. Black Family. (2-3) Selected topics for understanding life styles of black families. Implications for professionals working with black children and families. Pr.: Nine hours of social science and junior standing. HDFS-652-0-1305

HDFS 654. Death and the Family. (2-3) I, S. Exploration of contemporary attitudes toward death and dying; related influences on individual development and family life. Pr.: HDFS 650 or SOCIO 640. HDFS-654-0-1305

HDFS 670. Parent Education. (3) I, II. Principles in child development and family relationships applied to professional group and individual work with parents. Pr.: HDFS 310; HDFS 650 or six hours psychology; and consent of instructor. HDFS-670-0-1305

HDFS 700. Problems in Human Development and Family Studies. (Var.) I, II, S. Independent study on aspects of family and child development. Pr.: Consent of instructor. HDFS-700-3-1305

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 social-behavioral science and consent of instructor. HDFS-704-0-1305

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-708-0-1305

HDFS 710. Child Care: Components and Issues. (2-3) On sufficient demand. 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-710-0-1305

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-728-0-1305

HDFS 750. Low-Income Families. (2-3) On sufficient demand. Factors affecting family life in disadvantaged families; life styles of subcultures; proposed programs; implications for persons working with low-income children and families. Pr.: HDFS 650. HDFS-750-0-1305

Graduate credit

HDFS 810. Child Development. (3) I, II. Behavioral characteristics and developmental processes in childhood and adolescence. Analysis of developmental trends and issues in terms of research evidence and theoretical expectations. Pr.: HDFS 310; and three additional hours in HDFS or child psychology. HDFS-810-0-1305

HDFS 815. Infant Behavior and Development. (3) II. In alternate years. Study of the infant as a developing individual within the family; examination of the theories and research relevant to development from conception through the second year. Pr.: HDFS 310, HDFS 810, and BIOL 198. HDFS-815-0-1305

HDFS 820. Theories of Child Development. (3) I. Theories of development relating to physical, social, and psychological patterns of children's growth and interaction with the family and the community. Pr.: HDFS 310; and three additional hours in HDFS or child psychology. HDFS-820-0-1305

HDFS 822. Transition to Adulthood. (3) S. In alternate years. Advanced study of theory and research of the transition period from adolescence through youth to adulthood. Pr.: HDFS 520 and 810. HDFS-822-0-1305

HDFS 824. Parent-Child Interaction: Theory and Research. (3) II. Developmental theories and empirical research concerning the reciprocal interactions between parents and their children focusing on the socialization of the child within the family. Pr.: HDFS 810. HDFS-824-0-1305

HDFS 830. Advanced Program Development. (2-3) Alternate II. Analysis of the process and application of child development theory to early childhood program planning. Pr.: HDFS 820. HDFS-830-0-1305

HDFS 840. Social Processes in Human Development. (3) II. Integration of principles of social maturation and growth with physiological and self-processes of human development. Pr.: Eight hours natural science and eight hours social science. HDFS-840-0-1305

HDFS 842. Physiological Processes in Human Development. (3) In alternate years. Integration of principles of physiological growth with social and self-processes of human development. Pr.: Eight hours natural science and eight hours social science. HDFS-842-0-1305

HDFS 843. Self-Processes in Human Development. (3) Integration of precepts relating to self with principles of social and physiological processes in human development. Pr.: Eight hours natural science and eight hours social science. HDFS-843-0-1305

HDFS 845. Adult Development and Aging. (3) II. Developmental aging research as related to individual, social, and family functioning throughout adulthood. Pr.: Twelve hours social science. HDFS-845-0-1305

HDFS 850. Family Studies. (3) II. Survey of family research literature to illustrate various approaches to the study of the family and to understand family changes within the life cycle. Pr.: HDFS 650; and STAT 330 or 702. HDFS-850-0-1305

HDFS 852. Contemporary Family Theories. (3) I. Survey of contemporary family conceptual frameworks and theoretical perspectives, with emphasis on the application of family theory in basic and applied family research. Pr.: HDFS 650; and STAT 330 or 702. HDFS-852-0-1305

HDFS 854. Loss, Grief, and Bereavement. (3) II or S. Analysis of human loss, and the processes and dynamics of grief and bereavement, with implications for families, educators, and professional care-

givers. Pr.: HDFS 654 and consent of instructor. HDFS-854-0-1305

HDFS 855. Family Crisis. (3) I. The nature of stress in the family from a theoretical and research base, focusing on the genesis of family crisis and the family's response to stress and crisis. Pr.: HDFS 650. HDFS-855-0-1305

HDFS 862. Marital Interaction. (3) I. A study of the dynamics of marital interaction with emphasis upon the interpersonal relationships and processes of adjustment. Pr.: HDFS 350 and HDFS 650 and consent of instructor. HDFS-862-0-1305

HDFS 863. Single-Parent and Reconstituted Families. (3) I, II. Survey of research literature regarding single-parent and reconstituted families. Demography, complexity, problems, strengths, and processes of adjustment of family units and their members. Implications for professionals working with these families. Pr.: HDFS 650. HDFS-863-0-1305

HDFS 865. Human Sexuality. (3) II, alternate S. Focus on implications of personal and familial aspects of human sexuality throughout the life cycle. Pr.: HDFS 350 and six hours social science. HDFS-865-0-1305

HDFS 870. Principles of Marriage and Family Counseling. (3) II. Examination of processes in marriage and family counseling; study of interactions within the counseling setting; and application of knowledge of the family and of marriage to the helping relationship. Pr.: EDAF 823; HDFS 850; some of the material is confidential, therefore consent of instructor is required. HDFS-870-0-1305

HDFS 874. Clinical Theory and Practice. (3) I. Frameworks and skills for helping individuals within the family context. Study and observation of operations in family clinical programs and family therapy. Pr.: HDFS 272; HDFS 650; and HDFS 870 or conc. enrollment. HDFS-874-0-1305

HDFS 875. Delivery of Human Services. (3) I, II, alternate S. Cognitive and experiential understanding of professional responsibilities to work effectively with families in an educational outreach or consultative setting. Pr.: HDFS 879 or conc. enrollment. HDFS-875-0-1305

HDFS 878. Professional Studies in Family Therapy. (3) II. Analysis of professional issues, techniques, and responsibilities associated with working effectively with families in a family therapy setting. Pr.: HDFS 874. HDFS-878-0-1305

HDFS 879. Family Life Education and Consultation. (3) I, II. Theory and procedures for family life education and consultation with professional and volunteer staff in a variety of settings.

Pr.: HDFS 272 or 420; and HDFS 650. HDFS-879-0-1305

Practica in Human Development and Family Studies. (Var.) I, II, S. Supervised experience in providing help and/or instruction in the several areas of human development and family studies presented in terms of the special interests of the students. Consent of practicum supervisor is required for each.

HDFS 880. Practicum in Counseling. Same as PSYCH 860 and EDAF 863. Pr.: HDFS 870, EDAF 823. HDFS-880-2-1305

HDFS 881. Practicum in Family and Community Services. Pr.: HDFS 875 and 879. HDFS-881-2-1305

HDFS 882. Practicum in Study of Student Development. HDFS-882-2-1305

HDFS 883. Practicum in Early Childhood Education. Pr.: HDFS 535. HDFS-883-2-1305

HDFS 884. Practicum in Parent Education. Pr.: HDFS 670. HDFS-884-2-1305

HDFS 890. Research Methods in Human Development and Family Studies. (3) I, II. Study and application of family and human developmental methodology for research in graduate programs and professional careers. Pr.: STAT 330 or STAT 702. HDFS-890-0-1305

HDFS 891. Family Survey Research. (3) II. Principles and techniques for collection, coding, analysis, and interpretation of survey data from several family members. Computer-oriented. Pr.: STAT 330, HDFS 650 and 890. HDFS-891-0-1305

HDFS 892. Practicum in Human Development Research. (Var.) I, II, S. Observation, modification, and reporting of behavior. Pr.: HDFS 890; course in methods of research; nine other graduate hours in human development and family studies; consent of instructor. HDFS-892-4-1305

HDFS 894. Readings in Human Development and Family Studies. (Var.) I, II, S. Implications of research findings in preparation for professional work in counseling, teaching, and research in human development and family studies. Pr.: Twelve hours in social-behavioral science; and consent of instructor. May be taken for a maximum of nine hours. HDFS-894-3-1305

HDFS 895. Principles and Techniques of Family Measurement. (3) II. The comparative reliability and validity of current measures of family interaction and analysis of their suitability for use in program evaluation of family life education and family therapy. Pr.: HDFS 850 and a graduate level research methods course. HDFS-895-0-1305

HDFS 896. Advanced Family Therapy. (3) I. Analysis of care management issues and literature related to the application of advanced techniques in family therapy. To be taken concurrently with HDFS 880. Pr.: HDFS 870. HDFS-896-0-1305

HDFS 899. Research in Human Development and Family Studies. (Var.) I, II, S. Individual research problems which may form the basis for the master's thesis or report. Pr.: Consent of major professor. HDFS-899-4-1305

HDFS 908. Topics in Family Life Education and Consultation. (3) On sufficient demand. Recent research, theory construction, and program development; focusing on selected relevant topics. Designed for doctoral students in family life education and consultation. Pr.: HDFS 879. HDFS-908-0-1305

HDFS 910. Topics in Marriage and Family Therapy. (1-3) I, II. Examination of recent research, theory, and clinical practice related to marriage and family therapy. Pr.: HDFS 870 and consent of instructor. May be taken up to nine hours. HDFS-910-0-1305

HDFS 950. Advanced Family Theory. (3) I. In alternate years. Examination of theoretical approaches to the study of the family unit from the perspective of interpersonal relationships. Emphasis on axiomatic theory construction in contemporary family studies literature. Pr.: HDFS 850, 852, and 890. HDFS-950-0-1305

HDFS 979. Advanced Family Life Education and Consultation. (3) II. In alternate years. Theory and practices of family life education and consultation, including issues of development of the family life profession and national family policy. Pr.: HDFS 879. HDFS-979-0-1305

HDFS 981. Advanced Practicum in Family and Community Services. (1-3) Supervised experience in family life education and consultation. Pr.: HDFS 875, HDFS 879, HDFS 881, and consent of instructor; may be taken for a maximum of six hours. HDFS-981-2-1305

HDFS 985. Ph.D. Practicum in Marriage and Family. (1-3) I, II, S. Supervised experience in family therapy. Consent of instructor is required. Pr.: HDFS 880. May be taken for up to nine hours. HDFS-985-2-1305

HDFS 986. Practicum in Supervision of Marriage and Family Therapy. (1-3) I, II, S. Supervised experience in supervision of marital and family therapy. Consent of instructor required. Pr.: HDFS 985. May be taken for up to nine hours. HDFS-986-2-1305

HDFS 988. Conjoint and Group Techniques in Family Counseling. (3) II, S. Advanced theory in marriage and family

counseling with emphasis on group techniques. Pr.: HDFS 880 and consent of instructor. HDFS-988-0-1305

HDFS 990. Dissertation Proposal Seminar. (1) I, II. Presentation and discussion of proposals for dissertation research. Pr.: Six hours of statistics, three hours of research design or methods, and consent of major professor. HDFS-990-0-1305

HDFS 999. Research in Human Development and Family Studies. (Var.) I, II, S. Pr.: Consent of major professor. HDFS-999-4-1305

Courses in family economics

Undergraduate credit

FEC 110. Consumer Action. (2) I, II. Consumer rights and responsibilities emphasizing issues and problems confronting students, their families, and others as consumers. Political, social, economic, and legal implications of consumer decisions. Competencies and techniques for taking effective action. FEC-110-0-1304

FEC 400. Family Economics. (3) I, II. Economic forces affecting families, and management by families of their economic resources. Pr.: ECON 110 or conc. enrollment. FEC-400-0-1304

FEC 405. Personal and Family Finance. (3) I, II. Practical aspects of money management with emphasis on consumer credit, savings, insurance, income tax, home financing, and budgeting. FEC-405-1-1304

FEC 410. Consumer Relations Practicum. (Var.) I, II, S. Supervised experiences in business-consumer relations and study of consumer issues, including consumer redress. Pr.: Consent of instructor. FEC-410-2-1304

FEC 415. Consumer Law. (3) II. A study of law and agency regulations related to consumer protection. Pr.: Junior standing. FEC-415-0-1304

FEC 460. Family Resource Management Theory and Application. (3) I, II. The process by which individuals and families identify needs, set goals, and allocate resources. Two hours lec. and two hours lab each week. Pr.: Sophomore standing. FEC-460-1-1304

FEC 499. Problems in Family Economics. (Var.) I, II, S. Independent study. Pr.: Consent of instructor. FEC-499-3-1304

Undergraduate and graduate credit

FEC 600. Economic Status of Women. (3) I. Discrimination, rights, and responsibilities affecting the economic roles of women. Income, wealth, gainful and nongainful employment, taxation, laws, and attitudes. Pr.: Senior or graduate standing and nine credit hours in social science or women's studies. FEC-600-0-1304

FEC 605. Consumers and the Market. (3) I. Problems of the consumer in the present market, market practices, aids toward intelligent buying of commodities, and the types of protection, including legislation. Pr.: ECON 110. FEC-605-0-1304

FEC 610. Resources for Consumer Education. (2) S. Survey and evaluation of the content of consumer education books, pamphlets, and audiovisuals. Pr.: Six hours in consumer or education courses. FEC-610-0-1304

FEC 670. Field Study in Family Economics. (Var.) I, II, S. Supervised experiences with community action programs and consumer services in industry and government agencies. May be taken more than one semester. Pr.: FEC 400 and 460. FEC-670-2-1304

FEC 680. Seminar in Family Economics. (1-3) I, II, S. A review of research literature; trends in the field of family economics; the contribution of the area to the family and community. Pr.: Senior or graduate standing. FEC-680-0-1304

FEC 700. Families in the American Economy. (3) I. Study of the interrelation of the national economy and the family, family incomes and expenditures, cost of living estimates, measures of family welfare, public policies affecting family welfare and standards of living. Pr.: ECON 110 or conc. enrollment. FEC-700-0-1304

FEC 705. Financial Problems of Families. (3) I. Financial problems confronting families, primarily of the middle-income classes; study of insurance, credit, savings, and estate planning as they relate to family living. Pr.: FEC 405. FEC-705-0-1304

FEC 710. Consumer Marketing Programs and Policies. (3) II, in alternate years. Review of consumer marketing programs and policies of education, business, and government as they bear upon consumer decision-making in the market. Pr.: FEC 605 or equiv. FEC-710-0-1304

FEC 712. Family Financial Counseling. (3) II. Analyses of specific financial problems of families seeking counsel from cooperating agencies. Pr.: FEC 705 or conc. enrollment. FEC-712-0-1304

FEC 713. Financial Counseling Practicum. (1-4) I, II, S. Financial counseling in the Family Center or with a cooperating agency or business. Pr.: FEC 712 or conc. enrollment. Placement contingent on staff approval. FEC-713-2-1304

FEC 760. Family Decision Making. (3) II, in alternate years. Processes by which families and individuals make and act upon choices regarding family resource allocation. Pr.: REC 460 or HDFS 650. FEC-760-0-1304

FEC 770. Economics of Aging. (3) II, in alternate years. Analysis of economic factors associated with aging; implications for individuals, society, and the economy. Pr.: FEC 700 or SOCIO 744 or ECON 633. FEC-770-0-1304

FEC 780. Problems in Family Economics. (Var.) I, II, S. Individual investigation in standards of living and family expenditures; housing and household equipment; time and motion study; and use of family resources. Pr.: Consent of instructor. FEC-780-3-1304

Graduate credit

FEC 811. Consumer Education. (3) S. Evaluation of syllabi and approaches to teaching consumer economics and consumer affairs. Pr.: FEC 400. Same as EDAO 811. FEC-811-0-1304

FEC 815. Advances in Consumer and Family Economics. (3) II, in alternate years. Critical analysis of research in consumer and family economics. Possible topics include economic analysis of consumption decisions, labor force participation, and effects of public policies on families. Pr.: FEC 605, FEC 700, ECON 520, and two graduate level courses in statistics. FEC-815-0-1304

FEC 860. Advances in Family Management. (3) II, in alternate years. Critical analysis of current research in family resource management. Possible topics include goal formation, resource evaluation, standard setting, planning, and implementing strategies. Pr.: REC 460 or FEC 760 and STAT 702 or STAT 703. FEC-860-0-1304

FEC 894. Readings in Family Economics. (1-3) I, II. Selected review of literature in family economics, housing, consumer finance, consumer economics, home management, household equipment, consumer product safety, and the consumer movement. Pr.: FEC 400 or FEC 700; six hours of social science; and consent of department head. May be taken more than once. FEC-894-3-1304

FEC 899. Research in Family Economics. (Var.) I, II, S. Individual research problems which may form the basis for the master's thesis. Pr.: Consent of instructor. FEC-899-4-1304

FEC 999. Research in Family Economics. (Var.) I, II, S. Pr.: Consent of major professor. FEC-999-4-1304

Faculty

AGAN, ANNA TESSIE, Assoc. Prof. Emerita of Family Economics; Agr. Exp. Sta. (1929). BS 1927, U. of Nebraska; MS 1930, 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. (*)

ATKINSON, DAISEY E., Assoc. Prof. Emerita of Foods and Nutrition (1959). BA 1938, MS 1953, Iowa St. U.

AVERELL, ROBERT B., Adjunct Asst. Prof. of Clothing, Textiles, and Interior Design (1981). BA 1964, U. of Pennsylvania; MS 1969, Rutgers.

BALK, DAVID E., Asst. Prof. of Human Development and Family Studies (1987). BA 1965, Immaculate Conception Seminary; MA 1970, Marquette U.; PhD 1981, U. of Illinois. (*)

BARNES, HOWARD, Assoc. Prof. of Human Development and Family Studies; Agr. Exp. Sta. (1985). BA 1972, Macalester Col.; MS 1980, Kansas St. U.; PhD 1985, U. of Minnesota. (*)

BARR, MICHAEL G., Adjunct Instr. of Dietetics (1987). BS 1978, U. of Texas at Austin; MS 1981, Southwest Texas St. U.

BARTZ, JACQUELYN, Adjunct Instr. of Dietetics (1975). BS 1965, MS 1967, Ohio St. U.

BECKHAM, KATHRYN, Asst. Prof. of Human Development and Family Studies (1986). BA 1975, MSW 1982, PhD 1986, U. of Georgia.

BERGEN, BETSY, Assoc. Prof. of Human Development and Family Studies (1966). AB 1949, Ottawa U.; MS 1964, PhD 1972, Kansas St. U. (*)

BOLLMAN, STEPHAN RAY, Prof. of Human Development and Family Studies; Agr. Exp. Sta. (1966). BS 1957, MS 1963, PhD 1966, Iowa St. U. (*)

BOSCHETTI, MARGARET, Assoc. Prof. of Clothing, Textiles, and Interior Design (1986). BS 1961, Henderson St. U.; MS 1965, U. of Tennessee; PhD 1984, U. of Michigan.

BOWERS, JANE RAYMOND, Prof. and Head, Foods and Nutrition; Agr. Exp. Sta. (1966). BS 1962, MS 1963, PhD 1967, Kansas St. U. (*)

BRADSHAW, MICHAEL H., Assoc. Prof. of Human Development and Family Studies (1978). BS 1968, MS 1971, Brigham Young U.; PhD 1978, Kansas St. U.

BRIGGS, BEVERLY, Asst. Prof. of Human Development and Family Studies (1982). BS 1968, MS 1971, U. of Illinois; PhD 1982, Ohio St. U. (*)

BROCKMAN, HELEN L., Prof. Emerita of Clothing, Textiles, and Interior Design (1967). BA 1926, U. of Iowa. (*)

BURKE, KATHERINE K., Prof. of Clothing, Textiles, and Interior Design (1970). BS 1958, MS 1971, Kansas St. U.

BUTH, DENNIS K., Adjunct Asst. Prof. of Dietetics (1976). BS 1968, Wichita St. U.; MD 1972, U. of Kansas.

CANNON, BARBARA, Instr. of Clothing, Textiles, and Interior Design (1981). BS 1971, MS 1981, Kansas St. U.

CANTER, DEBORAH D., Assoc. Prof., Hotel, Restaurant, Institution Management and Dietetics (1977). BS 1972, MS 1974, PhD 1977, U. of Tennessee. (*)

CANTRELL, JOYCE A., Instr. of Human Development and Family Studies (1986). BS 1983, MS 1986, Kansas St. U.

CAUL, JEAN FRANCES, Prof. Emerita of Foods and Nutrition (1967). AB 1937, Lake Erie Col.; MA 1938, PhD 1942, Ohio St. U. (*)

CLARKE, MARY P., Assoc. Prof. of Foods and Nutrition (1973). BS 1950, Indiana U.; MS 1970, Indiana St. U.; PhD 1973, Kansas St. U.

CORBIN, MARILYN B., Asst. Prof. of Clothing, Textiles, and Interior Design (1975). BS 1970, Southwestern Col., Winfield, Kansas; MS 1972, Kansas St. U.

CORRALES, RAMON, Adjunct Assoc. Prof. of Human Development and Family Studies (1981). BA 1966, DeLaSalle Col., Manila; MA 1968, Xavier U., Philippines; PhD 1974, U. of Minnesota.

COULSON, L. ANN, Asst. Prof. of Human Development and Family Studies; Agr. Exp. Sta. (1987). BS 1974, U. of Missouri; MS 1981, U. of Arkansas; PhD 1987, U. of Missouri.

CRAIGIE, BARBARA, Asst. Prof. Emerita of Clothing, Textiles, and Interior Design (1954). BA 1932, U. of Minnesota; MA 1942, U. of Missouri. (*)

DANA, JANICE T., Instr. of Hotel, Restaurant, Institution Management and Dietetics (1979). BS 1964, U. of North Carolina; MS 1966, Iowa St. U.

DANBY, JOHN HERBERT, Adjunct Asst. Prof. Dietetics (1984). MD 1956, U. of Leeds, England.

DEEGAN, ANN, Asst. Prof. of Clothing, Textiles, and Interior Design (1983). BS 1974, MS 1977, U. of California, Davis; PhD 1983, U. of Maryland.

DRAY, JEANNE F., Instr. of Foods and Nutrition (1985). BS 1971, U. of Missouri-Kansas City; MS 1976, Kansas St. U.

ELDRINGHOFF, SYLVAN, Instr. of Clothing, Textiles, and Interior Design (1982). BS 1958, MA 1968, U. of Missouri.

FILE, NANCY K., Instr. of Human Development and Family Studies (1984). BS 1978, U. of Pittsburgh; MS 1983, Purdue U.

FREUND, PATRICIA, Instr. of Dietetics (1980). BS 1969, Clarke Col.; MA 1976, U. of Nebraska.

FRIESEN, JUDITH A., Adjunct Instr. of Hotel, Restaurant, Institution Management and Dietetics (1983). BS 1972, Kansas St. U.; MS 1981, Wichita St. U.

FRYER, E. BETH, Prof. of Foods and Nutrition; Agr. Exp. Sta. (1959). BS 1945, U. of New Mexico; MS 1949, Ohio St. U.; PhD 1959, Michigan St. U. (*)

GILROY, MARILYN, Adjunct Instr. of Dietetics (1981). BS 1962, Col. of St. Francis; MS 1966, St. Louis U.

GREGOIRE, MARY B., Asst. Prof. of Hotel, Restaurant, Institution Management and Dietetics; Agr. Exp. Sta. (1985). BS 1974, MS 1975, North Dakota St.; PhD 1985, Kansas St. U. (*)

GREIG, BETTIE, Adjunct Instr. of Dietetics (1981). BSHE 1948, BSE 1949, U. of Arkansas; MS 1968, Kansas St. U.

GRUNEWALD, KATHARINE K., Assoc. Prof. of Foods and Nutrition; Agr. Exp. Sta. (1979). BS 1974, U. of Wisconsin; MS 1976, PhD 1979, U. of Kentucky. (*)

HALL, JUDITH A., Instr. of Hotel, Restaurant, Institution Management and Dietetics (1980). MS 1973, Kansas St. U.

HARBERS, CAROLE ANN ZIMMERMAN, Assoc. Prof. of Foods and Nutrition; Agr. Exp. Sta. (1979). BS 1969, Ohio U.; MS 1976, Virginia Poly. Inst and St. U.; PhD 1979, Kansas St. U. (*)

HARRISON, DOROTHY LUCILE, Prof. Emerita of Foods and Nutrition; Agr. Exp. Sta. (1947). BS 1938, Dakota Wesleyan U.; MS 1943, PhD 1947, Iowa St. U. (*)

HEARNE, SHARON, Instr. of Hotel, Restaurant, Institution Management and Dietetics (1984). BS 1977, Texas Tech U.; MS 1984, Kansas St. U.

HEINZ, JO L., Adjunct Asst. Prof. of Clothing, Textiles, and Interior Design (1985). BS 1971, Kansas St. U.

HERRING, NANCY S., Adjunct Instr. of Dietetics (1983). MS 1974, Purdue U.

HIGGINS, MARY L., Adjunct Asst. Prof. of Foods and Nutrition (1985). BS 1975, MS 1979, PhD 1982, Iowa St. U.

HILL, OPAL BROWN, Assoc. Prof. Emerita of Clothing, Textiles, and Interior Design (1944). BS 1944, MS 1950, Kansas St. U. (*)

HOEFLIN, RUTH, Dean and Prof. Emerita of Home Economics; Agr. Exp. Sta. (1957). BS 1940, Iowa St. U.; MA 1945, U. of Michigan; PhD 1950, Ohio St. U. (*)

HOLCOMB, CAROL ANN, Assoc. Prof. of Foods and Nutrition; Women's Studies Faculty (1979). AB 1966, Mercer U.; MA 1975, PhD 1977, Oregon St. U. (*)

HOOVER, LU ANN, Instr. of Human Development and Family Studies (1978). BS 1974, MS 1978, Kansas St. U.

HOWE, HAZEL DELL, Assoc. Prof. Emerita of Clothing and Textiles (1936). BS 1921, MS 1935, Kansas St. U. (*)

HOWE, JERELENE R., Assoc. Prof. Emerita of Clothing, Textiles, and Interior Design (1965). BS 1951, MS 1965, Kansas St. U.

HUCK, JANICE E., Asst. Prof. of Clothing, Textiles, and Interior Design (1986). BS 1969, MS 1975, PhD 1986, Kansas St. U.

HUYCK, ELNORA T., Assoc. Dean and Prof. Emerita of Home Economics; Agr. Exp. Sta. (1977). BS 1940, MS 1958, Kansas St. U.; PhD 1971, U. of Minnesota. (*)

INGALSBE, NOALEEN G., Adjunct Instr. of Dietetics (1983). BS 1969, Iowa St. U.; MS 1976, Kansas St. U.

JACKSON, SUSAN E., Asst. to the Dean; Instr. of Human Ecology (1987). BA 1982, Bowdoin Col.; MA 1987, Kansas St. U.

JONES, JOSEPH H., Adjunct Prof. of Clothing, Textiles, and Interior Design (1984).

JONES, JOYCE E., Asst. Prof.; Human Development and Family Studies (1975). BS 1972, Tex. A & I U.; MS 1973, U. of Nevada; PhD 1987, Oklahoma St. U.

JONES, STEPHAN A., Adjunct Instr. of Human Development and Family Studies (1982). BS 1960, U. of Utah, MSW 1963, Brigham Young U.

JURICH, ANTHONY P., Prof. of Human Development and Family Studies; Agr. Exp. Sta. (1972). BS 1969, Fordham U.; MS 1971, PhD 1972, Pennsylvania St. U. (*)

KENNEDY, CARROLL E., Prof. Emerita of Human Development and Family Studies; Agr. Exp. Sta. (1970). AB 1949, Wheaton Col.; MS 1953, Kansas St. U.; EdD 1963, U. of Maryland. (*)

KIRSCHNER, MOLLY S., Adjunct Instr. of Dietetics (1987). BS 1978, U. of Texas at Dallas.

LANG, GRACE E., Asst. Prof. of Foods and Nutrition (1976). BS 1965, Ohio St. U.; MS 1977, Kansas St. U.

LARSON, SUSAN S., Asst. Prof. Emerita of Human Development and Family Studies (1955). BS 1940, U. of Iowa; MS 1942, U. of Wisconsin.

LIENKAEMPER, GERTRUDE ELISE, Assoc. Prof. Emerita of Clothing and Textiles (1941). BS 1921, Oregon St. Col.; MS 1938, U. of Washington. (*)

LONG, IVALEE McCORD, Prof. Emerita of Human Development and Family Studies (1957). BS 1933, MS 1951, Kansas St. U.; PhD 1964, Purdue U. (*)

LOOKHART, GEORGE, Adjunct Prof. of Foods and Nutrition (1982). BS 1968, Kearney St. Col.; PhD 1973, U. of Wyoming. (*)

MacLAURIN, DONALD J., Instr. of Hotel, Restaurant, Institution Management and Dietetics (1987). BS 1977, Florida International U.; MS 1987, U. of Nevada-Las Vegas.

MALLARD, CHARLES E., Adjunct Instr. of Human Development and Family Studies (1987). BA 1961, Stetson Univ.; MA 1975, Azusa Pacific Col.

MANNING, ROBERT T., Adjunct Asst. Prof. of Dietetics (1983). MD 1954, U. of Kansas Medical Center.

McCOMAS, MARLENE J., Instr. of Clothing, Textiles, and Interior Design (1980). BS 1974, MS 1980, U. of Wisconsin-Stout.

McCULLOUGH, ELIZABETH, Assoc. Prof. of Clothing, Textiles, and Interior Design (1978). BS 1974, Ohio St. U.; MS 1975, PhD 1978, U. of Tennessee. (*)

McNEIL, JOAN N., Asst. Prof. of Human Development and Family Studies (1970). BS 1951, Kansas St. U.; MS 1956, U. of Minnesota; PhD 1980, Kansas St. U. (*)

MEEK, JOSEPH C., JR., Adjunct Asst. Prof. of Dietetics (1987). AB 1954, MD 1957, U. of Kansas.

MINSHALL, BETTIE C., Asst. Prof. of Clothing, Textiles, and Interior Design; Agr. Exp. Sta. (1987). BS 1973, Northwest Missouri St. U.; MS 1979, Iowa St. U.; PhD 1986, U. of Minnesota.

MORSE, RICHARD L. D., Prof. Emeritus of Human Development and Family Studies (1955). BA 1938, U. of Wisconsin; PhD 1942, Iowa St. U. (*)

MOSER, PATRICIA, Adjunct Instr. of Dietetics (1986). BS 1982, Kansas St. U.

MOXLEY, VIRGINIA M., Assoc. Dean and Prof. of Human Development and Family Studies (1985). BS 1968, MS 1969, PhD 1977, Kansas St. U.

MULLEN, IVA MANILLA, Asst. Prof. Emerita of Foods and Nutrition (1936). BS 1925, Kansas St. U.; MS 1928, Iowa St. U. (*)

MUNSON, DEANNA M., Asst. Prof. of Clothing, Textiles, and Interior Design; Agr. Exp. Sta. (1967). BS 1966, MS 1967, PhD 1980, Kansas St. U. (*)

MURRAY, JOHN P., Prof. and Head of Human Development and Family Studies (1985). BA 1965, John Carroll U.; MA 1967, PhD 1970, The Catholic U. of America.

NEWBY, FRANCES ANN, Asst. Prof. Emerita of Clothing, Textiles, and Interior Design (1963). BFA 1961, Kansas City Art Inst.; MArch 1970, Kansas St. U.

NEWELL, KATHLEEN, Prof. Emerita of Foods and Nutrition; Agr. Exp. Sta. (1962). BS 1944, Kansas St. U.; MS 1951, U. of Wisconsin; PhD 1973, U. of Tennessee. (*)

PARTLOW, CHARLIE, Asst. Prof. of Hotel, Restaurant, Institution Management and Dietetics (1981). BS 1979, Mississippi St. U.; MS 1980, U. of Southern Mississippi; PhD 1987, Kansas St. U.

PELLETIER, LAWRENCE JR., Adjunct Asst. Prof. of Dietetics (1985). BA 1964, Bowdoin Col.; MD 1968, Columbia U.

PENCE, KAREN T., Asst. to Dean, Instr. of Human Ecology (1977). BSE 1971, Emporia St. U.; MS 1972, Kansas St. U.

PENNER, KAREN P., Assoc. Prof. of Foods and Nutrition (1973). BS 1971, MS 1972, Kansas St. U.; PhD 1981, Michigan St. U. (*)

PETERSON, MARY DON, Assoc. Prof. and Head of Clothing, Textiles, and Interior Design (1968). BS 1958, MS 1959, U. of Tennessee; EdD 1975, Oklahoma St. U. (*)

PORESKY, ROBERT H., Assoc. Prof. of Human Development and Family Studies; Agr. Exp. Sta. (1972). AB 1963, MS 1967, PhD 1969, Cornell U. (*)

RANHOTRA, GURBACHAN, Adjunct Prof. of Foods and Nutrition (1977). BVS 1958, MS 1960, Agra U., India; PhD 1964, U. of Minnesota. (*)

RASMUSSEN, ALBIE C., Asst. Prof. Emerita of Family Economics (1966). BS 1962, U. of Alaska; MS 1964, Kansas St. U.

REAGAN, BARBARA, Prof. of Clothing, Textiles, and Interior Design; Agr. Exp. Sta. (1976). BS 1968, Syracuse U.; MS 1972, PhD 1976, Purdue U. (*)

REEVES, ROBERT D., Prof., Foods and Nutrition; Agr. Exp. Sta. (1977). BA 1964, MS 1965, Texas Tech. U.; PhD 1971, Iowa St. U. (*)

ROACH, FAITH RUSSELL, Assoc. Prof. of Hotel, Restaurant, Institution Management and Dietetics (1965). BS 1947, MS 1966, PhD 1973, Kansas St. U. (*)

ROOS, MAUREEN E., Adjunct Asst. Prof. of Dietetics (1983). MD 1978, U. of Kansas.

RO-TROCK, LAURENCE G., Adjunct Asst. Prof. of Human Development and Family Studies (1984). PhD 1978, U. of Missouri-KC.

RUESCHHOFF, BERNARD, Instr. of Clothing, Textiles, and Interior Design (1985). BS 1982, Kansas St. U.; MS 1985, Oklahoma St. U.

RUSSELL, CANDYCE S., Prof. of Human Development and Family Studies; Agr. Exp. Sta. (1974). BS 1968, Cornell U.; MA 1972, PhD 1975, U. of Minnesota. (*)

SCHEIDT, RICK JAMES, Assoc. Prof. of Human Development and Family Studies (1976). BA 1967, MA 1969, California St. U.; PhD 1973, U. of Nebraska. (*)

SCHUMM, WALTER R., Assoc. Prof. of Human Development and Family Studies; Agr. Exp. Sta. (1979). BS 1972, The Col. of William and Mary; MS 1976, Kansas St. U.; PhD 1979, Purdue U. (*)

SEGO, R. JEAN, Asst. to Dean; Instr. of Human Ecology (1967). BA 1960, Friends U.; MS 1967, Kansas St. U.

SETSER, CAROL S., Prof. of Foods and Nutrition; Agr. Exp. Sta. (1976). BS 1962, U. of Missouri; MS 1964, Cornell U.; PhD 1971, Kansas St. U. (*)

SHOULBERG, DONALD J., Adjunct Asst. Prof. of Human Development and Family Studies (1983). PhD 1975, U. of Kansas.

SHUGART, GRACE SEVERANCE, Prof. Emerita of Dietetics, Restaurant and Institutional Management; Agr. Exp. Sta. (1951). BS 1931, Washington St. U.; MS 1938, Iowa St. U. (*)

SLINKMAN, ZOE E., Prof. Emerita; Clothing, Textiles, and Interior Design (1967). BS 1947, Greeley, Colorado St. Col.; MS 1970, Kansas St. U.

SMITH, CHARLES A., Assoc. Prof. of Human Development and Family Studies (1978). BS 1968, U. of Dayton; MS 1970, PhD 1972, Purdue U.

SMITH, MEREDITH, Assoc. Prof. of Foods and Nutrition, Agr. Exp. Sta. (1981). BS 1970, Trinity U.; PhD 1978, Virginia Poly. Inst. and St. U. (*)

SPEARS, MARIAN C., Prof. and Head of Hotel, Restaurant, Institution Management and Dietetics; Agr. Exp. Sta. (1975). BS 1942, MS 1947, Western Reserve U.; PhD 1971, U. of Missouri. (*)

STITH, MARJORIE MAY, Prof. Emerita of Human Development and Family Studies (1961). BS 1943, Alabama St. Col. for Women; MS 1958, PhD 1961, Florida St. U. (*)

STONE, MARTHA B., Assoc. Prof., Foods and Nutrition; Agr. Exp. Sta. (1977). BS 1974, MS 1975, PhD 1977, U. of Tennessee. (*)

STOWE, BARBARA S., Dean and Prof. of Clothing, Textiles, and Interior Design (1983). BS 1954, U. of Nebraska; MA 1957, Michigan St. U.; PhD 1973, U. of North Carolina-Greensboro and North Carolina St. U.

SWEET, DONNA E., Adjunct Asst. Prof. of Dietetics (1987). BS 1970, MS 1972, Wichita St. U.; MD 1979, U. of Kansas.

TINKLIN, GWENDOLYN LaVERNE, Prof. Emerita of Foods and Nutrition; Agr. Exp. Sta. (1943). BS 1940, MS 1944, Kansas St. U. (*)

TUCKER, MARY E., Prof. Emerita of Clothing, Textiles, and Interior Design (1974). BS 1953, Northwest St. Col., Oklahoma; MS 1959, Oklahoma St. U.; MS 1969, Iowa St. U.

VILLASI, LUDWIG, Asst. Prof. of Clothing, Textiles, and Interior Design (1975). BS 1968, MS 1975, Wayne St. U. (*)

VIN ZANT, WHITNEY L., Adjunct Asst. Prof. of Dietetics (1983). MD 1971, U. of Kansas.

WALKER, DORIS K., Assoc. Prof. of Human Development and Family Studies (1984). BS 1953, MS 1973, PhD 1975, U. of California, Davis.

WANSKA, SUSAN K., Assoc. Prof. of Human Development and Family Studies (1978). PhD 1977, U. of Wisconsin.

WEST, LOUELLEN, Instr. of Human Development and Family Studies (1977). BS 1966, Harding Col.; MS 1968, U. of Illinois.

WRIGHT, DAVID, Asst. Prof. of Human Development and Family Studies; Agr. Exp. Sta. (1985). BS 1971, California St. U.; MS 1977, Chapman Col.; PhD 1985, U. of Georgia. (*)

ZAYAS, JOSEPH, Prof. of Foods and Nutrition; Agr. Exp. Sta. (1983). MS 1956, PhD 1962, DSc 1970, Tech. Inst., Moscow. (*)

Veterinary Medicine

John L. Noordsy,* Acting Dean
Carolyn V. Roberts, Assistant to the Dean
101 Trotter Hall
532-5660

General Requirements

Admission

Enrollment in the College of Veterinary Medicine is limited to well-qualified students after completing the minimum 71 required hours of pre-professional courses (see pre-professional requirements). A student must have at least a B (3.0) 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 meeting academic requirements. 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 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 KSU 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 associate dean, College of Veterinary Medicine, for current information regarding contract states. There is also a limited number of at-large positions 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 Associate 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 Kansas State University in the College of Arts and Sciences or the College of Agriculture or in other academically accredited institutions.

Listed below are required courses, with KSU course numbers listed at left.

Requirements

ENGL 100	English Composition I	3
ENGL 120	English Composition II	3
SPCH 105 or 106	Public Speaking	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 555	Microbiology (with lab)	5
ASI 102	Principles of Animal Science	3
ASI 103	Dairy Science	1
ASI 104	Poultry Science	1
ASI 105	Animal Sciences and Industry	1
ASI 318	Fundamentals of Nutrition	3
ASI 500	Genetics	3
Social sciences and/or humanities		12
		71

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 section on Fees in the front of the catalog.

Doctor of veterinary medicine curriculum

The curriculum in veterinary medicine at Kansas State University was established to give individuals of this state an opportunity to pursue these studies in an environment where the facilities offered by other branches of the University would be

available. To educate the veterinarian to deal with the livestock problems that must be met, the student is required to take courses in livestock feeding, breeding, and judging; poultry, milk, and dairy inspection; chemistry, bacteriology, parasitology, and zoology; in addition to purely professional work.

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.

While not required, fourth year students are encouraged to accept off-campus externships when school is not in session.

See the Graduate School section for the program leading to the M.S. and Ph.D. degrees.

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—71; professional—156; total—227.)

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
		20

Spring semester

AP 705	Gross Anatomy II	6
AP 715	Developmental Organology and Placentation	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
		20

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
		20

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
		21

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
		22

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
		20

Fourth professional year**Summer (7 week session)**

SM 804	Clinical Medicine I	5
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Fall semester

SM 806	Clinical Medicine II	14
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Spring semester

SM 808	Clinical Medicine III	14
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Veterinary medical library

The College of Veterinary Medicine has a well-equipped library consisting of approximately 20,000 volumes which deal with all phases of veterinary medical literature and many allied fields. It subscribes to 700 journals and has a large audiovisual collection of over 1,500 items. Numerous additional textbooks and journals are available at the main library on campus.

Anatomy and Physiology

R. A. Frey,* Head

Professors Clarenburg,* Erickson,* Fedde,* Frey,* Gallagher,* Klemm,* Oehme,* Upson,* and Westfall;* Associate Professors Blecha,* Hartke,* and Quadri;* Assistant Professors Cash* and Troyer;* Instructor Miller-Davis; Emeriti: Professors Trotter and Weinman; Adjunct Professors Gardner, Hand,* and Lewis.*

The Department of Anatomy and Physiology presents courses in physiology, pharmacology, physiological chemistry, nutrition, gross anatomy, and microscopic anatomy at both the undergraduate and graduate levels.

Biophysical electronic instrumentation, an electron microscope, environmental chambers, scintillation counter, respiratory

mass spectrometer, treadmills, and other instruments are available for physiological and anatomical studies.

The graduate program in anatomy and physiology leads to the doctor of philosophy degree and the master of science degree with specialties in the areas of anatomy, pharmacology, physiological chemistry, physiology, and toxicology.

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-530-1-1218

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. AP-531-0-1218

Undergraduate and graduate credit

AP 700. Gross Anatomy I. (6) I. Gross dissection of the dog with comparative aspects of the cat. Three hours lec. and nine hours lab a week. Pr.: First-year standing in College of Veterinary Medicine. AP-700-1-1218

AP 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. Same as ASI 702 and SM 702. Pr.: First-year standing in College of Veterinary Medicine. AP-702-0-1218

AP 705. Gross Anatomy II. (6) II. Gross dissection of the horse and ruminant with comparative aspects of the pig, laboratory animals, and the chicken. Three hours lec. and nine hours lab a week. Pr.: AP 700. AP-705-1-1218

AP 710. Microscopic Anatomy I. (5) I. Origin, development, and microscopic structure and appearance of the cells and tissues of the animal body. Three hours lec. and six hours lab a week. Pr.: First-year standing in College of Veterinary Medicine. AP-710-1-1218

AP 715. Developmental Organology and Placentation of Domestic Animals. (2) II. Detailed organogenesis of the various body systems of the mammal correlating adult anatomy with its developmental basis; presentation of histology and anatomy of the various placentae of domestic animals.

Two hours lec. a week. Pr.: BIOL 510, AP 700 or 725. AP-715-1-1218

AP 720. Anatomy III. (1) I. Through fall 1988. Topographic, applied, and surgical anatomy covering all organ systems including the central nervous system. The dog will be the major species emphasized. One hour lec. a week. Pr.: Third-year standing in College of Veterinary Medicine. AP-720-1-1218

AP 721. Anatomy IV. (1) II. Through spring 1989. Topographic, applied, and surgical anatomy covering all organ systems including the central nervous system. The large domestic animals will be the major species emphasized. One hour lec. a week. Pr.: AP 720. AP-721-1-1218

AP 725. Gross and Microscopic Anatomy. (5) I. Survey of the gross and microscopic anatomy of the major organ systems using the dog as a model; variations from canine structure seen in domestic animals will be emphasized where significant. Pr.: BIOL 201 or equiv. AP-725-1-1219

AP 737. Veterinary Physiology I. (6) I. Functioning of animals, to include cellular physiology and metabolism, renal physiology and water balance, digestive physiology, and animal behavior, with emphasis on physiologic control mechanisms, interrelationships of body systems, and criteria for evaluating animal health. Four hours lec. and six hours lab a week. Pr.: BIOCH 521 or equiv. AP-737-1-1218

AP 740. Veterinary Orientation. (1) I. Lectures on introduction to veterinary medicine. One hour lec. a week. Pr.: First-year standing in College of Veterinary Medicine. AP-740-0-1218

AP 747. Veterinary Physiology II. (6) II. Functioning of the nervous, muscular, endocrine, cardiovascular, respiratory, and reproductive systems of animals with emphasis on physiologic control mechanisms, interrelationships of body systems, and criteria for evaluating animal health. Four hours lec. and six hours lab a week. Pr.: AP 737 or equiv. AP-747-1-1218

AP 757. Physiological Chemistry. (5) II. This course will consider control mechanisms that operate at the molecular, cellular, and organ levels, and integrate that information into a global picture of the physiological functioning of animal metabolism. Five hours of lec. a week. Pr.: BIOCH 521 or equiv. AP-757-0-1219

AP 770. Pharmacology. (5) I. The basic principles of pharmacology, the interaction of drugs and living systems which includes: the action of the drug upon the animal's systems, and the actions of the animal's body upon the drug. The application of these principles to the safe and efficacious use of drug regimens in veterinary medical and surgical patients. Four hours lec. and

three hours lab a week. Pr.: AP 737 and 747 or equiv. AP-770-1-1218

AP 773. Bioinstrumentation Laboratory. (1) I, in even years. 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.: AP 747 or equiv., or conc. enrollment in EECE 773. AP-773-1-1219

AP 775. Clinical Pharmacology. (2) I. Through fall 1989. The application of the basic principles of pharmacology to the proper use of a single drug or multiple drug regimens with veterinary medical and surgical patients. Two hours lec. a week. Pr.: Fourth-year standing in College of Veterinary Medicine. AP-775-0-1218

AP 778. Respiratory Function in Health and Disease. (3) II, in even years. A comprehensive overview of normal respiratory physiology in mammals with clinical application to the recognition of obstructive, restrictive, infectious, and allergic diseases, and the management of mechanical ventilation and oxygen therapy. Pr.: AP 747 or equiv. AP-778-0-1219

Graduate credit

AP 801. Clinical Skills I. (1) II. Introduction to terminology and thought/organization for clinical veterinary medicine. Emphasis on problem identification from a clinical data base, and basic veterinary skills with animals. Same as SM 801. Pr.: First-year standing in College of Veterinary Medicine. Three hours of lab a week. AP-801-1-1218

AP 803. Seminar. (1) I, II, S. Designed primarily for graduate and senior students enrolled for graduate credit in physiology. Each student is required to give a report on some subject related to physiology. The course is intended to stimulate interest in research and evaluation of data. One hour a week. Pr.: Consent of staff. AP-803-0-1219

AP 825. Special Anatomy. (Var.) I, II, S. The gross and/or microscopic study of any system (or systems) of any domestic animal. Pr.: AP 700, or 710 or 725, or equiv. and consent of staff. AP-825-3-1219

AP 850. Anatomical Techniques. (1-2) I, in odd years, S. Pr.: Consent of staff. AP-850-3-1219

AP 855. Comparative Physiology. (3) II. Comparisons of physiological functions in the animal kingdom, including respiration, circulation, digestion, excretion, locomotion, and control. Pr.: BIOL 201, AP 530 or equiv. AP-855-0-1219

AP 860. Neuroscience. (2) I. An advanced multidisciplinary study of the central nervous system, including neurochemistry, neuropharmacology, neuroanatomy, neurophysiology, clinical neurology, and behavioral science. Pr.: Consent of staff. AP-860-0-1219

AP 865. Physiologic Constituents of Body Fluids. (2) I, II, S. Analysis of body fluids, with application to specific and fundamental problems in veterinary medicine. One hour rec. and one to three hours lab a week. Pr.: AP 747 and consent of staff. AP-865-1-1219

AP 885. Environmental Toxicology. (2) II, in odd years. An advanced toxicology course concerned with the occurrence, biological effect, detection, and control of foreign chemicals in the environment. Pr.: Consent of staff. AP-885-0-1219

AP 886. Comparative Animal Nutrition. (5) I. Through fall 1989. A study of the veterinary medical aspects of nutrition including principles of feeding and nutrition of common domestic species of food-producing and companion animals; consideration of material relative to therapeutic nutrition as related to clinical management of diseased and convalescent animals. Same as SM 886 and ASI 886. Pr.: Third-year standing in College of Veterinary Medicine or ASI 700. AP-886-0-1218

AP 886. Clinical Nutrition. (3) II. Effective spring 1990. The clinical aspects of nutrition as it relates to (a) medical and surgical management of diseased and convalescent animals (therapeutic nutrition), and (b) programs of disease prevention of the common domestic species of food-producing, companion animals, pet birds, and exotic animals (nutritional preventive medicine). Same as ASI 886 and SM 886. Pr.: Third-year standing in College of Veterinary Medicine. AP-886-0-1218

AP 888. Advanced Neuroendocrinology. (2) II, in even years. A study of the chemical link between the brain and the endocrine system; the roles of brain peptides, neural pathways, and centrally acting drugs in the release of hormones; hormonal involvement in reproduction, aging, breast cancer, stress, etc.; a survey of the new and evolving concepts and techniques in neuroendocrinology. Two hours lec. a week. Pr.: AP 747 or BIOL 710 or equiv. AP-888-0-1219

AP 890. Problems in Pharmacology and Toxicology. (Var.) I, II, S. Individual investigation into the interactions of chemical compounds and living systems. Pr.: AP 770 or SM 895 or equiv. AP-890-4-1219

AP 898. Master's Report. (2) I, II, S. Pr.: Consent of staff. AP-898-4-1219

AP 899. Research. (1-4) I, II, S. For graduate students in the field of anatomy working toward the M.S. degree. Pr.: Consent of staff. AP-899-4-1219

AP 900. Physiology and Pharmacology of the Hormones. (3) II. The internal secretions, their synthetic analogues, and use in research and therapy in domesticated animals will be evaluated. Two hours rec. and one to three hours lab a week. Pr.: AP 747 and consent of staff. AP-900-0-1219

AP 915. Histophysiology of Nutritional Deficiencies. (3) I, II, S. The study of changes occurring in tissues from nutritional deficiencies. Two hours rec. and three hours lab a week. Open to graduate students and veterinary students earning graduate credit. Pr.: Consent of staff. AP-915-0-1219

AP 925. Advanced Physiology. (3-5) I, II, S. The principles and techniques in the investigation of bioelectrical phenomena in relation to: (a) the physiology of the digestive organs, (b) myophysiology, (c) endocrinology, and (d) neurophysiology. Advanced physiological experiments will be conducted to provide an understanding of the applications of electronic equipment. Rec. and two three-hour labs a week. Pr.: AP 747 and consent of staff. AP-925-1-1219

AP 995. Problems in Physiology. (Var.) I, II, S. Special problem-involving techniques utilized in studying the function of various organ systems of the body. Pr.: Consent of instructor. AP-995-4-1219

AP 999. Research in Physiology. (1-6) I, II, S. For graduate students working toward the M.S. or Ph.D. degree. Pr.: Consent of staff. AP-999-4-1219

Laboratory Medicine

W. E. Moore,* Head

Professors Bailie,* Keeton,* Minocha,* and Moore;* Associate Professors Chengappa* and Ridley;* Assistant Professors McVey and Seedle; Instructor Hoffman; Emeriti: Professors Coles, Kelley, and Lindquist; Associate Professor Burroughs.

Courses in parasitology, microbiology, public health, and clinical pathology are offered for students enrolled in the veterinary medicine curriculum. Classroom instruction is by lecture, recitation, laboratory experience, seminar, and demonstrations. Third- and fourth-year veterinary medical students receive practical instruction in clinical laboratory procedures and the interpretation of results of laboratory tests.

Major work leading to the master of science and the doctor of philosophy is offered in the interdepartmental group in pathology. (See description in Graduate School section.) Work at the graduate level includes advanced courses in clinical pathology, parasitology, microbiology, and public health.

Undergraduate and graduate credit

LM 645. Veterinary Mycology. (3) II, in even years. Detailed study of etiology of cutaneous, subcutaneous, and systemic fungus infections of animals, using histopathologic examinations and culture studies. Two hours rec. and three hours lab a week. Pr.: BIOL 198 and PA 710. LM-645-1-1219

LM 650. Fundamentals of Public Health and Food Safety. (3) I. Organization and function of food inspection services; principles of disease transmission; diseases transmitted to humans through the food chain. (Jointly with HRIMD 650.) Pr.: BIOL 198 and consent of staff. LM-650-0-1219

LM 705. Principles of Veterinary Immunology. (2) II. A study of host parasite interactions and immunologic mechanisms in health and disease of domestic animals. Two hours lec. per week. Pr.: AP 737. LM-705-1-1218

LM 712. Veterinary Bacteriology and Mycology. (5) I. Morphology, biology, and classification of pathogenic bacteria and fungi and their relation to the causes of disease. Three hours rec. and six hours lab a week. Pr.: LM 705 and BIOL 555. LM-712-1-1218

LM 715. Experimental Parasitology. (3) II, in even years. Planning, execution, analysis, and reporting of experiments in parasitology. Techniques concerning laboratory diagnosis of parasitisms, anthelmintic evaluation, life cycle experiments. Pr.: Consent of instructor and five credit hours of parasitology. LM-715-2-1219

LM 722. Veterinary Virology. (3) II. Morphology, biology, and classification of viruses and their relation to the causes of disease. Two hours rec. and three hours lab a week. Pr.: LM 712 or equiv. LM-722-1-1218

LM 753. Zoonoses and Preventive Medicine. (3) I. Consideration of the bacterial, viral, parasitic, and mycotic diseases shared by animals and man. The role of the veterinarian in wholesomeness and quality assurance of foods of animal origin including regulatory requirements. Three hours lec. a week. Pr.: Fourth-year standing in College of Veterinary Medicine. LM-753-1-1218

LM 755. Principles and Methods of Epidemiology. (2) II. Use of ecologic and epidemiologic concepts in the study of diseases in populations; introduction to epidemiologic methods emphasizing problem solving; application to epidemiologic principles of disease control. Two lec. a week. Pr.: First-year standing in College of Veterinary Medicine. LM-755-1-1218

LM 775. Clinical Pathology. (3) II. Principles, application, and interpretation of clinical laboratory procedures, and experience with applicable techniques. Two hours lec. and three hours lab a week. Pr.: Second-year standing in College of Veterinary Medicine. LM-775-1-1218

LM 777. Laboratory Diagnosis. (1) I. A study of laboratory techniques in hematology, cytology, bacteriology, mycology, urology, and clinical chemistry as applied to the diagnosis of animal diseases. Three hours of lab a week. Pr.: Third-year standing in College of Veterinary Medicine. LM-777-1-1218

LM 793. Veterinary Parasitology. (5) I. Study of the helminth, arthropod, and protozoan parasites of domestic animals. Emphasis on disease prevention, signs and lesions of parasites, biological and medicinal controls, and relation of parasites to public health. Three hours lec. and six hours lab a week. Pr.: Second-year standing in College of Veterinary Medicine or consent of instructor. LM-793-1-1218

Graduate credit

LM 806. Clinical Medicine II. (9) I. Laboratory and field experience in epidemiology and public health (jointly with SM 806). Pr.: Fourth-year standing in College of Veterinary Medicine. LM-806-1-1218

LM 808. Clinical Medicine III. (12) II. Instruction in laboratory procedures and interpretation of results (jointly with SM 808). Pr.: Fourth-year standing in College of Veterinary Medicine. LM-808-1-1218

LM 810. Problems in Laboratory Medicine. (1-3) I, II, S. Work is offered in parasitology, microbiology, clinical pathology, and epidemiology. For M.S. students. Not for thesis research. Pr.: Graduate standing. LM-810-3-1219

LM 821. Advanced Clinical Pathology Laboratory. (1) I, II, S. Practical training in advanced techniques of clinical chemistry and hematology used in a large clinical pathology laboratory. Pr.: LM 820. LM-821-1-1219

LM 825. Pathology of Body Fluids. (4) I, in even years. A detailed study of the alterations of the components of body fluids occurring in disease processes, and interpretations of these changes. Pr.: LM 775 and SM 870. LM-825-1-1219

LM 827. Veterinary Exfoliative Cytology. (2) I, in odd years. A study of the preparation, examination, and interpretation of aspiration, biopsies with emphasis on the recognition of inflammatory and neoplastic processes. Exfoliated material derived from various body fluids, tissues, and organs of the living clinic patient will serve as the basis of the study. One hour lec. and three hours lab a week. Pr.: LM 775 and PA 710. LM-827-1-1219

LM 830. Laboratory Medicine Seminar. (1) I, II, S. Primarily for graduate and veterinary students interested in infectious diseases. Each student is required to give reports on subjects related to infectious diseases. LM-830-0-1219

LM 835. Veterinary Epidemiology. (2) I, in even years. The scope and objectives of epidemiologic principles relative to infectious and noninfectious diseases transmissible from animals to man, and application of these principles by use of case investigations. Two hours lec. a week. Pr.: LM 753 and SM 870. LM-835-0-1219

LM 850. Advanced Veterinary Parasitology. (3) II, in odd years. Structure, life cycle, pathology, immunology, public health significance, diagnosis, and treatment of protozoan and metazoan parasites of veterinary significance. Pr.: Consent of instructor and five credit hours of parasitology. LM-850-2-1219

LM 860. Advanced Veterinary Bacteriology. (3) II, in odd years. The detailed study of the classification, morphology, and biochemical and differential characteristics permitting identification of the bacteria of veterinary medical significance. One hour rec. and six hours lab a week. Pr.: LM 720, BIOL 610 or equiv. LM-860-1-1219

LM 865. Diagnostic Veterinary Virology. (3) I, in odd years. The study of viruses associated with diseases of veterinary medical significance with emphasis on diagnosis. Clinical observations, pathogenesis, lesions, epidemiology, immunity, and control will be considered. One hour rec. and six hours lab a week. Pr.: LM 720, BIOL 730 or equiv. LM-865-1-1219

LM 877. Advanced Laboratory Diagnosis. (1-2) I, II, S. Practical training in evaluation, interpretation, and written description of selected clinical pathology case materials. Course may be repeated by laboratory medicine or pathology majors for a maximum of four credit hours (M.S.) and eight credit hours (Ph.D.). Pr.: LM 777. LM-877-3-1219

LM 880. Principles and Techniques of Research in Medical Investigations. (3) I, on sufficient demand. A study of the procedures in planning and evaluating medical experiments and the use of special research instruments in medical research.

Three hours rec. a week. Pr.: PA 703, AP 747 or equiv. LM-880-1-1219

LM 890. Veterinary Hematology. (3) II, in odd years. A detailed study of the blood of domestic animals. Emphasis is placed on the species variabilities. Three hours lec. a week. Pr.: LM 877. LM-890-1-1219

LM 899. Research in Laboratory Medicine. (1-6) I, II, S. Individual research in any of the fields of laboratory medicine. Pr.: Graduate standing. This work may form the basis for the M.S. thesis. LM-899-4-1219

LM 980. Problems in Laboratory Medicine. (1-6) I, II, S. Work is offered in parasitology, microbiology, and clinical pathology. Not for thesis research. For Ph.D. candidates. Pr.: Graduate standing. LM-980-4-1219

LM 999. Research in Laboratory Medicine. (Var.) I, II, S. Individual research in any of the fields of laboratory medicine. This work may form the basis for the Ph.D. dissertation. Pr.: Graduate standing. LM-999-4-1219

Pathology

J. E. Smith,* Head

Professors Cook,* Dennis,* Kruckenberg,* Leipold,* and Smith;* Associate Professors Fenwick* and Schoning;* Assistant Professors Hall and Oberst.

Basic courses in pathology are offered for students enrolled in the veterinary medicine curriculum. Instruction is by lecture, recitation, laboratory work, seminars, and demonstrations. Practical necropsy experience is provided for students as an adjunct to their pathology training and as an aid to disease diagnosis.

Major work leading to the degrees master of science and doctor of philosophy is offered.

Work at the graduate level includes advanced courses in general, systemic, developmental, cellular, molecular, laboratory, and wildlife pathology.

Courses in diseases of laboratory animals, wildlife, and fish are offered for non-veterinary undergraduate and graduate students.

Undergraduate and graduate credit

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-500-1-1218

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. PA-501-0-1218

PA 703. General Pathology. (5) I. Study of etiology, pathogenesis, lesions, and termination of processes of disease, including inflammation, necrosis, regeneration, oncology, and disturbances of metabolism, circulation, and growth. Three hours lec. and six hours lab a week. Pr.: Second-year standing in College of Veterinary Medicine. PA-703-1-1218

PA 710. Systemic Pathology. (5) II. Pathology of the organ systems of domestic animals including gross and microscopic study of lesions. Three hours lec. and six hours lab a week. Pr.: PA 703. PA-710-1-1218

Graduate credit

PA 804. Clinical Medicine I. (5) S. Through summer 1989. Experience in the necropsy laboratory. (Jointly with SM 804.) Pr.: Third-year standing in College of Veterinary Medicine. PA-804-1-1218

PA 806. Clinical Medicine II. (9) I. Through fall 1989. Experience in the necropsy laboratory. (Jointly with SM 806.) Pr.: Fourth-year standing in College of Veterinary Medicine. PA-806-1-1218

PA 808. Clinical Medicine III. (12) II. Through spring 1990. Experience in the necropsy laboratory. (Jointly with SM 808.) Pr.: Fourth-year standing in College of Veterinary Medicine. PA-808-1-1218

PA 826. Histopathology. (3) I, S. Introductory histopathological techniques course emphasizing routine and selected special techniques including light, darkfield, phase, and fluorescent microscopy. Practical experience will include preparing and embedding tissue blocks, cutting and mounting sections, hematoxylin and eosin staining, and selected special stains. Basic cellular changes in response to injury will be covered with emphasis on tissue and species differences. Principles of black and white, color, and Polaroid photomicrography will be taught, followed by practical experience in preparing slides in the histopathology laboratory. Pr.: PA 710 and consent of instructor. PA-826-1-1219

PA 845. Advanced Diagnostic Pathology. (3) I, S. Study of pathologic alterations of disease with emphasis on diagnostic characteristics. Pr.: PA 826 and consent of instructor. PA-845-1-1219

PA 850. Perinatal Pathology. (2) S. Study of placental and fetal lesions of congenital infections in domestic animals. Pr.: PA 845. PA-850-1-1219

PA 851. Advanced Principles of Pathology. (3) I. Advanced study of disease and its effects with emphasis on etiology and pathogenesis; morphologic change will be correlated with changes in chemical com-

position and function. Pr.: PA 710 and consent of instructor. PA-851-1-1219

PA 852. Surgical Pathology. (1-2) I, II, S. Practical experience in examining and processing surgical biopsy specimens and writing histopathological reports. Pr.: PA 845. PA-852-1-1219

PA 855. Oncology. (3) I, in odd years. Etiology, behavior, gross and microscopic characteristics, identification, and prognosis of tumors. Pr.: PA 845 and consent of staff. PA-855-1-1219

PA 857. Developmental Pathology. (2) I, in even years. A bridging course between embryology and pathology with emphasis on congenital defects in domestic animals. Pr.: PA 710 and consent of instructor. PA-857-1-1219

PA 858. Medical Genetics. (3) I, in odd years. Study of genetic diseases of domestic animals with emphasis on chromosomal observations, biochemical factors, and hereditary patterns in transmission. Pr.: PA 845 or equiv. PA-858-1-1219

PA 859. Laboratory Animal Science. (2) II. Consideration of the management and health of common species of laboratory animals. Two hours lec. a week. Pr.: Second-year standing in College of Veterinary Medicine. PA-859-0-1218

PA 860. Pathology of Diseases of Laboratory Animals, Fish, and Wildlife. (3) I, in even years. Pathology of diseases affecting laboratory animals, fish, and wildlife. Pr.: PA 845 and consent of instructor. PA-860-1-1219

PA 865. Advanced Topics in Comparative Pathology. (1-3) I, II, S. Selected topics to assist pathology majors in their areas of specialization. Pr.: PA 845. PA-865-1-1219

PA 870. Pathology Seminar. (1) I, II, S. Pr.: Consult department head. PA-870-0-1219

PA 880. Problems in Pathology. (1-6) I, II, S. Work is offered in pathology, pathological techniques, avian diseases, and diseases of laboratory animals, fish, and wildlife. Pr.: PA 710 and consent of instructor. PA-880-2-1219

PA 899. Research in Pathology. (1-6) I, II, S. Individual research in the pathology of animal disease. Pr.: PA 710 and VD 849. This work may form the basis for the master's thesis and the Ph.D. dissertation. PA-899-4-1219

PA 947. Advanced Systemic Pathology I. (5) I, in odd years. Study of etiology, pathogenesis, gross and microscopic characteristics, and systemic effects of diseases of cardiovascular, respiratory, gastrointestinal, urinary, and endocrine systems. Pr.: PA 845 and 851, plus four credits of 985. PA-947-1-1219

PA 950. Advanced Systemic Pathology II. (5) II, in even years. Study of etiology, pathogenesis, gross and microscopic characteristics and systemic effects of diseases of the skin, of musculoskeletal, genital, and nervous systems, and of special senses. Pr.: PA 947. PA-950-1-1219

PA 965. Cellular and Molecular Pathology. (4) II. Biochemistry of the injured cell, relationship of intracellular parasitism to cellular metabolism, metabolic and genetic basis of inherited disease. Pr.: Three hours credit in biochemistry or physiological chemistry and consent of instructor. PA-965-0-1219

PA 970. Pathology Seminar. (1) I, II, S. Pr.: Consult department head. PA-970-0-1219

PA 980. Problem in Pathology. (1-6) I, II, S. Work is offered in pathology, pathological techniques, avian diseases, and diseases of laboratory animals, fish, and wildlife. Pr.: PA 710 and consent of instructor. PA-980-2-1219

PA 985. Necropsy Diagnosis. (1-3) I, II, S. Necropsy procedures and diagnosis. May be repeated each semester by pathology majors with a maximum of 10 credit hours. Pr.: PA 845 or consent of staff. PA-985-3-1219

PA 999. Research in Pathology. (1-6) I, II, S. Individual research in the pathology of animal disease. Pr.: PA 710 and VD 849. This work may form the basis for the Ph.D. dissertation. PA-999-4-1219

Surgery and Medicine

J. R. Gillespie,* Head

Professors Anderson,* Brightman,* Gillespie, Mosier,* Noordsy,* Oehme,* Schoneweis,* and Vestweber,* Regents Distinguished Professor Leith; Associate Professors Beeman, Carnahan, Edwards,* Gabbert, Schneider, Spire,* and Taussig; Assistant Professors Avery, Brandt, Coyne, L. DeBowes, R. DeBowes,* Fingland, Fortney, Godshalk, Layton, and Watney; Emeriti: Professors Blauch, Butler, Frick, Guffy, and Railsback; Adjunct Professors Philipps and Travnicek.

The University Veterinary Hospital is exceptionally well equipped for diagnosis and treatment of animal disease and for instruction of students in the science and art of veterinary medicine.

The hospital has a capacity of 82 large animal patients and 150 small animal patients. Members of the clinical staff, accompanied by students, conduct a field service for the purpose of programming animal health and for diagnosing and

treating the various diseases affecting livestock and poultry. Consultation services result in frequent referral cases or investigational trips.

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, and theriogenology to veterinary students.

Opportunities leading to the master of science degree are offered. Prerequisite to graduate work in the department is the completion of a four-year curriculum substantially equivalent to that required of students majoring in veterinary medicine at this University.

Outstanding library facilities, physical equipment, and an abundance of cases offer excellent resources for research in surgery and medicine.

Courses in surgery

Graduate credit

SM 741. Ethics and Jurisprudence. (1) II. Socratic ethics is discussed along with the American Veterinary Medical Association's Code of Ethics and practical situations with a fundamental ethical basis. The Kansas Practice Act is explored as an example of governance in veterinary medicine. The role of animals in humans' wellbeing is addressed along with the philosophy of animal welfare. The law and the practicing veterinarian are discussed with emphasis upon professional liability. Pr.: First-year standing of College of Veterinary Medicine. SM-741-0-1218

SM 778. Respiratory Function in Health and Disease. (3) II, in even years. A comprehensive overview of normal respiratory physiology in mammals with clinical application to the recognition of obstructive, restrictive, infectious, and allergic diseases, and the management of mechanical ventilation and oxygen therapy. Pr.: AP 747 or equiv. SM-778-0-1219

SM 805. Surgery I. (3) II. Principles of surgery and consideration of instrumentation, the surgical suite, preparation and monitoring of the patient. Three hours lec. a week. Pr.: Second-year standing in College of Veterinary Medicine. SM-805-0-1218

SM 811. Large Animal Surgery. (4) II. Lectures and demonstrations of food animal and equine surgical patients, including participation in surgical laboratories. Three hours lec. and three hours lab a week. Pr.: Third-year standing in College of Veterinary Medicine. SM-811-0-1218

SM 814. Small Animal Surgery. (3) I. Effective fall 1989—4 hours. Lectures and demonstrations of small animal surgical patients, including participation in surgical laboratories. Two hours lec. and three hours lab a week. Pr.: Third-year standing in College of Veterinary Medicine. SM-814-0-1218

SM 832. Surgical Techniques. (1-6) I, S. The study and application of developments in surgical techniques. Pr.: D.V.M. degree or consent of department head. SM-832-3-1219

SM 872. Organ Transplantation. (3) II, in odd years. The study of transplantation of tissues and associated problems. Pr.: D.V.M. degree or consent of department head. SM-872-3-1219

SM 877. Orthopedic Surgery. (4) II, in even years. Fundamentals, theory, and practice concerning genetic, metabolic, infectious, neoplastic, and traumatic diseases of bones and joints. Pr.: D.V.M. degree or consent of department head. SM-877-3-1219

SM 887. Problems in Medicine or Surgery. (1-3) I, II, S. The course provides for the study of hospital, medical, or surgical problems. The student, in conference with his major professor, outlines the methodology and procedures, conducts the study, and prepares a detailed report. Pr.: D.V.M. or consent of department head. SM-887-3-1219

Courses in medicine

Undergraduate credit

SM 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. SM-235-0-1219

Graduate credit

SM 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. Same as AP 702 and ASI 702. Pr.: First-year standing in College of Veterinary Medicine. SM-702-0-1218

SM 801. Clinical Skills. (3) II. Through spring 1989. An orientation to clinical veterinary medicine, including clinical nomenclature and hospital procedures. Laboratory instruction and experience in common clinical procedures of examination and therapy and orientation to clinical records and problem solving. One hour lec. and six hours lab a week. Pr.: Third-year

standing in College of Veterinary Medicine. SM-801-1-1218

SM 801. Clinical Skills I. (1) II. Introduction to terminology and thought/organization for clinical veterinary medicine. Emphasis on problem identification from a clinical data base, and basic veterinary skills with animals. Same as AP 801. Pr.: First-year standing in College of Veterinary Medicine. Three hours lab a week. SM-801-1-1218

SM 802. Clinical Skills II. (1) II. Effective spring 1989. Continuation of Clinical Skills I. Introduction to clinical cases, data base accumulation, problem identification, problem solving, and basic veterinary skills with animals. Pr.: Second-year standing in College of Veterinary Medicine. Three hours lab a week. SM-802-1-1218

SM 803. Clinical Skills III. (1) II. Effective spring 1990. Laboratory instruction and experience in hand skills for physical examination and for veterinary therapy. Pr.: Third-year standing in College of Veterinary Medicine. Three hours lab a week. SM-803-1-1218

SM 804. Clinical Medicine I. (5) S. Through summer 1989. Study of the veterinary medical and surgical patient, participation in field studies of animal disease, veterinary public health, and application of problem-solving methodology. Exposure to client relationship through clinical receiving. Multidisciplinary aspects of case management emphasized through rounds. Third-year class divided into two groups, half being on vacation and half in the teaching hospital during each of two seven-week summer sessions. Minimum 44 hours lab a week. Pr.: Fourth-year standing in College of Veterinary Medicine. SM-804-1-1218

SM 806. Clinical Medicine II. (9) I. Through fall 1989. Study of the veterinary medical and surgical patient through participation in clinical service in the Veterinary Teaching Hospital and Field Service Unit. Clinical rounds, seminars, and clinico-pathologic conference emphasize multidisciplinary approach to clinical medicine. Application of theory to clinical practice is emphasized. Minimum 36 hours lab a week. Pr.: Fourth-year standing in College of Veterinary Medicine. SM-806-1-1218

SM 808. Clinical Medicine III. (12) II. Through spring 1990. Participation in elective clinical rotations in the Teaching Hospital and Field Service Unit and specialty offerings in areas of clinical medicine and surgery and production management. Externships in private practice, industry, and other academic and research institutions. In clinical rotations in the Teaching Hospital and Field Service Unit, correlation of the theory of medicine and surgery with client relationships,

animal welfare, economics, and production management are emphasized through participation in clinical service, clinical rounds, seminars, and clinico-pathologic conference. Minimum 44 hours lab a week. Pr.: Fourth-year standing in College of Veterinary Medicine. SM-808-1-1218

SM 804. Clinical Medicine I. (5) S. Effective summer 1990. Study of veterinary medical patients using problem-solving methodology at the Veterinary Medical Hospital; the University of Nebraska-Lincoln; and the Meat Animal Research Center, Clay Center, Nebraska. The course is offered in block rotation with one-half of fourth-year class on campus for each of two seven-week summer sessions. Minimum 44 hours lab a week. Jointly with PA 804 and VD 804. May not be taken for graduate credit. Pr.: Fourth-year standing in College of Veterinary Medicine. SM-804-1-1218

SM 806. Clinical Medicine II. (14) I. Effective fall 1990. Continuation of SM 804, Clinical Medicine I. Minimum 44 hours a week. Jointly with LM 806, PA 806, and VD 806. May not be taken for graduate credit. Pr.: Fourth-year standing in College of Veterinary Medicine. SM-806-1-1218

SM 808. Clinical Medicine III. (14) II. Effective spring 1991. Elective participation in clinical rotations in the Veterinary Medical Hospital; the University of Nebraska-Lincoln; the Meat Animal Research Center, Clay Center, Nebraska; private practice; industry; and other academic institutions. Minimum 44 hours lab a week. Jointly with PA 808, VD 808, and LM 808. May not be taken for graduate credit. Pr.: Fourth-year standing in College of Veterinary Medicine. SM-808-1-1218

SM 812. Research in Medicine. (1-6) I, II, S. An attempted solution of some of the medical and parasitological problems confronting the practitioner of veterinary medicine. Pr.: Consent of staff. SM-812-4-1219

SM 820. Theriogenology. (3) I. Consideration of prevention, diagnosis, and treatment of disease, and maintenance of health and productivity of the genital tract of domestic animals. Three hours lec. a week. Pr.: Third-year standing in College of Veterinary Medicine. SM-820-0-1218

SM 821. Companion Animal Medicine. (4) II. A study of the etiology, clinical signs, diagnosis, treatment, and control of infectious or contagious diseases which affect horses, dogs, and cats. Four hours lec. a week. Pr.: Third-year standing in College of Veterinary Medicine. SM-821-0-1218

SM 822. Breeding Diseases. (1-5) I, II, S. Advanced studies of the breeding diseases of domestic animals. Pr.: D.V.M. degree or consent of staff. SM-822-3-1219

SM 824. Food Animal Medicine. (4) I. A study of the etiology, clinical signs, diagnosis, treatment, and control of infectious or contagious disease conditions which affect cattle, swine, and sheep. Four hours lec. a week. Pr.: Third-year standing in College of Veterinary Medicine. SM-824-0-1218

SM 826. Systemic Medicine I. (1-3) I, II, S. Study of the medical aspects of diseases of the urinary, nervous, and integumentary systems, and special senses. Pr.: D.V.M. degree or consent of department head. SM-826-3-1219

SM 827. Systemic Medicine II. (1-3) I, II, S. Study of the medical aspects of diseases of the cardiovascular, respiratory, musculoskeletal, and endocrine systems. Pr.: D.V.M. or consent of department head. SM-827-3-1219

SM 830. Medicine I. (4) II. Consideration of medical and pathophysiologic aspects of diseases affecting the musculoskeletal, respiratory, cardiovascular, special senses, and nervous systems. Four hours lec. a week. Pr.: Second-year standing in College of Veterinary Medicine. SM-830-0-1218

SM 837. Interpretation of Radiologic Studies of Body Systems. (3) I, in odd years. The rationale of radiologic procedures are studied and the interpretation of radiographs of body systems emphasized. Pr.: D.V.M. degree or consent of department head prior to registration. SM-837-0-1219

SM 840. Radiology. (3) II. The theory and principles of x-rays, production and interpretation of radiographs and exposure factors, special radiographic methods, film storage and handling, processing, safety measures, and biologic effects of radiation. Three hours lec. a week. Pr.: Third-year standing in College of Veterinary Medicine. SM-840-1-1218

SM 842. Comparative Gastroenterology. (3) I, in odd years. A comparative medical study of the etiopathogenesis, diagnostic criteria, and treatment of gastroenteric disorders in the canine, equine, porcine, and bovine species. Comparable disorders in humans are discussed. Pr.: D.V.M. degree. SM-842-3-1219

SM 850. Medicine II. (4) I. Consideration of the medical and pathophysiological aspects of diseases affecting the gastrointestinal, endocrine, urinary, integumentary, and hemic and lymphatic systems. Four hours lec. a week. Pr.: Third-year standing in College of Veterinary Medicine. SM-850-0-1218

SM 870. Medicine III. (3) I. Through fall 1989. Preventive medicine programs are discussed for domestic animals. Production management systems are also considered. Three hours lec. a week. Pr.: Fourth-year standing in College of Veterinary Medicine. SM-870-0-1218

SM 875. Production Medicine. (2) II. Effective spring 1990. The role of the veterinarian in livestock production units, including interactions with producers, nutritionists, investors, and others in decision analysis. Emphasis is on the professional service that veterinarians provide to beef feedlot, cow/calf, swine, dairy, and dog kennel segments of animal production. Pr.: Third-year standing in College of Veterinary Medicine. SM-875-0-1218

SM 882. Clinical Science Seminar. (1) I, II, S. A required seminar for all house officers and graduate students in the Department of Surgery and Medicine. One-hour conference weekly. May re-enroll for total maximum of two credits. Pr.: Consent of department head. SM-882-0-1219

SM 883. Veterinary Practice Management. (2) I. Through fall 1989. The business aspects of a veterinary medical practice, including consideration of factors involved in establishing and maintaining a professional practice, professional ethics, accounting, and investments. Two hours lec. a week. Pr.: Fourth-year standing in College of Veterinary Medicine. SM-883-0-1218

SM 885. Principles of Veterinary Internal Medicine. (3) II. An intermediate course presenting the key unifying concepts of veterinary internal medicine. Each concept is introduced as a symptomatic entity ranging across the major domestic species. Interactions between body systems, the diagnostic process, and the development of rational treatments are emphasized. Pr.: D.V.M. degree. SM-885-0-1219

SM 886. Comparative Animal Nutrition. (5) I. Through fall 1989. A study of the veterinary medical aspects of nutrition including principles of feeding and nutrition of common domestic species of food producing and companion animals; consideration of material relative to therapeutic nutrition as related to clinical management of diseased and convalescent animals. Same as AP 886 and ASI 886. Pr.: Third-year standing in College of Veterinary Medicine or ASI 700. SM-886-0-1218

SM 886. Clinical Nutrition. (3) II. Effective spring 1990. The clinical aspects of nutrition as it relates to (a) medical and surgical management of diseased and convalescent animals (therapeutic nutrition), and (b) programs of disease prevention of the common domestic species of food-producing, companion animals, pet

birds, and exotic animals (nutritional preventative medicines). Same as ASI 886 and AP 886. Pr.: Third-year standing in College of Veterinary Medicine. SM-886-0-1218

SM 887. Problems in Medicine or Surgery. (1-3) I, II, S. The course provides for the study of medical or surgical problems. The student, in conference with his major professor, outlines the methodology and procedures, conducts the study, and prepares a detailed report. Pr.: D.V.M. SM-887-3-1219

SM 892. Toxins in the Biological System. (2) I, in odd years. An advanced toxicology course concerned with the cellular and subcellular effects of various groups of toxins on the intact animal organism. Pr.: Biochemistry, organic chemistry, pharmacology, or consent of instructor. SM-892-3-1219

SM 895. Toxicology. (3) I. Effects of harmful substances on the animal body. Emphasis placed on toxicologic principles and management of the poisoned patient. Three hours lec. a week plus three one- to three-hour field trips. Pr.: Third-year standing in College of Veterinary Medicine, BIOCH 521, and AP 747 or equiv. SM-895-0-1218

SM 897. Current Topics in Toxicology. (2) II, in even years and summers. An advanced toxicology course providing in-depth examination of toxicological areas of current relevance to and/or controversy on mammalian health. Specific topics will change from semester to semester. Students in Ph.D. programs may repeat the course. Pr.: BIOCH 521 and AP 747. SM-897-3-1219

SM 899. Research in Surgery. (1-6) I, II, S. Solving problems confronting the veterinary surgeon. Pr.: AP 700, 705, 720; SM 805, 811, 814. Offered especially for graduates in veterinary medicine. SM-899-4-1219

Veterinary Diagnosis

M. W. Vorhies, Head

Professors Kennedy,* Phillips,* Strafuss,* and Vorhies; Associate Professor Marrs; Assistant Professor Cole; Instructors Daniels, Jensen, and Veatch; Emeriti: Professor Anthony; Associate Professors Gray and Milleret.

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, and by teaching professional and graduate students in the College of Veterinary Medicine.

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.

The laboratory conducts diagnostic procedures to assist veterinary practitioners and animal owners using specially trained personnel and equipment. The laboratory conducts the official Kansas public health rabies examinations.

The department's academic responsibilities include teaching diagnostic necropsy and laboratory procedures to fourth-year professional students and pathology graduate students.

Graduate credit

VD 804. Clinical Medicine I. (5) S. Experience in the necropsy lab. Same as SM 804 and PA 804. Pr.: Third-year standing in College of Veterinary Medicine. VD-804-1-1218

VD 806. Clinical Medicine II. (9) I. Experience in the necropsy lab. Same as SM 806, PA 806, and LM 806. Pr.: Fourth-year standing in College of Veterinary Medicine. VD-806-1-1218

VD 808. Clinical Medicine III. (12) II. Experience in the necropsy lab. Same as SM 808, PA 808, and LM 808. Pr.: Fourth-year standing in College of Veterinary Medicine. VD-808-1-1218

VD 847. Avian Diseases. (3) I. The prevention, diagnosis, and treatment of avian diseases. Three hours lec. a week. Pr.: Third-year standing in College of Veterinary Medicine. VD-847-0-1218

VD 848. Avian Pathology. (2) I, in even years. Study of etiology, pathogenesis, and gross and microscopic characteristics of avian diseases. Pr.: VD 847 or consent of instructor. VD-848-1-1219

VD 849. Pathologic Technique and Diagnosis. (3) I, II. Practical experience in mammalian necropsy, avian necropsy, histologic techniques, and diagnostic lab procedures. Pr.: PA 710 and/or consent of staff. VD-849-1-1219

VD 985. Necropsy Diagnosis. (1-3) I, II, S. Necropsy procedures and diagnosis. May be repeated each semester by pathology majors with a maximum of six credit hours. Pr.: PA 845 or consent of staff. VD-985-3-1219

Faculty

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. (*)

ANTHONY, HARRY D., Prof. Emeritus of Diagnostic Lab; Research Pathologist (1955). DVM 1952, MS 1957, Kansas St. U. (*)

AVERY, THOMAS B., Asst. Prof. of Food Animal Medicine (1977). DVM 1974, MS 1974, PhD 1984, 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. (*)

BEEAMAN, KEITH B., Assoc. Prof. of Food Animal Medicine (1977). BS 1958, DVM 1958, Kansas St. U.; Diplomate 1981, American Col. of Theriogenology.

BLAUCH, BRUCE S., Assoc. Prof. Emeritus of Small Animal Medicine (1965). BS 1949, Pennsylvania St. U.; VMD 1956, U. of Pennsylvania; MS 1969, Kansas St. U. (*)

BLECHA, FRANK, Assoc. Prof. of Physiology; Research Stress Physiologist (1981). BS 1971, MS 1977, U. of Idaho; PhD 1981, Washington St. U. (*)

BRANDT, GARY W., Asst. Prof. of Equine Medicine (1969). BS 1964, DVM 1966, MS 1971, U. of Illinois; Diplomate 1984, American Col. of Theriogenology.

BRIGHTMAN, ALAN H., Prof. of Ophthalmology (1987). DVM 1974, Kansas St. U.; MS 1977, U. of Illinois; Diplomate 1978, American Col. of Vet. Ophthalmologists.

BURROUGHS, ALBERT L., Assoc. Prof. Emeritus of Virology; Research Virologist (1960). BS 1938, U. of Wyoming; DVM 1958, Texas A & M; MS 1941, Montana St. Col.; PhD 1946, U. of California. (*)

BUTLER, HUGH C., Prof. Emeritus of Surgery (1968). BS 1950, DVM 1954, Washington St. U.; Diplomate 1965, American Col. of Vet. Surgeons; MS 1968, Washington St. U. (*)

CARNAHAN, DAVID L., Assoc. Prof. of Obstetrics and Gynecology (1961). BS 1959, DVM 1959, MS 1964, Kansas St. U.; Diplomate 1976, American Col. of Theriogenology.

CASH, WALTER C., Asst. Prof. of Anatomy (1974). DVM 1971, PhD 1982, Kansas St. U.

CHALMAN, JAMES A., Asst. Prof. of Small Animal Surgery (1984). BS 1969, DVM 1971, U. of California.

CHENGAPPA, M. M., Assoc. Prof. of Lab Medicine (1988). BVSc 1970, MS 1973, U. of Agricultural Science, India; PhD 1981, Michigan St. U.

CLARENBERG, RUDOLF, Prof. of Physiological Chemistry; Research Physiological Chemist (1966). BS 1954, PhD 1959, St. U. of Utrecht. (*)

COFFEE, E. GUY, Asst. Prof., Info. and Doc. Service (1970). AB 1958, U. of Missouri; ML 1970, Emporia St. U.

COLE, DUANE E., Asst. Prof. of Diagnostic Lab (1984). DVM 1962, PhD 1984, Kansas St. U.

COLES, EMBERT H., JR., Prof. Emeritus of Lab Medicine; Research Clinical Pathologist and Immunologist (1954). DVM 1945, Kansas St. U.; MS 1946, Iowa St. Col.; PhD 1958, Kansas St. U. (*)

COOK, JAMES E., Prof. of Pathology; Research Pathologist (1969). DVM 1951, Oklahoma St. U.; Diplomate 1956, American Col. of Vet. Pathologists; PhD 1970, Kansas St. U. (*)

COX, JUDY H., Asst. Prof. of Equine Medicine (1981). DVM 1968, MS 1984, Kansas St. U.; Diplomate 1987, American Col. of Vet. Internal Medicine.

COYNE, CODY P., Asst. Prof. of Equine Medicine (1987). DVM 1981, Colorado St. U.; PhD 1986, U. of California; Diplomate 1986, American Col. of Vet. Internal Medicine.

DANIELS, EDDIE K., Instr. of Diagnostic Lab (1985). DVM 1972, Kansas St. U.

DE BOWES, LINDA J., Asst. Prof. of Small Animal Medicine (1982). DVM 1981, Washington St. U.; MS 1985, Kansas St. U.; Diplomate 1986, American Col. of Vet. Internal Medicine.

DE BOWES, RICHARD M., Asst. Prof. of Equine Medicine (1982). DVM 1979, U. of Illinois; MS 1982, Washington St. U.; Diplomate 1985, American Col. of Vet. Surgeons. (*)

DENNIS, STANLEY M., Prof. of Pathology; Research Pathologist (1966). BVSc 1949, PhD 1961, U. of Sydney. FRCVS 1962, FRC Path. 1974; Diplomate 1975, American Col. of Theriogenologists. (*)

DOUGLASS, JAMES P., Asst. Prof. of Radiology (1984). DVM 1979, Purdue U.

EDWARDS, ALVIN J., Assoc. Prof. of Food Animal Medicine (1975). DVM 1959, PhD 1979, Kansas St. U. (*)

ERICKSON, HOWARD H., Prof. of Physiology; Research Cardiovascular Physiologist (1981). BS 1957, DVM 1959, Kansas St. U.; PhD 1966, Iowa St. U. (*)

FEDDE, M. ROGER, Prof. of Physiology; Research Neurophysiologist (1964). BS 1957, Kansas St. U.; MS 1959, PhD 1963, U. of Minnesota. (*)

FENWICK, BRADLEY W., Assoc. Prof. of Pathology (1986). DVM 1981, MS 1983, Kansas St. U.; PhD 1985, U. of California. (*)

FINGLAND, ROGER B., Asst. Prof. of Small Animal Surgery (1987). DVM 1981, U. of Missouri; MS 1985, Ohio St. U.; Diplomate 1987, American Col. of Vet. Surgeons.

FORTNEY, WILLIAM D., Asst. Prof. of Small Animal Medicine (1977). BS 1970, DVM 1974, U. of Missouri.

FREY, RUSSELL A., Prof. and Head of Anatomy and Physiology (1963). DVM 1952, PhD 1970, Kansas St. U. (*)

FRICK, EDWIN J., Prof. Emeritus of Surgery and Medicine (1919). DVM 1918, Cornell U. (*)

GABBERT, NATHAN H., Assoc. Prof. of Small Animal Medicine (1973). DVM 1963, Washington St. U.

GALLAGHER, RICHARD R., Prof. of Electrical and Computer Engineering; Assoc., Inst. for Environmental Research (1968). BS 1964, MS 1966, PhD 1968, Iowa St. U. (*)

GARDNER, JAMES D., Adjunct Prof. of Physiology (1979). MD 1971, St. Louis U.

GILLESPIE, JERRY R., Prof. and Head of Surgery and Medicine (1985). DVM 1961, Oklahoma St. U.; PhD 1965, U. of California; Diplomate 1975, American Col. of Vet. Anesthesiologists. (*)

GODSHALK, CYNTHIA P., Asst. Prof. of Radiology (1988). DVM 1981, MS 1987, U. of Illinois; Diplomate 1987, American Col. of Vet. Radiology.

GRAY, ANDREW P., Assoc. Prof. Emeritus, Diagnostic Lab; Research Pathologist (1964). DVM 1953, MS 1963, PhD 1966, Kansas St. U.

GUFFY, MARK M., Prof. Emeritus of Radiology (1963). DVM 1949, MS 1966, Colorado St. Univ; Diplomate 1968, American Col. of Vet. Radiology. (*)

HALL, S. MARK, Asst. Prof. of Pathology (1987). DVM 1982, Louisiana St. U.; PhD 1986, Oklahoma St. U.

HAND, MICHAEL S., Adjunct Prof. of Physiology (1986). DVM 1968, PhD 1982, Colorado St. U.

HARTKE, GLENN T., Assoc. Prof. of Anatomy; Research Anatomist (1962). BS 1958, DVM 1960, MS 1965, PhD 1974, Kansas St. U. (*)

HOFFMAN, SHRYLL L., Instr. of Clinical Pathology (1977). BA, MT-ASCP 1968, Kansas Wesleyan.

HOWARD, DENNIS R., Asst. Prof., Diagnostic Lab (1972). BS 1972, MS 1976, PhD 1980, Kansas St. U. (*)

JERNIGAN, LOYCE D., Asst. Prof. of Medicine (1965). DVM 1945, Kansas St. U.

JOHNSON, LINDA M., Instr. (1970). BS 1969, Ohio U.; MS 1978, Kansas St. U.

KEETON, KERRY S., Prof. of Clinical Pathology; Research Clinical Pathologist (1977). Diplomate 1965, American Col. of Vet. Pathologists; BS 1965, DVM 1966, Texas A & M; PhD 1971, U. of California. (*)

KELLEY, DONALD C., Prof. Emeritus of Public Health; Research Mycologist (1958). Diplomate, American Col. of Vet. Preventive Medicine. DVM 1935, MS 1952, Kansas St. U. (*)

KENNEDY, GEORGE A., Prof. Diagnostic Lab; Research Pathologist (1970). DVM 1967, Washington St. U.; PhD 1975, Kansas St. U.; Diplomate 1976, American Col. of Vet. Pathologists. (*)

KLEMM, ROBERT D., Prof. of Anatomy; Research Functional Morphologist (1972). BS 1957, Capital U.; MS 1959, Ohio U.; PhD 1964, Southern Illinois U. (*)

KRUCKENBERG, SAMUEL M., Prof. of Pathology; Dir. of Animal Resource Facility; Research Pathologist (1975). DVM 1963, MS 1965, Kansas St. U.; Diplomate 1968, American Col. of Lab Animal Medicine; PhD 1971, Kansas St. U.; Diplomate 1982, American Col. of Vet. Pathologists. (*)

LAYTON, CANDACE E., Asst. Prof. of Small Animal Surgery (1980). BS 1975, MS 1982, DVM 1977, Kansas St. U.

LEIPOLD, HORST W., Prof. of Pathology; Research Pathologist (1970). DVM 1963, Justus Liebig U.; MS 1967, PhD 1968, Kansas St. U. (*)

LEITH, DAVID E., Regents Distinguished Prof. (1987). BA 1953, Lehigh U.; MD 1957, Harvard Medical School; Diplomate 1964, American Board of Anesthesiology.

LELAND, STANLEY E., JR., Prof. of Parasitology; Research Parasitologist; Assoc. Dir., Agr. Exp. Sta. (1967). BS 1949, MS 1950, U. of Illinois; PhD 1953, Michigan St. U. (*)

LEWIS, LON D., Adjunct Prof. of Physiology (1986). BS 1962, U. of Wyoming; DVM 1967, PhD 1972, Colorado St. U.

LINDQUIST, WILLIAM D., Prof. Emeritus of Parasitology; Research Parasitologist (1968). BS 1940, MS 1942, U. of Idaho; ScD 1949, Johns Hopkins U. (*)

MARRS, GLEN E., JR., Assoc. Prof. of Vet. Diagnosis (1986). DVM 1969, MS 1974, Texas A & M; Diplomate 1980, American Col. of Vet. Pathologists.

McVEY, D. SCOTT, Asst. Prof. of Clinical Pathology (1986). DVM 1980, U. of Tennessee; PhD 1986, Texas A & M.

MILLER-DAVIS, PAMELA A., Instr. (1977). BS 1971, MS 1974, U. of Missouri.

MILLERET, ROY J., Assoc. Prof. Emeritus, Diagnostic Lab; Research Pathologist (1960). DVM 1944, MS 1959, Kansas St. U.

MINOCHA, HARISH C., Prof. of Virology; Research Virologist (1969). BVSc 1955, Indiana; MS 1963, PhD 1967, Kansas St. U. (*)

MOORE, WILLIAM E., Prof. and Head of Lab Medicine; Research Clinical Pathologist (1968). BS 1956, DVM 1958, Cornell U.; PhD 1968, U. of Minnesota; Diplomate 1972, American Col. of Vet. Pathologists. (*)

MOSIER, JACOB E., Prof. of Surgery and Medicine (1945). DVM 1945, MS 1948, Kansas St. U.; Diplomate 1972, American Col. of Vet. Internal Medicine. (*)

NOORDSY, JOHN L., Assoc. Dean and Prof. of Surgery; Research Clinical Scientist (1960). BS 1943, South Dakota St. Col.; DVM 1946, MS 1962, Kansas St. U. (*)

OBERST, RICHARD D., Asst. Prof. of Pathology (1987). DVM 1983, Oklahoma St. U.; PhD 1987, U. of California.

OEHME, FREDERICK W., Prof. of Toxicology, Medicine, and Physiology; Research Toxicologist (1959). BS 1957, DVM 1958, Cornell U.; MS 1962, Kansas St. U.; DMV 1964, Justus Liebig U.; Diplomate 1968, American Board of Vet. Toxicology; PhD 1969, U. of Missouri; Diplomate 1980, American Board of Toxicology; Diplomate 1982, Acad. of Toxicological Sciences. (*)

PARKER, RICHARD L., Adjunct Prof. of Public Health (1987). DVM 1955, Kansas St. U.; MPH 1963, U. of Minnesota.

PHILIPP, JOSEPH T., Adjunct Prof. of Ophthalmology (1982). MD 1971, U. of Kansas.

PHILLIPS, ROBERT M., Prof., Diagnostic Lab; Research Virologist (1975). DVM 1951, Kansas St. U.; PhD 1972, U. of Georgia. (*)

QUADRI, S. KALEEM, Assoc. Prof. of Physiology; Research Endocrinologist and Reproductive Physiologist (1977). MS 1966, Kansas St. U.; MS 1970, PhD 1973, Michigan St. U. (*)

RAILSBACK, LEE T., Prof. Emeritus of Surgery and Medicine (1961). BS 1936, DVM 1937, Kansas St. U.

RIDLEY, ROBERT K., Assoc. Prof. of Parasitology; Research Parasitologist (1981). MS 1960, U. of Kentucky; PhD 1967, Florida St. U.; DVM 1978, Kansas St. U. (*)

ROBERTS, CAROLYN V., Instr.; Asst. to the Dean (1977). BS 1955, U. of Colorado; MS 1976, Kansas St. U.

RUDD, RAY G., Asst. Prof. of Small Animal Surgery (1985). DVM 1981, U. of Tennessee; MS 1985, Purdue U.

SCHNEIDER, JACOB E., Assoc. Prof. of Equine Medicine (1972). BS 1958, DVM 1960, Colorado St. U.

SCHONEWEIS, DAVID A., Prof. of Food Animal Medicine (1966). BS 1956, DVM 1956, MS 1971, Kansas St. U. (*)

SCHONING, POLLY, Assoc. Prof. of Pathology; Research Pathologist (1979). DVM 1964, MS 1970, PhD 1979, Kansas St. U.; Diplomate 1982, American Col. of Vet. Pathologists. (*)

SEEDLE, C. DONALD, Asst. Prof. of Epidemiology; Research Epidemiologist (1984). DVM 1963, Colorado St. U.; MS 1968, U. of Maryland; Diplomate 1986, American Col. of Vet. Preventative Medicine.

SMITH, JOSEPH E., Prof. and Head of Pathology; Research Pathologist (1969). BS 1959, DVM 1961, Texas A & M; PhD 1964, U. of California; Diplomate 1972, American Col. of Vet. Pathologists. (*)

SPIRE, MARK F., Assoc. Prof. of Food Animal Medicine (1976). DVM 1974, Texas A & M; MS 1978, Kansas St. U.; Diplomate 1981, American Col. of Theriogenology. (*)

STRAFUSS, ALBERT C., Prof. of Pathology; Research Pathologist (1968). BS 1952, DVM 1954, Kansas St. U.; MS 1958, Iowa St. U.; PhD 1963, U. of Minnesota. (*)

TAUSSIG, ROBERT A., Assoc. Prof. of Small Animal Medicine (1966). DVM 1945, Colorado St. U.; MS 1970, Kansas St. U.

TRAVNICEK, ROBERT G., Adjunct Prof. of Medicine (1979). MD 1965, U. of Nebraska.

TROTTER, DONALD M., Prof. Emeritus of Anatomy; Research Anatomist (1956). DVM 1946, Kansas St. U.; Diplomate 1951, American Col. of Vet. Pathologists; MS 1957, Kansas St. U. (*)

TROYER, DERYL L., Asst. Prof. of Anatomy (1986). DVM 1972, PhD 1987, Kansas St. U.

UPSON, DAN W., Dir. of Education, Service, and Outreach; Prof. of Pharmacology (1959). DVM 1952, MS 1962, PhD 1969, Kansas St. U.; Fellow 1977, American Col. of Vet. Pharmacology and Therapeutics. (*)

VESTWEBER, JEROME G. E., Prof. of Food Animal Medicine (1977). DVM 1964, U. of Minnesota; MS 1970, PhD 1973, Kansas St. U. (*)

VORHIES, MAHLON W., Prof. and Head of Vet. Diagnosis (1986). DVM 1962, Iowa St. U.; MS 1967, Michigan St. U.

WATNEY, GUY C., Asst. Prof. of Anesthesiology (1986). MRCVS 1978, MA 1983, PhD 1984, Cambridge U.

WEINMAN, DONALD E., Assoc. Prof. Emeritus of Anatomy; Research Anatomist (1974). DVM 1946, Kansas St. U.; MS 1960, PhD 1967, U. of Georgia. (*)

WESTFALL, JANE A., Prof. of Microanatomy; Research Neuroscientist (1957). AB 1950, Col. of Pacific; MA 1952, Mills Col.; PhD 1965, U. of California. (*)

WILLARD, GAYLE K., Asst. Prof. of Vet. Medicine Library (1987). BS 1970, MS 1984, Kansas St. U.; MLS 1987, Emporia St. U.

Intercollegiate Athletics

Larry Travis, Head and Athletic Director

Coaches Bietau, Capriotti, Clark, Kruger, Mossman, Nelson, Parrish, and Sedorcek; Assistant Coaches Altman, Anderson, Bennett, L. C. Cole, Mark Deal, Mike Deal, Epps, Flegal, Grensing, Hansen, Hartman, Lasswell, Palmieri, Rachel, Singler, Steele, and Stewart; Assistant Sports Information Directors Buckert and Mossman; Trainers Brace, Cramer, Harklau, and Roschke; Administrative Staff Adolph, DaPron, Fisher, Jones, McMillen, Moon, Renfro, and Travis.

Kansas State University 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 competes 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-101-5-0899

ATHM 102. Varsity Basketball. (1) I, II. Pr.: Consent of instructor. ATHM-102-5-0899

ATHM 103. Varsity Cross Country. (1) I, II. Pr.: Consent of instructor. ATHM-103-5-0899

ATHM 104. Varsity Football. (1) I, II. Pr.: Consent of instructor. ATHM-104-5-0899

ATHM 105. Varsity Golf. (1) I, II. Pr.: Consent of instructor. ATHM-105-5-0899

ATHM 107. Varsity Track—Indoor. (1) I, II. Pr.: Consent of instructor. ATHM-107-5-0899

ATHM 108. Varsity Track—Outdoor. (1) I, II. Pr.: Consent of instructor. ATHM-108-5-0899

ATHW 150. Intercollegiate Basketball. (1) I, II. Pr.: Consent of instructor. ATHW-150-5-0899

ATHW 152. Intercollegiate Track. (1) I, II. Pr.: Consent of instructor. ATHW-152-5-0899

ATHW 154. Intercollegiate Tennis. (1) I, II. Pr.: Consent of instructor. ATHW-154-5-0899

ATHW 155. Intercollegiate Volleyball. (1) I. Pr.: Consent of instructor. ATHW-155-5-0899

ATHW 157. Intercollegiate Golf. (1) I, II. Pr.: Consent of instructor. ATHW-157-5-0899

Faculty and Staff

ADOLPH, CAROL, Ticket Manager (1955).

ALTMAN, DANA, Asst. Men's Basketball Coach (1986). BA 1980, Eastern New Mexico; MBA 1981, Western State Col.

ANDERSON, DARRYL, Asst. Track Coach (1984). BS 1983, Kansas St. U.

BENNETT, SCOTT, Asst. Track Coach (1985). BS 1975, U. of Wisconsin at Madison; MS 1984, U. of Wisconsin at LaCrosse.

BIETAU, STEVE, Head Tennis Coach (1984). BS 1979, Doane Col.

BRACE, STEVEN C., Asst. Athletic Trainer (1987). BS 1985, Eastern Illinois U.; MS 1987, Syracuse U.

BUCKERT, LEAH R., Asst. Sports Info. Dir. (1987). BS 1986, Culver-Stockton Col.

CAPRIOTTI, JOHN, Head Track Coach (1986). BS 1980, California Polytechnic St. U.; MS 1982, Kansas St. U.

CLARK, MICHAEL R., Baseball Coach (1986). BS 1975, Missouri Western St. Col.; MS 1977, Northwest Missouri St. U.

COLE, LAWRENCE (L. C.), Asst. Football Coach (1986). BS 1980, U. of Nebraska.

CRAMER, CARL, Dir. of Sports Medicine (1982). BA 1976, Augsburg Col.; MED 1982, U. of Wisconsin-Superior.

DaPRON, DUANE, Sports Info. Dir. (1985). BS 1979, MS 1980, Fort Hays St. U.

DEAL, MARK, Asst. Football Coach (1985). BS 1979, U. of Indiana.

DEAL, MIKE, Asst. Football Coach (1985). BS 1970, MS 1971, U. of Indiana.

EPPS, JAMES, Spec. Asst. to the Head Football Coach (1981). BA 1969, Washburn U.; MS 1972, Pittsburg St. U.

FISHER, MIKE, Dir. of Acad. Services (1987). BA 1967, U. of Kansas; MA 1973, Pittsburg St. U.; PhD 1979, U. of Kansas.

FLEGAL, DAVID, Asst. Football Coach (1985). BS 1979, MS 1982, U. of Akron.

GRENSING, GREG, Asst. Men's Basketball Coach (1986). BS 1979, MS 1981, SW Texas St. U.

HALL, STEPHEN J., Acad. Counselor (1986). BA 1975, Missouri Western St. Col.; MA 1978, U. of Colorado.

HANSEN, RAYMOND B., Asst. Track Coach (1986). BS 1984, Kansas St. U.

HARKLAU, DENISE A., Asst. Athletic Trainer (1987). BA 1985, U. of Northern Iowa; MS 1986, Illinois St. U.

HARTMAN, GERALD, Asst. Football Coach (1985). BS 1969, U. of Michigan; MS 1979, Eastern Michigan U.

JONES, MICHAEL, Bus. Mgr. (1985). BS 1972, MS 1977, Kansas St. U.

KLEINAU, JAMES L., Equipment Manager (1979). BS 1977, Oklahoma St. U.

KRUGER, LON, Head Men's Basketball Coach (1986). BS 1975, Kansas St. U.; MS 1977, Pittsburg St. U.

LASSWELL, TERRI A., Asst. Women's Basketball Coach (1986). BS 1978, Washburn U.; MS 1983, U. of Kansas.

LOONEY, MICHAEL, Television Specialist (1982). AA 1976, Dodge City Community Col.

McMILLEN, MATTHEW A., Field Rep. (1987). BS 1985, Kansas St. U.

MOON, Sr., WILLIAM LEE, Assoc. Athletic Dir. (1985). BS 1970, Virginia Military Inst.; MS 1973, U. of Virginia.

MOSSMAN, KENNETH, Asst. Sports Info. Dir. (1985). BS 1981, Southwestern Col.

MOSSMAN, MATILDA, Head Women's Basketball Coach (1984). BS 1979, MS 1980, Western Kentucky U.

NELSON, SCOTT, Head Volleyball Coach (1980). BS 1979, Ball St. U.; MS 1980, Brigham Young U.

PALMIERI, GERARD A., Strength and Conditioning Coach (1987). BS 1980, Montclair St. Col.; MA 1984, U. of North Carolina.

PARRISH, STANLEY, Head Football Coach (1985). BS 1968, MA 1976, Purdue U.

RACHEL, RICHARD, Asst. Football Coach (1986). BA 1969, Parsons Col.; MA 1978, Morehead St. Col.

RENFRO, CRAIG, Dir. of Ahearn Scholarship Fund (1985). BS 1982, Kansas St. U.

ROSCHKE, MARCIA, Asst. Athletic Trainer (1987). BA 1970, Valparaiso U.; MS 1986, Kansas St. U.

SEDORCEK, ROBERT, Men's and Women's Head Golf Coach (1985). BS 1986, Kansas St. U.

SINGLER, WILLIAM, Asst. Football Coach (1985). BS 1976, MS 1983, Stanford U.

STEELE, P. DALE, Asst. Football Coach (1987). BS 1976, U. of South Carolina; MS 1978, Ball St. U.

STEWART, JEFFREY J., Asst. Baseball Coach (1986). MS 1979, Northern Illinois U.; MS 1985, Mississippi St. U.

TRAVIS, LARRY, Dir. of Athletics (1985). BS 1963, MS 1969, U. of Florida.

Research Resources

Library System

Brice Hobrock, Dean of Libraries
Farrell Library
532-6516

The University Libraries provide research library support for the educational, research, extension, and public services objectives of Kansas State University. The Libraries' staff is responsible for acquiring, developing, maintaining, and preserving collections of library materials suitable to the total program requirements of the University. Librarians at KSU are dedicated to organizing, promoting, and interpreting the collections to the University community and to the citizens of Kansas.

Farrell Library, named after Kansas State University's eighth president, Francis David Farrell, is the central unit of the University library system. It is supplemented by four specialized subject libraries in other buildings. These branch libraries are architecture and design (Seaton Hall), chemistry (Willard Hall), math/physics (Cardwell Hall), and veterinary medical (Veterinary Medical Teaching Building).

The University Libraries contain over one million volumes and that number is increasing at an annual rate of about 40,000 volumes. Current journal and serials subscriptions total 7,649. In addition to the volumes cataloged according to the Library of Congress Classification, the Libraries contain a document depository collection of United States government publications that numbers nearly 600,000; about 100,000 maps; a complete archival collection of ERIC (Educational Resources Information Center) documents; a curriculum materials collection of around 10,000 items; and more than two million pieces of microforms. Audiovisual materials number approximately 17,000 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 that must be protected and accorded special treatment because of their value and condition. The archives offer an assortment of published and unpublished material, including photographs, documenting the history of Kansas State University. 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 10,000 volumes of children's books and is used primarily by students in teacher education.

The reference/information services department, located on the first floor of Farrell Library, is the service center of the system and provides traditional reference service as well as computerized information retrieval from more than 200 data bases. This department is staffed by a group of librarians who are available to help students, faculty, and others find the information they need. The card catalogs are located in this department.

Other areas of Farrell Library containing collections and providing services are reserves (basement), the microforms/periodicals reading room (second floor), government documents department (third floor), and the study space (fourth floor). Special collections/University archives and the audiovisual department are on the fifth floor. The minorities center is on the fourth floor of old Farrell. Resources on developing countries, on the third floor of old Farrell, provide research information about developing countries in support of KSU international agricultural programs. A postharvest documentation service (fourth floor), supported by a USAID grant, provides information to developing nations on postharvest cereal and legume systems. The other departments on the first floor include acquisitions, cataloging, binding, circulation, automation, and administration.

Library instructional services, on the second floor of Farrell, help students acquire and develop skills in using the library through orientation tours, subject presentations, and a class for credit.

To take advantage of the library resources in the region, the libraries, through the interlibrary loan department on the second floor, operate a courier service which travels twice a week east to Topeka, Lawrence, and Kansas City and twice a week south to Emporia and Wichita. In addition to collections at the libraries of Regents' institutions, the vast scientific holdings of the Linda Hall Library in Kansas City are available. The six state-supported institutions of higher education belong to a computerized national network for cataloging and interlibrary loan. They also permit direct borrowing by students and faculty. The libraries are a member of the Kansas Information Circuit, a network of the larger public and system libraries of the state.

Computing and Telecommunications Activities

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

Computing services for instruction and instructional support activities in research, administration, and public service are provided by the Office of University Computing Activities. These services also are available to other public and private educational institutions. Statewide computing efforts are fostered among the Board of Regents' many educational institutions. University computing activities are organized into four groups—academic user services, administrative user services, technical services, and computer operations services.

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, the *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.

The computer for academic services is a National Advanced Systems 6630 with 12 megabytes of main memory and 13 gigabytes of associated direct-access storage. Supporting peripheral equipment includes tape drives, card reader, line printers, page printer, interactive terminals, color graphics terminals, remote-job-entry stations, and an incremental plotter. Many remote computing laboratories are on campus and provide interactive access to users.

Programming languages on the system include FORTRAN, COBOL, PL/1, SPITBOL, PASCAL, and Assembler. Generalized applications packages for mathematical statistical and simulation tasks are available using SPSS, SAS, BMD, IMSL, GPSS/H, MPSIII, LISREL, and CSMP. The Conversational Monitor System (CMS) is the interactive system that supports communications terminals using BASIC, SCRIPT, VS Assembler, GPSS/H, FORTRAN 77, PASCAL, PL/I, COBOL, SAS, SPSS, SQL/DS, WATFOR 77, and WATFIV. Noncredit courses are taught periodically to assist users to utilize more

fully the capabilities of the computer and its program environment.

Administrative services. The administrative community of the University is supported by administrative user services, technical services, and computer operations services. Services consist of application systems, programming, operational, and data entry functions provided by the staff on a closed-shop basis. Some of the computerized processing services performed directly for the student community are registration, personnel changes, payrolls, billings for student health, alumni/foundation system, and the concessions of the K-State Union.

The computer for administrative services is an IBM System 4381 Group 13 with 16 megabytes of main memory. Supporting equipment to this machine includes disk and tape drives, card reader, card punch, line printers, and card processing equipment. COBOL is the principal programming language. On-line transactions are processed using ADDS/ONLINE and SHADOW with the IDMS/R data base.

Particle Accelerators: J. R. Macdonald Laboratory

Patrick Richard, Director
106 Cardwell Hall
532-6783

Kansas State University, 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 associated with this facility including a 6 MV tandem Van de Graaff. The laboratory is building a new superconducting LINAC booster accelerator which will give 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. Also, a new type of ion source called CRYEBIS is being developed for producing high-charge, low-energy ions. A network of four MICRO-VAX work stations is available for the accumulation and analysis of data.

The J. R. Macdonald Laboratory is a national atomic physics user facility. The KSU faculty, together with a professional staff and graduate students, maintain an active research program which addresses problems in atomic interactions and spectroscopy. For further information concerning this facility, write to the director, J. R. Macdonald Laboratory, Department of Physics, 106 Cardwell Hall, Kansas State University, Manhattan, Kansas 66506.

Nuclear Reactor

Richard E. Faw, Director
127 Ward Hall
532-5963

Another major scientific facility is the TRIGA Mk II nuclear reactor and related equipment. In addition to basic research involving neutron spectroscopy and neutron cross-section studies, the Reactor Laboratory affords the entire University community neutron activation analysis capabilities for sensitive, non-destructive analysis. For further information, write the director, Reactor Laboratory, Department of Nuclear Engineering, 127 Ward Hall, Kansas State University, Manhattan, Kansas 66506.

Biological Research Facilities

Terry Johnson, Director
233 Ackert Hall
532-6705

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.

The Center for Basic Cancer Research offers numerous educational and research opportunities. Each year the center 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, a new and unique research facility that opened during the 1982-83 academic year, 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. The anticancer drug laboratory is an integral part of the Center for Basic Cancer Research in the Division of Biology, and it allows for the training of basic cancer research scientists.

The Division of Biology, in cooperation with Aerospace Engineering Sciences at the University of Colorado, has been selected by the National Aeronautics and Space Administration (NASA) to lead BioServe Space Technologies, a new Center for the

Commercial Development of Space. The division directs the life science activities of the center which adds a vast new dimension to the scientific education of future generations of students. 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.

Other facilities include the Kansas State University herbarium with a complete monographic library, a research and reference collection of insects in the Department of Entomology, greenhouses, aquatic and terrestrial research laboratories, animal quarters, controlled environmental chambers, and many pieces of specialized field and laboratory research equipment.

Kansas Wheat Commission

Steven M. Graham, Administrator
2630 Claflin Road
539-0255

The Kansas Wheat Commission is a state agency funded by the wheat-producing farmers of the state. The purpose of the commission is to increase the marketing of wheat and wheat products through education, public relations, technical assistance, and research. Toward this goal, the commission cooperates with Kansas State University on various projects. Professors from the Departments of Grain Science and Industry, Agricultural Economics, Agronomy, and others are continuously involved in projects designed to develop new markets and maintain existing ones, both domestic and foreign, for Kansas wheat.

U.S. Grain Marketing Research Laboratory

R. L. Dunkle, director
1515 College Avenue
776-2701

The center has three research units: (1) grain quality and structure; (2) biology of insects and microorganisms in stored grains and cereal products; and (3) engineering. Its laboratories include a pilot plant, a grain elevator, and facilities for biochemical, microscopic, milling, and baking research. The total annual budget is \$2.90 million; the number of permanent, full-time employees is 55. Sixteen members of the center's staff have courtesy faculty appointments at KSU to guide graduate students. The center and the University share many cooperative research projects, funded by a budget of almost a quarter million dollars for work involving about 20 graduate students and technicians, and up to 15 part-time undergraduate student helpers. The center publishes annually more than 70 scientific and technical publications.

International Grains Program

C. W. Deyoe, Director

Established in 1978 with funds provided by the Kansas legislature, the International Grains Program promotes the marketing of wheat, corn, soybeans, sorghum, and other U.S. grains. As a 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.

Laser Center

D. W. Setser, Director
322 Willard Hall
532-6692

The Laser Center is in Ward Hall and is used for fundamental research by faculty and students in chemistry, physics, and engineering. The lasers include rare gas halide pulsed lasers, continuous wave Ar ion lasers, and dye lasers. In Willard and Cardwell Halls carbon dioxide, nitrogen, and Nd-YAG lasers are available. Thus, a wide range of laser frequencies and laser powers can be provided for a variety of

different experiments. The Laser Center also has laboratory computers and a wide selection of spectroscopic equipment that can be used for monitoring laser-induced physical or chemical changes. For further information concerning this facility, write to D. W. Setser, Department of Chemistry or C. M. Sorensen, Department of Physics.

Other Research Facilities

A wide variety of specialized facilities is maintained to support research and scholarly work in the humanities, natural sciences, applied sciences, social sciences, and professional areas. Although an exhaustive listing is prohibitive, the following represent a selection of such supporting resources:

- Arp electronic music synthesizer
- Audiovisual materials center
- Center for Excellence in Computer-Controlled Automation
- Computer-Aided Design Laboratories (human ecology)
- Consortium for Political Research data banks
- Controlled environment test facility
- Early Childhood Laboratory
- Editorial offices of major journals in history, English, economics, horticulture, education, modern languages, and school food service (see below)
- Evapotranspiration laboratory
- Experimental animal facilities
- Fourier transform spectroscopic laboratory
- Glassblowing and instrument shops
- Heliodon and wind tunnel
- Institute for Environmental Research
- Interior architectural shops
- Near infrared protein laboratory
- Nuclear magnetic resonance spectrometers
- Physiology of exercise laboratory
- Plant disease diagnostic laboratory
- Population and demographic laboratory
- Recording Raman spectrometer
- Scanning electron microscope
- Sensory Analysis Center
- Soil testing laboratory
- Statistical laboratory
- Textile chemistry laboratory
- Textile conservation laboratory
- Transmission electron microscope
- Veterinary diagnostic laboratory
- Weather data laboratory
- Wind and soil erosion laboratory
- X-ray diffractometers

Scholarly and Professional Publications

Agricultural Extension

Numerous publications about research, in varied formats for various audiences

College of Architecture and Design

Newsletter of the Rural/Small Town Planning Division, American Planning Association—information, articles, and essays on the nature of rural/small town planning
OZ—modern architectural trends

College of Arts and Sciences

A&S—illustrated magazine of arts and sciences on arts, humanities, social sciences, and natural sciences

Department of English

Kansas Quarterly—prize-winning literary magazine, short stories, poetry, art, history, literary criticism
Literary Magazine Review—reviews of literary magazines and commentary on the international noncommercial literary magazine scene
The Manhattan Project—proceedings of the summer conference for high school writers
Touchstone—student literary magazine
Twister—genre fiction for the college-age audience

Department of Chemistry

Applied Spectroscopy—technical journal on spectroscopic research in chemistry and physics

Department of Economics

Regional Science Perspectives—regional economic developments based on science and technology

Department of History

Aerospace Historian—the journal of the Air Force Historical Foundation; aviation and space history with particular emphasis on military materials
Journal of the West—history and culture of the U.S. West (illustrated)
Military Affairs—comprehensive papers on military history in a wide range of eras and nations

Department of Modern Languages

Studies in Twentieth Century Literature—literary theory and practical criticism of twentieth century literature in French, German, Russian, and Spanish (with University of Nebraska-Lincoln)

College of Education

Educational Considerations—timely papers on educational issues at all levels
Media Adult Learning—research, reviews, papers

College of Engineering

Kansas State Engineer—technical and nontechnical articles on engineering developments

Research Activities—biennial report on research in the College of Engineering

College of Veterinary Medicine

Veterinary and Human Toxicology—toxicology, research, reviews, and field observation

Continuing Education

National Issues in Higher Education—proceedings of annual meetings on educational issues

IDEA Papers—series on college teaching, from the Center for Faculty Evaluation and Development

Rural Clearinghouse for Education and Development model programs, research reports, conference proceedings, and policy analysis

Office of News and Information

Perspectives—research and scholarship at Kansas State University

Center for Basic Cancer Research

Accepting a Challenge—Kansas State cancer research and education

Libraries

Bibliography Series—each bibliography on a different topic

The Library Insider—library newsletter published twice yearly

Agricultural Experiment Station

Walter Woods, Director

Kurt C. Feltner, Associate Director

Stanley E. Leland, Jr., Associate 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 (KAES) 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 mission of the KAES is to conduct original research to enhance the capability of agriculture in its broadest sense to provide adequate food and fiber and improve rural living and human nutrition for present and future generations.

The KAES, with headquarters in KSU's Waters Hall, currently is operating on an

annual budget of nearly \$30 million.

Research is performed both on and off campus (on state-owned and leased land), and researchers have access to laboratories and scientific equipment. Nearly 30 departments in five of the University's colleges are involved. Also, the station is a strong ally of the Graduate School; interested graduate students are encouraged to seek research assistantships to supplement their study programs.

Departments of the KAES are, by college:

Agriculture: agricultural economics; agronomy; animal sciences and industry; entomology; forestry; grain science and industry; horticulture; plant pathology.

Arts and sciences: biochemistry; biology; chemistry; economics; physics; sociology, anthropology, and social work; statistics.

Engineering: agricultural engineering, chemical engineering, civil engineering, electrical engineering, industrial engineering, mechanical engineering, nuclear engineering. *Human ecology:* clothing, textiles, and interior design; human development and family studies; foods and nutrition; dietetics, restaurant and institutional management. *Veterinary medicine:* veterinary diagnosis; laboratory medicine; pathology; anatomy and physiology; surgery and medicine.

Off-campus research is centered at four branch stations—Northwest, Fort Hays, Southwest, and Southeast Kansas—and 11 experiment fields in various parts of the state (see section on off-campus research).

Research by scientists in the KAES is organized into more than 600 projects, which cover nearly all phases of agriculture and related industries. Among projects in progress are those concerned with physiology and nutrition of plants and animals; water resources, with special attention to conservation and distribution of available water for irrigation and other agricultural uses; feeds for livestock; marketing of agricultural products; production, maintenance, and use of farm machinery and equipment; sociological problems; community development; and home economics, with emphasis on food science, human nutrition, family living, and institutional management.

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. Inquiries about or requests for station publications, copies of which are available free or at minimal charge to citizens of the state, should be sent to the Distribution Center, Umberger Hall, Kansas State University, Manhattan, Kansas 66506.

Off-Campus Research: Branch Stations and Experiment Fields

Fort Hays Branch Station

Patrick Coyne, Head and Professor

Professors Brethour and Harvey; Associate Professors Kofoid, Martin, and Stegmeier; Assistant Professors Olson, Seifers, Stahlman, and Thompson.

The oldest and largest of the branch stations, Fort Hays Branch Station (south of Hays in Ellis County), was organized in 1901, after the state legislature provided for its organization and appropriated funds for its operation. The station 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 the western half of the state, 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 as related to crops and livestock.

Northwest Research-Extension Center

Richard S. White, Head and Professor

Associate Professors Adams, Lawless, Mikesell, Schwulst, and Sunderman; Assistant Professors Ferrell, Noughton, Nelson, and Strine; Instructor Lamm.

When it was established in 1987, the Northwest Research-Extension Center merged activities of the Colby Branch Experiment Station and the Northwest Area Extension Office into a single facility. The center has been created to meet combined research and extension needs of northwest Kansas. It currently occupies 759 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, livestock, and 4-H.

Southwest Kansas Branch Experiment Station

G. M. Herron, Head and Associate Professor

Professor Greene; Associate Professors Buschman, DePew, and Witt; Assistant Professors Brandt, Morishita, Norwood, and Schlegel.

A 99-year lease from the Finney County commissioners to the State Board of Regents, beginning June 14, 1907, provided 320 acres for agricultural research. Additional adjoining tracts totaling 235 acres were purchased in 1937 and 1939. Since 1948 an 80-acre irrigated tract

has continuously been made available for research by the Garden City Company. Some additional land is rented or leased. In July 1986 the Garden City Branch Experiment Station and the Tribune Branch Experiment Station (190 acres) were combined to form the Southwest Kansas Branch Experiment Station with headquarters at Garden City. In June 1987, The Palen Farms, Inc. of Denver, Colorado, donated 40 acres of land that is adjacent to the Tribune Unit.

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, and soil and fertilizer relationships. Also beef cattle nutrition and management studies are conducted. Many research projects are conducted jointly between station and on-campus scientists.

Current planning involves the development of the Southwest Kansas Research-Extension Center from the present facilities of the Experiment Station and Area Extension Office.

Southeast Kansas Branch Station

Lyle W. Lomas, Head and Associate Professor

Assistant Professors Coffey, Kelley, Moyer, and Sweeney; Instructor Granade.

The Southeast Kansas Branch Experiment Station in Labette County was established in 1949. The station operates a total of 1,093 acres, 764 acres of which are owned and 329 leased (including 49 at Columbus and 280 at Mound Valley).

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. Five are operated by the KSU Department of Agronomy. They are on different soil types and in different climatic conditions. Three fields are supervised jointly by the KSU Departments of Agricultural Engineering and Agronomy and include irrigation studies. Fields (most 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 (De Soto).

Special Agencies Affiliated with the AES

The Kansas Water Resources Research Institute

Cooperating with the Water Resources Institute, University of Kansas

Established the same year that Congress passed the Water Resources Act (1964), the Kansas Water Resources Research Institute has a double charge: to conduct both basic and applied research on water use and to train scientists in water resources. By Regents' stipulation, representatives of Kansas State University (Manhattan) and The University of Kansas (Lawrence) participate in institute policy making and research. The institute may support water resources research in any department of either university—toward the end of providing maximum benefit to Kansans. Research is focused on finding the most effective ways of conserving, using, and distributing available water for the greatest benefit of today's and tomorrow's citizens.

Evapotranspiration Laboratory

Edward T. Kanemasu, Research Leader

How to organize crop and soil management systems to provide efficient use of water resources has been a main commitment of the Evapotranspiration Laboratory since its establishment by the Kansas legislature in 1968. In carrying out that commitment, laboratory scientists are studying processes of water use by evaporation from the soil and transpiration from the plant (evapotranspiration). These studies include such measurements as water movement in soils, plant photosynthesis, leaf temperatures, leaf area, solar radiation, air temperature, precipitation, and relative humidity.

Graduate student studies are supported by the laboratory and supervised by the staff to train scientists who will know the basics of efficient use of water in agricultural production.

The Food and Feed Grain Institute

C. W. Deyoe, Director

The Food and Feed Grain Institute has these major 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 of the Department of Grain Science and Industry, members of other University departments, and personnel of other agencies like U.S. Grain Marketing Research Center.

The Statistical Laboratory

George Milliken, Director

This laboratory, established in 1946 and administered by the Department of Statistics, is especially equipped and staffed to serve scientists associated with the Agricultural Experiment Station. Both consulting and computational services are available.

Other general services

Chemistry laboratories available to station researchers include those used primarily for research on feed stuffs (animal sciences and industry) and grain protein (grain science and industry), and for soil testing (agronomy and Southwest Branch Station). The scanning electron microscope maintained by the Department of Entomology is used increasingly by station scientists for particular projects. Other services are provided by the Weather Data Library, Plant Diagnostic Laboratory (plant pathology), Population Research Laboratory (sociology, anthropology, and social work), and Veterinary Diagnostic Laboratory.

Faculty and Staff

Library Faculty

ALLEN, DAVID, Chair, Library Automation (1987). BA 1978, MLS 1982, Brigham Young U.

BLANDING, SYLVIA J., Social Science Reference Bibliographer (1972). BA 1970, Kansas Wesleyan; MLS 1971, Emporia St. U.

BOWER, MERRY D., Nonbook Cataloger (1980). BA 1976, U. of Kansas; MLS 1980, U. of Illinois.

CHIANG, BELINDA, Chair, Cataloging (1987). BA 1959, National Taiwan U.; MLS 1963, Syracuse U.

CRAWFORD, ANTHONY R., Archivist (1983). BS 1967, Oklahoma St. U.; MLS 1973, U. of Oklahoma.

CURL, SHEILA, Science Reference Bibliographer (1986). BA 1977, Hunter Col.; MLS 1984, Columbia U.

ELDER, NELDA J., Chair, Collection Quality Enhancement (1972). BA 1963, Wichita St. U.; MLS 1970, Emporia St. U.

FARMER, DIANA M., Chair, Serials Dept. (1972). BA 1971, MLS 1972, Emporia St. U.

GEISER, CHERIE J., Chair, General Users Services (1978). BA 1972, U. of North Dakota; MLS 1978, U. of Missouri.

GORDON-GILMORE, ANITA L., Cataloger (1978). BA 1974, MA 1977, Fort Hays St. U.; MLS 1978, Emporia St. U.

GRASS, CHARLENE G., Assoc. Dean, Collection and Technical Services (1978). BA 1973, U. of Detroit; MLS 1978, U. of Missouri.

HAY, FREDERICK J., Social Science Reference Bibliographer (1988). BA 1975, Southwestern at Memphis; MA 1981, U. of Virginia; PhD 1985, U. of Florida; MLIS 1987, Florida St. U.

HECKER, THOMAS E., Business Reference Bibliographer (1988). BA 1980, Pennsylvania St. U.; MLS 1982, U. of Pittsburgh.

HOBROCK, BRICE G., Dean of Libraries (1982). BA 1959, Emporia St. U.; MS 1961, PhD 1964, Kansas St. U.; MLS 1973, U. of Denver.

JOHNSON, JOHN L., Chair, Reference/Information Services (1969). BA 1967, MA 1973, Kansas St. U.

KUYPER-RUSHING, LOIS, Music Cataloger (1987). BA 1977, Central Col., Iowa; MM 1978, Louisiana St. U.

MADSEN, DEBORA L., Acquisitions Librarian (1983). BA 1970, U. of California-Los Angeles; MLS 1979, U. of Arizona.

MORELAND, RACHEL S., Cataloger (1971). BS 1955, U. of Arizona; MS 1970, Kansas St. U.; MLS 1988, U. of Missouri.

PIGNO, ANTONIA, Chair, Specialized Collections (1975). BA 1968, SUNY, Stony Brook; MA 1971, Kansas St. U.

PRENTICE, MARGARET, Cataloger (1986). BA 1978, Edgewood Col., Madison; MA 1979, U. of Wisconsin-Madison; Certificate of Advanced Study 1986, U. of Illinois.

QUIRING, VIRGINIA M., Assoc. Dean for Library Development (1971). BA 1943, Ottawa U.; MLS 1971, MS 1978, Emporia St. U.

REMELTS, GLENN, Chair of Online Searching (1984). BS 1975, Grand Valley St. Col.; MLS 1979, Western Michigan U.

ROBERTS, SHARON A., Head of Adaptive Cataloging (1980). BA 1969, Butler U.; MA 1976, U. of Cincinnati; MLS 1979, Indiana U.

SCHENCK-HAMLIN, DONNA C., Post-Harvest Documentation Service Librarian (1983). BA 1975, MLS 1976, U. of Oregon; MM 1984, Kansas St. U.

SCHRAG, DWAYNE D., Head, Reference and Information Services (1979). BA 1960, Bethel Col.; ML 1967, Emporia St. U.

SCHRAG, SANDRA K., Documents Librarian (1979). BA 1966, ML 1967, Emporia St. U.; MS 1978, East Texas St. U.

SCHWARZWALDER, ROBERT, Science Reference Bibliographer (1986). BS 1979, Louisiana St. U.; MLS 1986, PhD 1986, Indiana U.

SCOTT, ANN, Assoc. Dean, Information Research Services (1973). BA 1964, MA 1970, Kansas St. U.

SMITH, CAROLYN J., Humanities Reference Bibliographer (1979). BM 1968, U. of Tennessee; MM 1978, Kansas St. U.

STARKE, NANCY, Instructional Services Librarian (1987). BA 1977, Fort Hays St. U.; MLS 1978, Emporia St. U.; PhD 1986, Kansas St. U.

STUBBAN, VANESSA L., Science Reference Bibliographer (1983). BA 1981, Carroll Col.; MLS 1983, U. of Denver.

TURNER, MARILYN S., Head of Bibliographic Maintenance Librarian (1984). BA 1973, Michigan St. U.; MS 1984, U. of Texas.

VANDER VELDE, JOHN J., Special Collections Librarian (1968). BA 1967, ML 1968, Emporia St. U.

WEISENBURGER, PATRICIA, Arch. and Design Librarian (1985). BA 1956, MA 1959, U. of Illinois; MLS 1981, Emporia St. U.

WILDE, LUCY M., Humanities Reference Bibliographer (1967). BA 1965, Avila Col.; MLS 1967, Rosary Col.; MA 1974, Kansas St. U.

WILLARD, GAYLE, Vet. Medical Librarian (1985). BS 1970, MS 1984, Kansas St. U.; MLS 1987, Emporia St. U.

WILLIAMS, SARA R., Preservation Librarian (1983). BA 1976, Nebraska Wesleyan U.; MLS 1981, Simmons Graduate School.

YOUNG, NEAL, Developing Countries Librarian (1986). BA 1977, U. of Kansas; MA 1986, Michigan St. U.; MLS 1986, Indiana U.

Computing and Telecommunications Activities

ALLOWAY, JAY E., Assoc. Operating Systems Specialist (1970). BS 1970, Kansas St. U.

CONROW, KENNETH, Assoc. Dir. of Academic User Services; Assoc. Prof. of Computer Science (1961). BA 1954, Swarthmore Col.; PhD 1957, U. of Illinois. (*)

GALLAGHER, TOM L., Dir. of Computing and Telecommunications Activities; Assoc. Prof. of Computer Science (1970). BA 1953, MS 1954, North Texas St. Col.; DSc 1967, Washington U. (*)

KENNEDY, FAYE L., Coord. of Microcomputing Systems (1985). BS 1969, MS 1982, Kansas St. U.

KEPPLE, MELVIN, Assoc. Dir. of Computer Operations (1967). BS 1950, Washburn U.

MILLER, MICHAEL H., Assoc. Dir. of Technical Services; Asst. Prof. of Computer Science (1960). BS 1958, MS 1960, Iowa St. U.

STREETER, JOHN W., Assoc. Dir. of Administrative User Services (1985). BS 1973, MBA 1974, Kansas St. U.

YOUNG, ROBERT A., Asst. Dir., Telecommunications (1977). BS 1975, MS 1976, Kansas St. U.

Outreach

International Agriculture

Vernon C. Larson, Director
108 Waters Hall
532-5714

Since the first foreign students were admitted in 1898, people from and in other countries have helped Kansas State University forge a proud achievement record in international activities. Most of these activities have focused on helping the developing countries establish land-grant type institutions geared to increasing food production and improving the country's economy.

The state of Kansas and the KSU staff and faculty have found cooperative environments abroad that, for the most part, have resulted in excellent development programs.

KSU has been involved in international activities since 1956 when its Colleges of Agriculture, Human Ecology (then Home Economics), and Veterinary Medicine were selected for work in India. The KSU Office of International Agricultural Programs was established in 1960 as the center for agricultural and veterinary medical programs already underway. Most of its activities have been through the Agency for International Development (AID). Involvement by the University since that time has produced a pool of faculty and international officers with long experience in managing international programs in harmony with the U.S. land-grant tradition—the U.S. educational movement that made education available to all people rather than only to those in upper strata.

During the work with India (1956–1972), 59 faculty members served there, and 160 Indian teachers studied at KSU. The work centered at Andhra Pradesh Agricultural University. Most of that university's deans and department heads earned Ph.D. degrees at KSU.

In Nigeria, KSU helped develop colleges of agriculture and veterinary medicine at Ahmadu Bello University (1964–1977). More than 90 faculty members worked in Nigeria and 70 Nigerian faculty have taken graduate training in the U.S., primarily at KSU. In 1980 the University became the recipient of a three-year USDA grant to reestablish linkages with Ahmadu Bello University. Eight similar grants were made available to U.S. universities that had assisted in establishing universities in a developing country. A prime requisite of the \$100,000 grant was that it must be

beneficial to both the U.S. and foreign institutions. In addition, the Nigerian government is funding the training of agricultural officers in six of its northern states.

From 1977 through 1983 the principal international project of KSU was with the government of the Republic of the Philippines. This \$20 million program, the Integrated Agricultural Production and Marketing Project, was funded by USAID and Philippine monies with KSU contracting directly with the Philippine government to provide the technical assistance within the Ministry of Agriculture in agricultural policy, agribusiness, agricultural statistics, agricultural extension, and cooperative development; at the University of the Philippines in Los Banos, for the development of an M.S. program in food systems economics; at Central Luzon State University, for the development of a B.Sc. program in food systems economics; in development of improved agricultural technology for the area's small farmers; in helping to develop a more effective rural marketing system; and in the design and construction of a pilot food and feed processing center.

The long-term impact of the project will be strengthened through the 92 Philippine professionals who earned advanced degrees at KSU and other universities in the United States and the more than 150 Filipinos trained in a variety of technical programs in the United States and other countries.

Over the life of the project, 21 KSU permanent and temporary faculty served consultancies of one year or longer and 46 others worked on special projects for periods of from two weeks to six months.

The Food and Feed Grain Institute highlights KSU's unique competence in the postharvest technology of food and feed grains. It has provided international technical assistance and research to over 50 countries since its inception in 1966.

KSU also is linked with the land-grant institutions of Iowa State, Missouri, Oklahoma State, and Nebraska to form the Midamerica International Agricultural Consortium (MIAC). This arrangement enables the University to respond quickly to international agency requests for assistance to developing countries in solving their food problems.

In August of 1982 KSU subcontracted with MIAC to serve as the lead institution to administer the Farming Systems Research Project in Botswana, Africa. The emphasis of this USAID-funded project is the development, within the research division of the Ministry of Agriculture, of an on-

farm research component linked to the Botswana Extension Service. Seven KSU faculty are currently on long-term assignment in Botswana and six Botswana professionals are in degree programs at KSU and other MIAC institutions. MIAC also has current projects in Liberia, Morocco, Tunisia, Peru, and Kenya.

The University is also involved in a joint memorandum of understanding with Alabama Agricultural and Mechanical University and AID. The ultimate objective of this cooperative relationship is the prevention of famine and freedom from hunger—to be realized by the provision of long-term support to the application of science for solving food and nutrition problems in developing countries; by improving the University involvement in AID's effort to apply science to the goal of increasing world food production; and by strengthening the capabilities of KSU in programs related to institutional development.

Kansas State University fully endorses the "Basic Principles for College and University Involvement in International Development Activities" as approved by the National Association of State Universities and Land-Grant Colleges. The basic principles are as follows:

Principle 1. Effective participation in international development activities requires a commitment by both administration and faculty.

Principle 2. Effective involvement in international development activities should be consistent with the institution's mission, commitment, and competencies.

Principle 3. Requisite key and supporting personnel resources must be available to assure effective, responsible, and continuous involvement in each project undertaken.

Principle 4. Adequate incentives should exist to assure that high quality, professionally active faculty members become involved in developmental activities.

Principle 5. Adequate and timely logistical support of and professional service to a faculty member or a team abroad requires special administrative policies and practices.

Principle 6. Provision of adequate orientation and specialized training of project personnel is necessary, especially before departure for international assignments.

Principle 7. Teaching, research, and public service activities of the university are enhanced by properly selected and executed international development activities, followed by appropriate integration efforts.

Principle 8. Adequate and appropriate training for international students, particularly through contract training programs, depends on specially focused university policies and practices to deal with the students' unique needs and background, and the highly specialized requirements of the training program.

Principle 9. Internal evaluation procedures are necessary to provide for continuous monitoring of activities, including international, and prompt adjustments when needed for international development activities.

Educational Communications Center

Melvin Chastain, Director

Established as a Regents' Center in 1987, the Educational Communications Center (ECC) is scheduled to be operational by the fall of 1989, and will house instructional television and related telecommunications studios, production, editing, and distribution facilities, including C-Band and Ku-Band uplinks and receive dishes. The center will also house studio and control room facilities for instructional use by journalism and mass communications faculty and students.

Designed to provide electronic access to and interconnection between each of the Kansas Regents' Institutions, the ECC is aligned administratively under the Office of the Provost. The center will not only produce and distribute university-level instructional material, but will develop course work and in-service content for public schools, as well as credit and non-credit continuing education material.

Division of Continuing Education

LaVerne B. Lindsey, Assistant Provost for Continuing Education

Roberta Flaherty, Associate Director, Continuing Education

Edward M. McAleer, Jr., Director, Academic Outreach Section

Don Gronau, Acting Director, Conferences Section

Douglas W. King, Director, Administrative Systems

Sue Maes, Director, Planning and Resource Development

301 Umberger Hall
532-5560

Professor Lindsey; Associate Professor Cashin; Assistant Professor Lockhart; Instructors Allen, Bailey, Butler, Carter, Cocke, Creighton, Dorst, Flaherty, Flores, Friel, Gronau, Hall, Hemphill, Hesser, King, Kruh, Maes, McAleer, McCulloh, Miller, Newhouse, Nikkel, Oliver, Pruett, Reed, Sinn, Smith, Spears, Stanley, Trent, Wherry, and Wood.

The Division of Continuing Education was formally established in 1966 by the Kansas Board of Regents. It functions as the coordinating agency through which Kansas State University makes its resources available statewide.

A variety of credit and noncredit educational programs for professional development or personal enrichment is currently offered to residents throughout the state. Each year more than 40,000 people participate in noncredit activities and off-campus credit courses in several Kansas communities.

K-State Summer Session

Summer Session is an integral part of the educational program of Kansas State University. The particular courses chosen for summer school are determined by each college on the basis of expected student demand and compatibility with unit mission. The Summer Session is designed to meet the needs of the following groups:

1. Undergraduate and graduate students who wish to accelerate their programs of study toward an early graduation, and those who wish to make up courses missed during fall or spring semesters.
2. Teachers and other professionals who are unable to attend the University during the two semesters.
3. Special interest, nondegree groups, including public school, business, and industrial personnel, and returning students.
4. High school graduates expecting to enter the University for the first time are encouraged to get a head start on college. These students find it valuable in establishing study habits, becoming acquainted with the campus and faculty, and adjusting to University life.

All facilities and services of the University available in the regular semesters are also available in the summer, including housing, food service, counseling and testing services, Lafene Student Health Center, and K-State Union recreational programs.

K-State and the community offer a variety of summer activities including movies, lectures, Arts in the Park Series, concerts, and other recreational activities.

Summer session is an eight-week session in which a student may earn as many as nine

semester hours of credit. Full-credit concentrated short courses accommodate students who cannot attend the eight-week session. There are also workshops and institutes offered.

The *Summer Session Bulletin* gives complete and detailed information about summer school. It is available in April each year. Information on short courses, workshops, and institutes will be available in March. A copy may be obtained free of charge from the Office of Admissions in Anderson Hall.

Through the Regents' Network, some KSU summer courses are offered at 37 Kansas locations and at others by access to electronic bridging equipment. (See Regents Network for schedules and regular locations.) TELENET allows individuals to enroll in courses offered by two other Kansas universities as well as KSU.

Summer Session teaching staff is formed from the regular instructional staff of the University, supplemented by visiting professors and lecturers.

Courses offered in the summer are chosen from those offered in regular semesters with the addition of conferences and workshops planned to meet special needs.

Outreach (off-campus) credit classes

The Division of Continuing Education strives to determine the educational needs of the people throughout the state and respond to those needs with credit courses, programs, and services from the various colleges and academic units.

An ever-expanding schedule of courses is offered at a growing number of locations in Kansas. Kansans may work toward an advanced degree from Kansas State University by attending classes taught by University faculty in students' home communities. Programs of sequenced courses lead to degrees in education, home economics, social work, and other disciplines.

In addition to sequenced courses leading toward a graduate or undergraduate degree, courses in response to specific requests or designed for particular groups are scheduled through the Division of Continuing Education and taught off campus. In-service training programs for various professional groups are frequently requested; academic units of Kansas State University respond to such requests by providing workshops, conferences, or short courses designed to cover topics of current interest to these groups. For detailed information contact KSU Outreach Coordinator, Umberger Hall, (913) 532-5686, or toll free in Kansas 1-800-432-8222.

Intersession

Kansas State University 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 this time, 25 to 45 courses are offered, including regular and new or experimental courses. These courses generally run for two or three weeks and are attended by current KSU students, as well as by persons unable to attend the University during the regular semesters. Intersession classes are open to the public; prior enrollment is not required.

Intersession offers the opportunity to study in another part of the state or country which would not be possible during regular school terms. Students also have the opportunity to explore new interests and topics in their majors with more depth and concentration than might otherwise be possible. Many students use intersession as an opportunity to examine academic areas not scheduled in their current curricula. The KSU faculty uses intersession as an opportunity to experiment with new ideas and formats for teaching. Many experimental courses test their possibilities for becoming regular offerings.

Intersession courses are considered part of the regular KSU course offerings and, as such, can fulfill degree requirements or requirements for recertification when applicable. Students are encouraged to consult with their advisors to determine if a particular intersession course will meet necessary degree requirements.

Fort Riley courses

KSU works in cooperation with the Army Education Center to provide persons in the nearby 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 KSU 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. KSU courses offered at Fort Riley are open to all area residents, although military personnel have priority.

Kansas State University maintains an office at Fort Riley staffed by KSU personnel familiar with degree requirements and KSU procedures on acceptance of transfer work. Students are encouraged to meet with these advisors to pursue their academic goals. For additional information contact the KSU coordinator at Fort Riley, (913) 784-5930.

Servicemember's Opportunity College

Kansas State University is a cooperating Servicemember's Opportunity College (SOC) and a member of the Associate Degree (SOCAD) Network. KSU maintains a commitment to servicemen and service-women interested in pursuing college educations. In addition to degree programs at Fort Riley, KSU offers graduate course work at Fort Leavenworth.

Regents Network (TELENET)

Many courses and educational programs offered on the KSU 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.

Each TELENET center is equipped with microphones and speakers allowing easy interactive communication among all locations. In addition to the amplified telephone system, each center is equipped with audio-visual support equipment. A teacher's aide is present at each location to operate the equipment, distribute handout materials, and provide general educational support.

Each year several thousand people participate in credit and noncredit courses at the graduate and undergraduate levels. Instruction originates from KSU or one of the other Regents universities. However, the flexibility of the system allows resource people from throughout America to be linked electronically into the system. Thus, Kansans across the state can have access to national educational resources.

A TELEbridge has been added to the Regents Network allowing for 24 more temporary teleconferencing classrooms to be established anywhere in Kansas for university courses, in-service training, meetings, or conferences. The TELENET and TELEbridge together provide a convenient and economical educational delivery system for the state.

Non-Traditional Study Program

The Non-Traditional Study Program (NTS) is designed for undergraduate students who are unable to complete degree requisition in conventional manners. NTS is oriented toward those students who have encountered obstacles to traditional college attendance, helping them surmount

barriers created by distance, physical handicap, employment, or family need.

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 late afternoon, evening, or off-campus classes, correspondence study, credit by examination, telecourses, TELENET courses, or internships.

In addition to class requirements, the advisors direct students toward the completion of independent study projects, and toward the development of documentation of prior nonsponsored learning. Given documentation and review by appropriate units, credits may be granted for learning achieved without formal, sponsored instruction.

Students graduating through the NTS program may earn degrees in traditional academic areas.

Conference Office

The KSU Conference Office makes the 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. All programs sponsored by KSU in which fees are collected from the participants and/or University facilities are used are coordinated through this office, which is empowered to collect all fees associated with such activities.

Services available through the Conference Office include: program development, design, and budgeting; brochure design and printing; publicity; facility, food, and accommodation arrangements; speaker and resource arrangements; preparation of materials; registration; and follow-up activities.

The Conference Office can assist you in: budgeting a meeting into your grant proposal; bidding to host your professional association on campus or elsewhere; disseminating your research; pursuing an area of interest with others.

Organizations outside the University may use these program services to facilitate meetings of their membership or employees. The Conference Office can also make many of its training programs available for in-house employee development.

Persons interested in further information on these services or specific training programs should contact the KSU Conference Office, 1623 Anderson Avenue, Manhattan, Kansas 66502 or phone (913) 532-5575.

Community Education

The community education program provides lifelong learning opportunities to the Kansas State University and Manhattan communities. Through community education, both adults and youth receive instruction in a variety of current topics. More than 120 classes are available during the six sessions annually. Special events and instructional programs are usually offered on a non-credit basis, with scheduling during the afternoon, evenings, and weekends.

Classes are scheduled each semester, including the summer, and offer instruction in aquatics, all levels of microcomputer training, cultural arts, personal enrichment, dance, gymnastics, horsemanship, music, personal finance, sign language, sailing, and tennis. Various clinics, workshops, and special events are offered during the summer sessions.

Community education also functions as the initial contact for groups not affiliated with KSU who are interested in using facilities on campus.

Persons interested in further information on classes should contact KSU Community Education, 1623 Anderson Avenue, Manhattan, Kansas 66502 or phone (913) 532-5570.

Center for Faculty Evaluation and Development in Higher Education

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.

Among the services available from the center are: the Instructional Development and Effectiveness Assessment system (IDEA), the center's system for student ratings of college classroom teaching; Departmental Evaluation of Chairperson's Activities for Development (DECAD), a parallel system of faculty ratings of department heads; and most recently, IDEA Form H, a student rating system for secondary instruction. Center staff also consult and present seminars and workshops for individual institutions. Center materials and services have been used by over 500 institutions, including doctoral granting universities, liberal arts colleges, and vocational-technical institutes.

For additional information contact the Center for Faculty Evaluation and Development, Wareham Building, 1623 Anderson Avenue, Manhattan, Kansas 66502, (913) 532-5970.

Planning and Resource Development

The Planning and Resource Development section serves as liaison between the Division of Continuing Education and

external agencies, organizations, and institutions. Planning and Resource Development offers assistance in grants and contracts, needs assessment and market analysis, and promotion.

Grants and contract assistance includes identification of government, foundation, and corporate funding sources and assistance in writing grant proposals for outreach projects. Design and implementation of needs assessment surveys related to development of new educational outreach programs are available. With computer assistance, the survey data are analyzed and a summary and recommendations are provided for future program development. Promotional assistance includes brochure development, media coverage, advertising, marketing, and direct marketing identification.

Also in the Planning and Resource Development office is the Rural Clearinghouse for Education and Development. Funded by the Ford Foundation, the Rural Clearinghouse is a national effort to improve rural access to continued education.

UFM

UFM is a community learning center which develops and conducts a wide variety of informal educational opportunities that do not involve prerequisites, grades, or credits. More than 750 programs are available during the three sessions a year. Classes, symposia, forums, and unstructured learning experiences covering a wide range of human interests, activities, and concerns are offered. A home repair service for elderly and low income people, and pottery, darkroom, and woodworking cooperatives are also available. UFM is committed to the development and expansion of informal learning opportunities available to the people of Kansas. Technical assistance is provided throughout Kansas and the Midwest to other communities beginning similar programming.

English Language Program

Enid Cocke, Director
205 Fairchild Hall
532-7324

The English Language Program offers intensive English courses primarily for international students who plan to enter a degree program at Kansas State. However, it also accepts students who wish to come only for English instruction.

The program offers three levels of intensive English for full-time students and half-time study for advanced students. The advanced class is divided into two sections to meet the specific needs of undergraduate and graduate students. The English Language Program courses are offered in the regular University schedule of fall and spring

semesters plus an eight-week summer school.

The program screens the English proficiency of all incoming non-native speakers who have a TOEFL score below 600. Those whose English is not yet adequate for university-level work will be placed in the appropriate English classes. The program also serves as a resource for students who are not required to take further English courses but still seek help for specific problems.

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 a brochure and other information, write the English Language Program, 205 Fairchild Hall. (For course descriptions, see the listings under English.)

Faculty and Staff

Educational Communications Center

CHASTAIN, MELVIN L., Dir. of Educational Communications Center; Prof. (1987). BA 1961, MA 1962, U. of Denver; PhD 1970, Texas A & M.

Division of Continuing Education

ALLEN, JOYCE M., Instr., English Language Program (1987). BA 1966, Michigan St. U.; MA 1970, Kansas St. U.

BAILEY, GWEN, Project Coord. of Rural Action Agenda Project (1985). BS 1969, U. of Nebraska; MS 1973, PhD 1985, Kansas St. U.

BUTLER, WILLIAM O., Administrator, Community Education (1985). BS 1972, MS 1974, Kansas St. U.

CARTER, ANN L., Instr., English Language Program (1986). BA 1975, Kansas St. U.; MA 1980, U. of Kansas.

CASHIN, WILLIAM E., Dir. of Center for Faculty Evaluation and Development (1975). BA 1958, MA 1961, PhD 1969, Catholic U. of America.

COCKE, ENID O., Dir., English Language Program (1986). BA 1967, Scripps Col., California; MA 1983, Kansas St. U.

CREIGHTON, BARBARA J., Staff Asst., TELENET (1987). BS 1983, Kansas St. U.

DORST, EUNICE, Campus Community Coordinator, UFM (1986).

FLAHERTY, ROBERTA D., Dir. of Conferences (1970). BEd 1970, Washburn U. of Topeka; MS 1975, Kansas St. U.

FLORES, SANDRA A., Instr., English Language Program (1986). BS 1972, MA 1978, Iowa St. U.

FRIEL, JOHN J. III, Asst. Specialist, Fort Riley Program (1987). BA 1975, Creighton U.; MS 1980, Kansas St. U.

GRONAU, DON M., Asst. Specialist, Conferences (1986). BS 1962, MS 1979, Kansas St. U.

HALL, LESA A., Staff Asst., TELENET (1987). BS 1984, Kansas St. U.

HEMPHILL, MARY, Admin. Asst., UFM (1984).

HESSER, JANA, Grant Writer/Research Coord. (1984). BA 1966, Oberlin Col., Ohio; MA 1970, PhD 1974, U. of Pennsylvania.

KING, DOUGLAS W., Dir. of Administrative Systems (1977). BS 1969, Kansas St. U.

KRUH, JANET J., Dir. of Kansas Regents Network—TELENET (1971). BA 1948, MA 1949, Washington U., St. Louis.

LINDSEY, LAVERNE B., Asst. Provost for Cont. Ed./Prof. (1983). EdD 1974, Mississippi St. U.

LOCKHART, WILLIAM E., Off-Campus Coord. (1969). BS 1956, Pittsburg St. U.; MA 1960, Arizona St. U.; PhD 1972, Kansas St. U.

MAES, SUE C., Dir., Planning and Resource Development (1969). BS 1969, MS 1973, Kansas St. U.

McALEER, EDWARD M., Dir. of Academic Outreach (1985). BA 1965, MA 1974, PhD 1978, Michigan St. U.

McCULLOH, KAREN I., Coord. of Lou Douglas Series, UFM (1987). BA 1965, U. of Kansas.

MILLER, MAX B., Asst. Prof. Emeritus (1946). BS 1946, MS 1950, Kansas St. U.

NEWHOUSE, BARBARA S., Asst. Specialist, Academic Outreach (1987). BS 1967, Western Michigan U.; MS 1974, PhD 1985, Kansas St. U.

NIKKEL, JANICE, Staff Asst., Conferences (1986). BS 1985, Kansas St. U.

OLIVER, JENNY P., Asst. Specialist, Conferences (1986). BA 1977, MEd 1983, North Carolina St. U.

PRUETT, THERESA I., Instr., English Language Program (1987). BA 1976, Western Illinois U.; MA 1982, Northern Illinois U.

REED, GERALDINE G., Dir., Community Resource Programs (1986). BS 1980, U. of Maine.

SINN, MELINDA L., Public Information Coord. (1981). AA 1978, Coffeyville Com. Col.; BS 1980, MS 1985, Kansas St. U.

SMITH, CAROL A., Continuing Education Specialist (1980). BS 1967, U. of Missouri.

SPEARS, JACQUELINE, Rural Action Agenda Coord. (1984). BS 1969, MS 1972, Kansas St. U.

STANLEY, RUTH A., Fort Riley Programs Coord. (1978). BS 1970, N.W. Oklahoma St. U.; MS 1978, Kansas St. U.

TRENT, CYNTHIA, Academic Outreach Coord. (1983). BA 1974, Kansas St. U.; MEd 1981, North Carolina St. U.

WHERRY, MARGARET, Off-Campus Coord. (1981). BA 1972, U. of Northern Iowa; MA 1974, Kansas St. U.

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Division of Cooperative Extension

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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. Thus, extension is people, problem, and progress oriented.

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 people in all corners of the state. At the same time, this unique information delivery system brings back requests for new knowledge to the research staff at the University.

Basis for cooperative title. The Cooperative Extension Service is so named because the federal, state, and county governments cooperate with local people in planning, conducting, and financing a county-wide educational program.

Kansas State University represents the state in this system through the Division of Cooperative Extension. The United States Department of Agriculture represents the federal government. The County Extension Council and the Board of County Commissioners, elected by the voters, represent the county.

Since its charter is broad, extension's educational programs must be broad in scope and directed to all population segments that have concerns relating to the four major programs—agriculture, home economics, 4-H youth, community economic development, and energy.

Changing conditions continually enlarge and modify the emphasis on subjects in the major programs. An increasing number of departments within the nine colleges of the University contribute knowledge to support the expanding programs of cooperative extension.

The audience for extension efforts includes urban and suburban people, as well as the farm families for whom the original programs were designed. Extension specialists recognize their charge to share new knowledge with all people, and thus keep their programs progressive, popular, and personal.

Extension takes the University to the people. To achieve the basic goal of taking the University to the people, the Cooperative Extension Service helps maintain a County Extension Office, operated by off-

campus KSU faculty members, in all 105 Kansas counties.

These county agents are teachers, organizers, educational advisors, and consultants who bring relevant programs to bear on the problems identified by the people in their counties. To literally thousands of people, these extension agents are a constant channel for communicating with Kansas State University.

Extension brings people to the University. Extension agents acquaint many people with the work of the University by organizing and conducting group visits to the University and its branch experiment stations and fields. Many statewide organizations in agriculture, home economics, and 4-H youth work are given assistance with annual conferences at the University. Included in this educational work are the various breed, seed, and feed associations; the Kansas Extension Homemakers Council; and 4-H Discovery Days.

Extension stimulates community action. Extension workers may assist persons to work together as a group for common goals such as organizing countywide campaigns to control diseases, pests, and weeds; conserve soil and moisture in an entire watershed; and study many different kinds of local, state, and national problems. They help conduct fairs and teach good standards of production in agriculture and home economics by serving as judges at county and state fairs.

Extension teaches in many ways. The methods of instruction used by extension workers are quite informal. Information on specific problems may be given through meetings, workshops, direct and media information flow, consultations, and demonstrations.

Extension agents also are specialists in training individuals who in turn train others, either individually or in groups. These public-spirited lay leaders often become, in effect, assistant instructors without pay.

Extension specialists are off-campus teachers. Highly trained specialists are stationed at the University and in area offices throughout the state. These specialists assist the county extension agents by helping individuals consider problem-solving alternatives. They also apprise the county extension agents of new developments in research.

The role of the extension specialist is to interpret research developed by the state agricultural experiment station and USDA, to help county agents demonstrate the

feasibility of applying new research through practical demonstrations, and to discover problems confronting the people of the state on which further research is needed.

Extension links people to educational programs. The 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 Communications

Jack M. Burke, Head

Professors Burke, Graham, and Titus; Associate Professors Daly, Jorgensen, Peck, Sullins, Ward, and Wright; Assistant Professors Atkinson, Baker, Buchanan, Frank, McGlashon, and Nelson; Instructor Ballou; Emeriti Professors Thomas, Unruh, and Warner; Associate Professors Dexter and Medlin; Assistant Professors Kuehn and Tennant.

The Department of Extension Communications supports the Cooperative Extension Service, with emphasis on the print media. One major objective is to prepare and transmit educational material to the people of the state about extension service programs and Agricultural Experiment Station research. This includes reporting new developments and recommendations in agriculture home economics, 4-H and youth work, public affairs, and community and rural development.

Scientific and general information, as written or produced in popular versions, is channeled through all appropriate means of communication, including newspapers, magazines, publications, circulars and posters, printed annual reports, exhibits, slides, radio, and television.

County extension agents are provided news releases and are trained in using a balanced information program. Information support is provided agents in 105 counties, specialists in the five area extension offices, and state specialists.

A second major objective is to support all state and area extension faculty by providing general editing and printing services related to publications, educational literature, reports, records, forms, and office supplies.

Areas of emphasis include:

Editorial support for developing and printing Extension publications

Editorial assistance in preparing training literature, reports, proposals, and other written communications

A duplicating center that provides the rapid reproduction services needed to meet small-quantity and short-notice demands

A distribution center for circulating extension and experiment station publications

Another major objective is to operate an instructional media center and graphics laboratory that makes a variety of audiovisual equipment and related services available to extension personnel. A library of motion pictures, slide sets, and video cassettes is maintained. Planning, designing, and preparing audiovisual materials and artwork for specialists working on extension programs is an important phase of the work.

Radio-Television-Film

Mass communications support is provided to all areas of the Cooperative Extension Service. In radio it administers and programs KKSU, an institution-owned, public radio station which is on the air from 12:30 p.m. to 5:30 p.m., Monday through Friday on 580 Hz. Station KKSU is used exclusively for the dissemination of news, information, and cultural programming.

The K-State Radio Network is both a live and audiotape service to Kansas commercial radio stations with over 10,000 tapes distributed each year. Subjects include agriculture, ecology, home economics, and public affairs.

County agents are given training and assistance in planning local radio and television programs.

Live or taped programs are arranged for extension service and other University staff members for use on local Kansas stations.

Television programs showing results of research and demonstrations are planned and presented on cooperating television stations, provided for Extension agents and specialists, and delivered via satellite videoconferences. Television training is provided for extension and other University staff members who appear on television or produce video materials.

Extension Agricultural Programs

Don D. Pretzer, Assistant Director, Professor

Specialists in several departments of the Colleges of Agriculture, Engineering, and Veterinary Medicine offer direct educational and technical assistance to Kansas citizens throughout the state.

Departments have extension faculty who plan, conduct, and evaluate off-campus programs in their respective subjects. These specialists organize educational information, prepare support materials, and make presentations in counties upon request from county agents. Farm and ranch profitability is a focus in many programs.

In addition, extension offers interdisciplinary programs in four areas:

Food, feed, and forage production enhances sound production practices, good business management, efficient use of labor, and rapid adoption of new technology in food, feed, and forage production through application of physical, biological, and economic principles discovered through research and applied through an informal adult education process.

Animal production and utilization provides for effective production and use of meat, dairy, and poultry products for the consuming public through the application of research and management principles in genetics, animal nutrition and management, environmental physiology, marketing, engineering, and veterinary medicine.

Resource use and conservation focuses attention on increasing need for pollution-free soil, water, and air in rural and urban settings; zoning and land use; and public affairs education. It also emphasizes proper management and conservation of fields, forests, water, and natural resources used in production and recreation.

Farm business and financial management helps producers effectively manage their farm, forest, or range enterprises. Farmers need continued information about factors influencing markets as well as insight into enterprise organization, total business structure, and procurement of supplies, labor, credit, and equipment.

Extension Agronomy

George E. Ham, Head
David A. Whitney, State Leader

Professors Ham, Kilgore, Nilson, and Whitney; Associate Professors Lamond, Mikesell, Ohlenbusch, Regehr, and Shroyer; Assistant Professors Brotemarkle

(temporary), Devlin, Fjell, Hickman, and Mosier; Instructor Bonczkowski; Emeriti: Professors Bieberly, Bohannon, Dicken, Edelblute, Jones, and Lind; 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 through the acceptance by the farm operators of proven production and conservation practices.

The responsibility of the agronomy specialists in this program is to interpret and disseminate the results of research conducted by the Agricultural Experiment Station and the United States Department of Agriculture researchers, promote the adoption of proven practices, and inform the scientists of needed research. The agronomy specialists correlate their program with specialists in other subjects to ensure the most effective overall extension program.

Extension Animal Sciences and Industry

Jack G. Riley, Head
Larry R. Corah, State Leader

Professors Adams, Call, Corah, Dunham, Henderson, Riley, Schafer, Simms, and Zoellner; Associate Professors Brazle, Kuhl, Laudert, and Spaeth; Assistant Professors Gibbs, Houghton, Nelssen, and Ritter; Extension Assistant Olson; Emeriti: Professors Bonewitz, Francis, Good, Jackson, McAdams, 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. Programs are conducted in state areas and counties with producers and processors (both adult and youth) and the allied industries. These programs are planned in cooperation with clients, state, area, and county extension staff and are implemented cooperatively.

The function of wildlife damage control is to carry on an educational program throughout the state dealing with application of wildlife damage control methods that will minimize conflict between man and wildlife.

The work is based on the recognition that all species of wild animals are an important part of the environment in which we live, and that all species of wild animals have both negative and positive social and economic values. Encouragement is given to the use of techniques known to be of value in counteracting areas of conflict between humans and wildlife.

The work of this section is carried to every county in the state by conducting on-farm and in-town consultations. Records are kept and in each case efforts are made to determine the accurate cause and extent of economic loss. Specialists provide advice for prevention of further losses, and give control recommendations and demonstrations of equipment on an individual basis where damage has occurred.

Counsel is given on proper and up-to-date wildlife damage control procedures of animals such as rats, mice, moles, gophers, coyotes, sparrows, starlings, pigeons, or other non-game species. Information is disseminated by radio, television, and printed educational materials.

Extension Entomology

Theodore L. Hopkins, Acting Head
Donald C. Cress, Acting State Leader

Professors Brooks, Cress, Helgesen, and Mock; Associate Professors Bauernfeind, Lippert, and Sloderbeck; Assistant Professor Higgins; Extension Assistant Shufan; Emeritus: Professor Gates.

Extension entomology is concerned with practical insect control measures for Kansas citizens. The proper, safe use of insecticides is one of the methods used by Kansas producers to prevent insect damage. Cultural and biological methods are also used where appropriate. Extension entomology uses meetings, newsletters, and mass media to keep Kansas producers informed of populations of insects that may create problems. Pilot pest management projects are used to introduce and validate newer, integrated approaches to managing pest populations. The 4-H entomology project is designed to teach the interrelation of insects and the environment, as well as the identification of insects.

Extension Horticulture

Paul H. Jennings, Head
Frank D. Morrison, State Leader

Professors Jennings, Marr, Morrison, and van der Hoeven; Associate Professors Leuthold and Long.

Programs in extension horticulture and landscaping are developed to serve persons interested in horticultural plants, including fruits, nuts, vegetables, flowers, turf, shrubs, and ornamental and shade trees. Special interests may include food products for commercial sales, personal use, environmental improvement, or family gardens.

Assistance is available to suburban, urban, and rural homeowners; and to commercial producers, such as florists, nurseries, greenhouse operators, and fruit, vegetable, and nut growers.

Programs are developed for public and private concerns, such as park departments, schools, cemeteries, municipalities,

highway departments, industrial parks, and golf clubs. Youth education programs also are developed relating to the understanding and use of horticultural plants.

Information developed includes selection, production, use, and maintenance of the various horticultural plant materials. Assistance is available in every Kansas county and is given in a variety of ways, including training schools, workshops, demonstrations, publications, slides and scripts, news releases, radio and television programs, and personal contact.

State and Extension Forestry

Lester R. Pinkerton, Acting State Forester and Head, Department of Forestry

John K. Strickler, Associate State Extension Forester (LWOP)

Professors Naughton, Nighswonger, and Strickler; Associate Professors Aslin, Bratton, Gould, Loucks, Pinkerton, and Rowland; Assistant Professors Bruckerhoff, Kunkel, and Strine; Emeritus: Professor Gallaher.

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.

Assistance also is given in various types of conservation tree and shrub planting. A tree distribution program provides approximately one million low-cost seedlings each year for these conservation-type plantings.

A seed orchard for growing superior walnut and cottonwood planting stock is located near Milford Reservoir.

Foresters work closely with wood-using industries in the state to improve use of the timber crop.

The department also operates a cooperative rural fire control program. Assistance is given to rural fire districts in organizing, planning, obtaining fire equipment, fire prevention, and training fire district personnel.

Through contracts with the Corps of Engineers and the Bureau of Reclamation, the department develops vegetative management plans for public areas around reservoirs. The department is responsible for implementing these plans through tree planting, grass seeding, and recreational timber stand improvement.

Through a community forestry program, assistance is given to Kansas towns with the development of management programs for street, park, and other public trees.

The forestry offices are at 2610 Claflin Road in Manhattan. In addition to the administrative offices other facilities at this

location are tree distribution, cold storage, greenhouse, and shop. Paneling of 12 Kansas hardwood species is on display in the building. Area forestry offices are in Chanute, Garden City, Hays, Hutchinson, and Manhattan.

Extension Plant Pathology

Fred W. Schwenk, Head
William G. Willis, State Leader

Professors Schwenk and Willis; Assistant Professors Jardine and Tisserat; Emeritus: Professor King.

Plant pathology extension specialists keep the people of Kansas informed about the occurrence and nature of plant diseases and economic means for their control. This includes diseases of field crops, vegetables, fruits, trees, flowers, lawn grasses, and shrubs.

The specialists, working with the county extension agents, furnish plant disease information to rural and urban people by news articles in local papers, radio, television, meetings, field and home visits, and office and phone calls.

The extension specialists are responsible for the plant disease diagnostic laboratory which provides a service for those individuals who have a need for identification and control recommendations for plant diseases. Over 2,000 plant disease specimens are diagnosed annually. This service enables the cooperators to keep abreast of the latest developments in effective chemical recommendation and to utilize those materials that are currently registered for use.

Extension Veterinary Medicine

Homer K. Caley, State Leader

Professor Caley; Associate Professor Breeden.

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. Current research is evaluated and adapted for use in these areas.

Research projects and field trials are implemented into the work program so that our livestock interests are provided with actual test results as conditions exist on Kansas farms and ranches.

Extension Agricultural Engineering

Stanley J. Clark, Acting Head
James P. Murphy, State Leader

Professors Clark and Murphy; Associate Professors Black, Kuhlman, Powell, and Rogers; Assistant Professors Harner and Pacey; Emeriti: Professors Holmes, Jepson, Stover, and Wendling; Associate Professor Schindler.

The function of extension agricultural engineering is to carry on an educational program throughout the state dealing with application of engineering principles to various phases of agriculture. The work of this department is carried to every county in the state by demonstrations, institutes, training schools, publications, news releases, radio and television programs, and personal contacts.

The department conducts educational programs throughout the state in subjects such as the control of soil erosion; the development, conservation, and use of water resources; irrigation systems and water management; animal waste management and water pollution control; the location, layout, and design of livestock production plants; selection, maintenance, and operation of farm machinery; systems for handling, sorting, conditioning, and processing grains and feeds; the selection, installation, and use of electrical power on the farm and in the home; and the design and development of improved housing for all Kansas families.

The department conducts a safety program in all subjects. The department also assists with the development and planning of 4-H club programs which relate to the engineering phases of agriculture.

Much of the work is conducted in cooperation with the county extension office in each county. The remaining work is done in cooperation with various governmental agencies, the manufacturers and distributors of supplies, equipment, and machinery used on the farms, other groups or organizations which serve agriculture, electrical power suppliers, state officials, and regional and national professional groups.

Extension Agricultural Economics

Marc A. Johnson, Head
Barry L. Flinchbaugh, State Leader

Farm Management

Professors Fausett, Figurski, Flinchbaugh, Johnson, Langemeier, and Schlender; Associate Professors Barnaby, Brandsberg, McReynolds, and Parker; Assistant Professors Dhuyvetter and Nelson; Instructor Beech; Farm Management Association Fieldmen Allen, Collins, Crawford, Dawson, DeLano, Dickson, Everson, Freeze, Germann, Harter, Herod, Huschka, Janke, Lise, Miller, Rempe, Schwarzentraub, Smith, Sturdevant, Stucky, Wahl, Wilken, and Wood; Emeriti: Professors Coolidge, Thomas, and Whitehair; Assistant Professor Overly; Farm Management Association Fieldmen Faidley, Greene, Hackler, Hageman, McClelland, Means, and Mullen.

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 23 farm management fieldmen conduct an intensive educational program with 2,600 Kansas farm families via the County Extension Council in the six farm management associations. Each fieldman conducts a person-to-person educational program in farm management with 110 farm units. This program involves at least two fieldman visits to the farms for counseling, a visit in November and December for tax management purposes, county summary and analysis meetings, county fall crops and livestock forward planning meetings, individual summary and analysis of the farm and household records, special field days or tours, public tax management schools, and estate planning.

The program provides Kansas State University with a field laboratory and representative sample of farms for obtaining information important in conducting research and extension educational programs.

This sample of Kansas farms provides the foundation for development of publications and educational materials for the entire Kansas agricultural industry. In addition, each association farm family leads in the dissemination of useful information in agriculture, home economics, and related subjects.

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.

An important and successful tool is the *Farm Management Handbook*. This contains material on many of the specific management topics of concern to agents, farm people, and agribusiness interests.

Special interest topics include farm financial management, land economics, machinery investment analysis, farm business arrangements, farm records, and farm leases. In-depth workshops are conducted in cooperation with the production specialists and county agent. Cost-return analysis of the various livestock and crop programs is an important part of this public educational program. Publications and educational materials are prepared for distribution by county extension offices for the agricultural industry.

Special educational efforts are designed to meet the educational needs of agri-related businesses and persons, such as bankers,

Production Credit Association managers, machinery dealers, and grain, feed, and supply firms.

Agricultural Policy

The public affairs extension educational program provides the people of Kansas and their leaders with educational information on policy issues which are of current interest. The purpose is to provide the people with the facts so they have broader and more accurate knowledge base from which to make decisions. No causes are espoused and no positions are taken; the program is educational, not political. Problems are analyzed, alternatives and consequences examined, and the people are challenged to reach decisions. The issues to be covered are determined by the people.

The economic information program provides the people of Kansas with current data on factors affecting farming, business and industrial operations, labor supply and demand, and family living costs. The purpose of the program is to disseminate economic information to individuals which helps them make day-to-day decisions or immediate or long-term business plans.

Extension Marketing

Professor Erickson; Associate Professor Barton; Assistant Professors Mintert and Tierney; Emeriti: Professor Walker; Associate Professor Hoss.

The extension marketing program operates on the philosophy that all people in Kansas have a vested interest in the efficient distribution of food and fiber products. Thus, the educational program remains open to all ideas, interests, and approaches to marketing, and a team approach method is used to solve problems in the marketing field.

The main projects of marketing include marketing information, agri-business, and commodity marketing activities. Marketing news releases, monthly teleconferences, publications directed to the general public, and special information directed toward specific agricultural audiences are methods used in disseminating marketing information.

County public meetings are held where information covering price outlook, market systems, market structure, general economic trends in the nation, international trade, money and credit, bargaining power, balance of payment, and analysis of alternative farm policy proposals is presented.

Educational work is conducted with agricultural business firms handling food and fiber. Those firms are included which buy directly from the farmer and sell input products and retail products and services. Educational work is conducted in the fields of sales, cooperatives, business manage-

ment, market expansion, personnel training, advertising, and public relations.

The commodity marketing educational program emphasizes livestock, grain, dairy, and poultry marketing. Also included are market organization, supply-demand analysis, short-range price outlook, bargaining power, and transportation problems.

Extension Economic Development

Associate Professor Darling.

The Extension Economic Development is designed to assist communities in development efforts. News releases, publications, and seminars are conducted through county extension agents and area community development specialists.

Extension Grain Science and Industry

C. W. Deyoe, Head

Robert W. Schoeff, State Leader

Professors Balding, Schoeff, and Wilcox.

Kansas State University has the only formula feed extension program in the United States designed for the feed manufacturing industry. This extension program, established in 1962, assists personnel in the formula feed and allied industries in: (1) the adoption and use of the latest manufacturing techniques, safety equipment and practices; 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.

The clientele served are feed manufacturers, retail feed dealers, ingredient and equipment supply firms, milling facility contractors, commercial feedlots, and others involved in the manufacturing, custom mixing, and marketing of commercial feeds.

Educational work also is conducted in: (1) grain marketing in grain quality, grades, inspection, and transportation; and (2) processing and use through milling and baking.

Staff and Program Development

Marjory M. Mortvedt, Coordinator

Professors Johnson, Mortvedt, and Prawl; Emeritus: Professor Ringler.

Members of this department provide support and coordination for the development of programs, the professional development of faculty members, and the evaluation and reporting operations of the Kansas Cooperative Extension Service.

Each of these functions includes a variety of responsibilities.

Extension programs have as their goal the improvement of people's lives by helping them to solve high-priority problems. These programs are developed as a result of a proactive, anticipatory planning system that is University research and knowledge based. This system is driven by compelling issues identified by local audiences, with assistance from Extension faculty.

The planning function as carried out by this department provides coordination for: (1) identifying issues at local and University levels, (2) determining preferred plans for interdisciplinary, and single discipline, educational responses to these issues, (3) preparing written plans, (4) scheduling educational meetings, events, and specialist assistance to counties, and (5) carrying out civil rights responsibilities.

In order to provide programs which are dynamic, flexible, and responsive to change, Extension faculty must be carefully selected, well oriented, and continuously updated with respect to their evolving responsibilities. Special attention must be paid to individual professional improvement and career development needs.

The human resource development function of the department includes (1) supporting state, area, and county faculty and executive boards by developing and maintaining files of approved candidates for the recruitment process, (2) complying with Equal Employment Opportunity responsibilities, (3) coordinating and providing state level leadership in orientating new agents and specialists, (4) coordinating in-service education, (5) developing and maintaining a professional improvement record system and, (6) providing in-service education in such areas as evaluation, program development, civil rights, etc.

Current written evaluation/accountability requirements in Extension include maintaining accurate records of: (1) resource inputs, measured in time, and (2) program outputs, measured in terms of audiences served and benefits to clientele. Both quantitative and qualitative measurement is necessary.

Functions of the department with respect to evaluation/accountability are: (1) giving leadership in evaluating statewide program objectives, (2) consulting on and coordinating faculty-led program evaluations, (3) conducting selected evaluations, (4) providing leadership in improving, implementing, and using the management information system, (5) implementing the statewide reporting process, and (6) submitting written reports as required.

Extension Community Development

William M. Eberle, Assistant Director of Extension

Associate Professors Albright, Bittel, Eberle, Halazon, Sisk, and Utermoehlen; Assistant Professor Darling; Emeriti: Professors Frazier and Norby.

The mission of the Extension Community Development program is to help the people of Kansas communities arrive at group decisions and take actions to enhance their communities as economic, social, service, and living centers. The long-time goal is to help every Kansas community develop the needed leadership and organization skills and the pride and enthusiasm that will, when combined with adequate information and analytical tools, make them more desirable places to live and work.

Major community development education program components include organization and leadership development, business and economic development, local government, and various natural resources programs.

The Kansas PRIDE Community Improvement Program is conducted in cooperation with the Kansas Department of Economic Development. More than 100 communities are enrolled annually and more than half of the 627 cities in Kansas have participated in the program.

The extension community development staff helps communities develop and implement programs in coordination with the five area extension offices, the 105 county extension offices, local leaders, civic groups, and local governments. Faculty from several colleges of Kansas State University and other Regents institutions and resource persons from various agencies and the private sector are called upon to provide educational assistance.

Community groups are encouraged and assisted in identifying community needs, setting priorities and identifying human and economic resources available to solve community's needs to help communities improve themselves.

Extension Home Economics Programs

College of Human Ecology

Ronald S. Jones, Assistant Director of Extension, Home Economics Programs

Professors Burke and Tucker; Associate Professors Appleby, Bradshaw, Clarke, Howe, Penner, Smith, and Walker; Assistant Professors Beckham, Corbin, Ferrell, Jones, Mark, Phillips, and Young; Emeriti: Professors Allen, Anderson, Carlson, Ellithorpe, Neufeld, and Slinkman; Associate Professors Atkinson, Brill, Clonts, Dickinson, 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.

Each county designs its home economics program according to needs of individuals, families, and communities in the county.

Educational materials are prepared by extension specialists and county extension home economists. Educational programs are carried on through organized study groups, public meetings, individual consultation, self-teaching materials, and the mass media of press, radio, and television.

Extension home economics programs are often joint with other extension departments, agencies, and organizations.

Extension Expanded Food and Nutrition Education Program

Marilyn B. Corbin, Assistant Director of Extension, Home Economics Programs (Acting)

Instructor Lang.

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

Professors Apel, Bates, Lang, and Redman; Associate Professors Adams, Borst, Fisher, and Salmon; Assistant Professors Astroth, Burns, Kling, McFarland, and Weaver; Emeriti: Professors Busset, Eyestone, Johnson, and Regnier; Associate Professor Whipps.

Kansas 4-H, Kansas' largest youth education program (apart from the public schools), is the pre-college age level education program of the University, conducted in cooperation with County Extension Councils and the United States Department of Agriculture.

The mission of the Kansas State University 4-H specialists staff and county extension agents is to interpret, extend, and encourage the application of relevant and current information to concerned adults, parents, and community leaders on techniques of working with and relating to children and youth as individuals and in groups so that the children and youth will become self-directing, contributing members of society as they build self-confidence, develop inquiring minds, learn to make decisions, relate to others, and develop a concern for the community and those in it.

Kansas 4-H programs include 92,469 boys and girls 7 to 19 years of age who belong to community clubs and special interest groups, participate in a variety of 4-H events including camps, or enroll in 4-H enrichment programs conducted in cooperation with other community youth-serving agencies and organizations.

The 4-H program is also Kansas' largest adult education program working with youth. County extension council members, numbering 2,745, have the responsibility to identify community youth problems and establish priorities for their solutions. Additionally, nearly 12,000 adults and 5,000 teen volunteers work directly with the 4-H boys and girls throughout the year. Another 15,000 adult volunteers run county 4-H events, promote participation in 4-H programs, and help those adult and teen volunteers who work with the boys and girls directly.

Personnel of numerous other organizations and agencies cooperate in the mission of Kansas 4-H youth programs. First and foremost is the support provided to that mission by Cooperative Extension Service specialists in agriculture, home economics, community development, and information services. Personnel in numerous trade and special interest groups in agriculture and other industry sectors provide a significant amount of promotional, physical, and human resource support. More than 25 full- or part-time Kansas 4-H Foundation staff members help in: soliciting contributions to support state 4-H programs; publishing a leader training-oriented magazine with 15,000 circulation, 10 times a year; operating two University scholarship houses for 4-H alumni; and providing service and support for one outdoor education facility.

Within each of the Kansas communities, there are: cooperating community agencies and organizations concerned with child and youth development; county fair organizations; and newspapers, radio stations, and community-based cable television systems. Personnel of public and private schools, recreation commission agencies, and other local organizations and groups cooperate in many ways, especially by using the techniques and subjects as extended and advocated by 4-H youth extension personnel.

In each community, Kansas 4-H'ers were involved in: individual or group projects designed to meet their own interests or needs; service programs to develop responsibility and a sense of caring for the community; one or more meetings to plan, learn, celebrate, or just talk; and tours or trips to learn and broaden their feelings about other people and places. 4-H camps set the stage for learning about nature, developing new skills, having fun with others, and discovering themselves. County fairs include displays of 4-H exhibits and enable 4-H'ers to compare 4-H projects and tell the 4-H story to the public.

Extension Field Operations

Area extension offices. Five area extension offices are in different parts of the state to place extension staff, including specialists, closer to the counties in which they work. These area offices are in Garden City, Colby, Hutchinson, Manhattan, and Chanute. Extension specialists in the area offices work directly with the county extension agents and local leaders in conducting educational programs specifically fitted to the particular area.

Southwest Area Extension Office, Garden City

Ray H. Mann, Area Extension Director

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Richard S. White, Head

Reba B. White, Associate Head

Professor R. S. White; Associate Professors Adams and Mikesell; Assistant Professors Ferrell and Nelson; Associate Head R. B. White; Emeritus: Assistant Professor Overley.

South Central Area Extension Office, Hutchinson

Earl L. Van Meter, Area Extension Director

Professor Van Meter; Associate Professors Albright, Bauernfeind, and McReynolds; Assistant Professors Fjell, Phillips, Ritter, and Weaver; Emeriti: Professor Cox; Associate Professor Wiggins; Assistant Professor Orwig.

Northeast Area Extension Office, Manhattan

Bob W. Newsome, Area Extension Director

Professors Figurski and Newsome; Associate Professors Borst, Simms, and Utermohlen; Assistant Professors Devlin and Mark; Instructor Bonczkowski; Emeriti: Professor Francis; Instructors Burkhardt and Marlow.

Southeast Area Extension Office, Chanute

Benny S. Robbins, Area Extension Director

Professors Fausett and Kilgore; Associate Professors Appleby, Bittel, Bratton, Brazle, Lippert, Robbins, and Rowland; Assistant Professors Astroth and Bruckerhoff.

County extension offices. County extension work takes research information from the University to the people of Kansas to help them solve problems.

There are county extension offices in each of the 105 counties. These offices are staffed with two or more county extension agents. County extension positions in these offices may include any or all of the following: county extension director, agricultural agent, home economist, 4-H agent, and/or horticultural agent. The professional persons holding these positions are joint employees of the county and Kansas State University and are members of the KSU faculty.

In addition to the problem-solving responsibility, local extension professionals assist local persons in organizing group action to help solve community problems.

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PRAWL, WARREN L., Prof.; Extension Specialist, Evaluation and Program Development (1952). BS 1954, Kansas St. U.; MS 1958, EdD 1962, Cornell U.

PRETZER, DON D., Prof.; Asst. Dir., Extension Agriculture and Natural Resources (1958). BS 1955, MS 1970, Kansas St. U.; PhD 1971, U. of Missouri.

REDMAN, ALICE LOIS, Prof.; Extension Specialist, 4-H—Youth Programs (1978). BS 1953, U. of Missouri; MS 1959, U. of Maryland.

REGEHR, DAVID L., Assoc. Prof.; Extension Specialist, Weed Science (1981). BS 1964, MS 1968, PhD 1975, U. of Illinois.

REGNIER, ROGER E., Prof. Emeritus; Extension Specialist, Resource Development (1934). BS 1924, MS 1932, Kansas St. U.

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RINGLER, WILBER E., Prof. Emeritus; Assoc. Dir. of Extension (1957). BS 1948, MS 1949, U. of Nebraska; PhD 1958, U. of Wisconsin. (*)

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ROBBINS, BENNY S., Assoc. Prof.; Area Extension Dir. (1967). BS 1966, MS 1971, Oklahoma St. U.

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SCHINDLER, DALE E., Assoc. Prof. Emeritus; Extension Architect (1955). BArch 1953, MS 1960, Kansas St. U. Registered Architect.

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SCHWARZENTRAUB, MARK A., Farm Management Association Fieldman (1980). BS 1976, MS 1980, U. of Missouri.

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SMITH, CHARLES A., Assoc. Prof.; Extension Specialist, Human Development (1978). BS 1968, U. of Dayton; MS 1970, PhD 1972, Purdue U.

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STOCKARD, JOHN R., Assoc. Prof. Emeritus; Extension Motion Picture Producer (1966). BS 1955, U. of North Carolina; MS 1969, Kansas St. U.

STOVER, HAROLD E., Prof. Emeritus; Extension Agricultural Engineer (1936). BS 1929, Kansas St. U.

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WENDLING, LEO T., Prof. Emeritus; State Leader, Agricultural Engineering Program (1947). BS 1947, MS 1956, Kansas St. U.

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GOLLADAY, RICHARD E., Osborne County, Osborne (1979). BS 1952, Kansas St. U.

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HARRINGTON, MAURICE C., Anderson County, Garnett (1958). BS 1958, Kansas St. U.

HARTMAN, PAUL D., Pratt County, Pratt (1977). BS 1977, Kansas St. U.

HENDERSHOT, ROGER L., Emeritus, Ellis County, Hays (1945). BS 1938, Kansas St. U.

HENSON, DARL W., Edwards County, Kinsley (1983). BS 1978, Fort Hays St. U.

HOLDER, MICHAEL S., Chase County, Cottonwood Falls (1973). BS 1971, Kansas St. U.

HOLTHAUS, JODY R., Jackson County, Holton (1980). BS 1980, Kansas St. U.

HOLLINGSWORTH, C. A., Emeritus, Greenwood County, Eureka (1927). BS 1931, Kansas St. U.

HOSIE, DARREL D., Cloud County, Concordia (1966). BS 1967, Kansas St. U.

INGLE, DONALD W., Emeritus, Sedgwick County, Wichita (1930). BS 1929, U. of Missouri.

JEPSEN, DELBERT D., Russell County, Russell (1962). BS 1956, Kansas St. U.; MS 1974, Fort Hays St. U.

JOHNSON, ARTHUR R., Jefferson County, Oskaloosa (1958). BS 1958, Kansas St. U.

KATER, LARRY E., Wichita County, Leoti (1981). BS 1969, Kansas St. U.

KEELER, GARRY L., Washington County, Washington (1967). BS 1966, Kansas St. U.

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KRAINBILL, MILTON L., Lincoln County, Lincoln (1972). BS 1971, Kansas St. U.

KUBIK, RICHARD S., Thomas County, Colby (1949). BS 1949, Kansas St. U.

KUECK, DON L., Reno County, Hutchinson (1966). BS 1966, MS 1969, Kansas St. U.

LADD, ALAN J., Brown County, Hiawatha (1979). BS 1978, Kansas St. U.

LADD, CARL RAY, Atchison County, Effingham (1978). BS 1978, Kansas St. U.

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LAYLANDER, MARTA B., Neosho County, Erie (1985). BS 1982, Utah St. U.

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LINDQUIST, JACK W., Douglas County, Lawrence (1981). BS 1980, Kansas St. U.

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McMASTER, GERALD O., Emeritus, Brown County, Hiawatha (1951). BS 1940, MS 1951, Kansas St. U.

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GIBBS, MARY LOU, Pottawatomie County, Westmoreland (1972). BS 1952, Kansas St. U.

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GOETTEL, EVON W., Cherokee County, Columbus (1969). BS 1965, MS 1978, Kansas St. U.

GOODHEART, CLARENE L., Rooks County, Stockton (1974). BS 1961, Fort Hays St. U.

GOODIN, KATHY R., Marion County, Marion (1984). BS 1982, Kansas St. U.

GRIFFIN, KITTY C., Haskell County, Sublette (1979). BS 1978, South Dakota St. U.

GUERRERO, JANICE B., Stevens County, Hugoton (1972). BS 1963, Colorado St. U.; MS 1976, Kansas St. U.

HABIGER, JANA R., (1985). BS 1985, U. of Idaho.

HAYES, MARY M., Emerita, Smith County, Smith Center (1962). BS 1939, Kansas St. U.

HEINLY, KAYANN, Emerita, Riley County, Manhattan (1957). BS 1952, Midwestern U.; MS 1967, Kansas St. U.

HELMUTH, DIANE S., Douglas County, Lawrence (1978). BS 1973, McPherson Col.; MS 1977, Southwest Oklahoma St. U.

HISS, DEANN M., Woodson County, Yates Center (1981). BS 1981, Kansas St. U.

HODGES, R. JEAN, Sedgwick County, Wichita (1964). BS 1947, Kansas St. U.; MS 1970, Wichita St. U.

HOVE, GERTRUDE, Emerita, Cherokee County, Columbus (1934). BS 1931, Oklahoma St. U.

HUFF, RUTH K., Emerita, Pawnee County, Larned (1930). BS 1919, Kansas St. U.

JOHNSON, JUANITA B., Crawford County, Girard (1948). BS 1945, Kansas St. U.

KELLER, GLENDA L., Washington County, Washington (1965). BS 1965, Kansas St. U.

KENT, NANCY JO, Ford County, Dodge City (1959). BS 1959, Fort Hays St. U.

KOHN, DEBRA H., Logan County, Oakley (1977). BS 1976, Fort Hays St. U.

KRUMSICK, MARY E., Emerita, Shawnee County, Topeka (1938). BS 1931, Kansas St. U.

LANG, TERESA A., Sedgwick County (1982). BS 1971, MS 1973, Kansas St. U.

LEACH, GLINDA B., Shawnee County, Topeka (1967). BS 1950, Southeast Missouri St. Col.; MS 1961, MED 1966, U. of Missouri.

LILYHORN, BARBARA G., Barton County, Great Bend (1984). BS 1977, Kansas St. U.

LUPFER-NIELSEN, KATHRYN L., Lincoln County, Lincoln (1977). BA 1976, Sterling Col.

MAGES, MARCIA L., Franklin County, Ottawa (1976). BS 1976, Emporia St. U.; MS 1982, Kansas St. U.

MAGGARD, MARGARET H., Butler County, El Dorado (1963). BS 1963, Kansas St. U.

MAHONEY, SHERRIE M., Saline County, Salina (1980). BS 1972, N.W. Missouri St. U.; MS 1978, U. of Missouri.

MANNING, LEANNE M., Gray County, Cimarron (1986). BS 1984, U. of Nebraska; MS 1985, Kansas St. U.

MANSFIELD, EVA P., Emerita, Leavenworth County, Leavenworth (1953). BS 1940, U. of Georgia.

MANTZ, HELEN M., Emerita, Smith County, Smith Center (1942). BS 1942, Kansas St. U.

MARTINSON, DONNA R., Geary County, Junction City (1971). BS 1971, MS 1980, Kansas St. U.

McCAULEY, EULA MAY, Emerita, Doniphan County, Troy (1930). BS 1927, Northeast Missouri Teachers Col.; MS 1940, Kansas St. U.

McMAHON, JANICE C., Leavenworth County, Leavenworth (1983). BS 1980, MS 1982, Colorado St. U.

MEEK, MARY E., Emerita, Geary County, Junction City (1953). BS 1924, Emporia St. U.; MS 1938, Kansas St. U.

MERRIMAN, SCHARON V., Reno County, Hutchinson (1971). BS 1970, MS 1977, Kansas St. U.

MILLER, JACQUE L., Shawnee County, Topeka (1982). BS 1976, Friends U.; MS 1982, Emporia St. U.

MIRT, LINDA J., Sumner County, Wellington (1976). BS 1972, Kansas St. U.; MEd 1975, Pennsylvania St. U.

MOLZEN, SHARON B., Harvey County, Newton (1969). BS 1969, Kansas St. U.

MORRICAL, CARLA M., Trego County, WaKeeney (1983). BS 1982, Kansas St. U.

NEAL, MARGARET A., Cowley County, Winfield (1977). BS 1967, MS, Kansas St. U.

NEELY, ERMA M., Emerita, Trego County, WaKeeney (1950). BS 1942, Kansas St. U.

NELSON, NANCY C., Ellsworth County, Ellsworth (1978). BS 1977, Kansas St. U.

NIELSON, DIANE A., Greeley County, Tribune (1984). BS 1981, Northwest Missouri St. U.

NOLD, MARY K., Doniphan County, Troy (1980). BS 1980, Kansas St. U.

ODLE, MARY LOU Z., Saline County, Salina (1970). BS 1970, Fort Hays St. U.

O'FLYNN, DEBORAH L., Sedgwick County, Wichita (1980). BS 1978, Kansas St. U.

OLEN, ALICE M., Emerita, Seward County, Liberal (1956). BS 1926, Oklahoma St. U.; MS 1932, Iowa St. U.

OVERLEY, VICKY I., Phillips County, Phillipsburg (1979). BS 1966, Fort Hays St. U.

PALMER, RACHEL F., Emerita, Sedgwick County, Wichita (1941). BS 1941, Kansas St. U.

PASCHAL, JOANN A., Russell County, Russell (1976). BS 1976, Kansas St. U.

PATTERSON, SUSAN B., Graham County, Hill City (1986). BS 1984, Kansas St. U.

PAWLOWSKI, LISA M., Jewell County, Mankato (1985). BS 1985, South Dakota St. U.

PERKINS, LINDA S., Stafford County, St. John (1985). BS 1978, Western Illinois U.

PETRACEK, MARIAN H., Emerita, Barton County, Great Bend (1953). BS 1928, Kansas St. U.

PETTUJOHN, LINDA K., Wabaunsee County, Alma (1971). BS 1965, MS 1969, Kansas St. U.

PRICE, MARJORIE E., Emerita, Coffey County, Burlington (1957). BS 1931, Kansas St. U.

REAVES, CYNTHIA S., Wyandotte County, Kansas City (1985). BS 1981, MS 1985, Kansas St. U.

REDIKER, JANET B., Lyon County, Emporia (1966). BS 1958, Emporia St. U.; MS 1981, Kansas St. U.

REIST, DEANNA K., Clay County, Clay Center (1974). BS 1974, Kansas St. U.

RICHMOND, MARY FRANCES, Osage County, Lyndon (1975). BS 1973, Pittsburg St. U.

ROBINSON, ELSIE C., Emerita, Decatur County, Oberlin (1969). BS 1942, Fort Hays St. U.

ROWLAND, JEAN R., Labette County, Altamont (1974). BS 1974, Kansas St. U.

SCHRANDT, MARY M., Mitchell County, Beloit (1976). BS 1976, Iowa St. U.; MS 1984, Kansas St. U.

SCHUSTER, NANCY D., Anderson County, Garnett (1972). BS 1972, Fort Hays St. U.

SHEERER, JULIE E., Meade County, Meade (1987). BS 1986, Oklahoma Christian Col.

SHIELDS, SANDRA A., Ottawa County, Minneapolis (1965). BS 1965, Kansas St. U.

SHOEMAKER, LORI L., Atchison County, Effingham (1983). BS 1983, Kansas St. U.

SMITH, MABEL R., Emerita, Rice County, Lyons (1929). BS 1926, Kansas St. U.

SPARKE, ANN B., Morris County, Council Grove (1977). BS 1977, MS 1980, Kansas St. U.

STALNAKER, AMY J., Wilson County, Fredonia (1985). BS 1980, MS 1985, U. of Nebraska.

STEPHENS, JANET F., Greenwood County, Eureka (1970). BS 1970, Pittsburg St. U.; MS 1978, Kansas St. U.

STUBBS, LUCILLE, Emerita, Smith County, Smith Center (1955). BS 1923, Simpson Col.

SWENSON, SHELLEY C., Cloud County, Concordia (1975). BS 1974, South Dakota St. U.

SWISHER, MARY T., Rush County, LaCrosse (1970). BS 1970, Kansas St. U.

THODEN, NADA F., Johnson County, Olathe (1965). BS 1965, Colorado St. U.

TOOT, JANICE C., Seward County, Liberal (1966). BS 1966, Kansas St. U.

TRUAX, RUBY C., Emerita, Sedgwick County, Wichita (1959). BS 1936, Kansas St. U.

VIOLA, L. ANN, Shawnee County, Topeka (1974). BS 1969, Kansas St. U.

WALTER, LINDA K., Hodgeman County, Jetmore (1979). BS 1979, Kansas St. U.

WARNER, STACEY J., Pawnee County, Larned (1976). BS 1976, MS 1982, Kansas St. U.

WATTS, REBECCA A., Hamilton County, Syracuse (1979). BS 1976, Kansas St. U.

WATTS, TRANDA W., Gove City, Gove (1972). BS 1972, Fort Hays St. U.

WEAVER, MAE K., Emerita, Barton County, Great Bend (1952). BS 1949, Kansas St. U.

WEAVER, MARSHA K., Dickinson County, Abilene (1976). BS 1972, MS 1975, Kansas St. U.

WEIDENBACH, DORINDA K., Miami County, Paola (1985). BS 1985, South Dakota St. U.

WELCH, DORIS M., Kearny County, Lakin (1976). BS 1967, Jacksonville St. U.

WHITE, REBA B., Sheridan County, Hoxie (1967). BS 1967, MS 1985, Kansas St. U.

WHITEHAIR, LORI A., Stanton County, Johnson (1983). BS 1983, Kansas St. U.

WILLIAMS, CYNTHIA, Jefferson County, Oskaloosa (1985). BS 1981, U. of Nebraska.

WOLFE, FRANCES M., Wyandotte County, Kansas City (1970). BS 1941, Marymount Col.

WONER, ELIZABETH, Emerita, Harper County, Anthony (1950). BS 1930, Southwestern Col.

WOOLARD, MARGARET MAUK, Emerita, Saline County, Salina (1944). BS 1924, Kansas St. U.

WRIGHT, LINDA K., Sherman County, Goodland (1983). BS 1982, Kansas St. U.

WUELLNER, LORI L., Wyandotte County, Kansas City (1986). BS 1985, Kansas St. U.

YEAGER, DOROTHY F., Chase County, Cottonwood Falls (1980). BS 1978, South Dakota St. U.

YODER, RITA J., McPherson County, McPherson (1979). BS 1979, Sterling Col.

ZIEGLER, MARY D., Emerita, Sedgwick County, Wichita (1928). BS 1916, Kansas St. U.

County Extension 4-H Agents

ANDEREGG, MARVIN K., Labette County, Altamont (1969). BS 1969, Kansas St. U.

ARNOLD, JO ELLEN, Franklin County, Ottawa (1977). BS 1977, Kansas St. U.

CHILDERS, JAMES R., Emeritus, Reno County, Hutchinson (1944). BS 1941, Oklahoma A & M.

CLAWSON, ELDON L., Shawnee County, Topeka (1965). BS 1965, Kansas St. U.

CONLEY, ANITA K., Dickinson County, Abilene (1984). BS 1984, Kansas St. U.

DAVIS, ROBERT J., Reno County, Hutchinson (1967). BS 1964, Kansas St. U.

ENGLER, CATHERINE J., Grant County, Ulysses (1985). BS 1985, Kansas St. U.

EWING, MARLENE K., Shawnee County, Topeka (1978). BS 1978, Kansas St. U.

FINK, CAROL J., Pottawatomie County, Westmoreland (1980). BS 1977, Kansas St. U.

FULTZ, WILLIAM E., Sedgwick County, Wichita (1962). BS 1961, Kansas St. U.; MEd 1964, Wichita St. U.

GAINS, SHELIA, Wyandotte County (1982). BS 1981, Colorado St. U.

HUNTER, KAY E., Leavenworth County, Leavenworth (1984). BS 1983, Kansas St. U.

KEHLER, DAVID F., Butler County, El Dorado (1976). BS 1975, Kansas St. U.

KREISEL, PHYLLIS M., Cherokee County, Columbus (1981). BS 1979, U. of Nebraska.

LANHAM, K. EUGENE, Wyandotte County, Kansas City (1971). BS 1970, Kansas St. U.

LAUXMAN, LISA S., Lyon County, Emporia (1979). BS 1978, Kansas St. U.

LINDQUIST, LINDY R., Douglas County, Lawrence (1973). BS 1973, Kansas St. U.

McNEILL, DIANE D., Ford County, Dodge City (1986). BS 1983, Kansas St. U.

MENGARELLI, JIMMIE J., Crawford County, Girard (1985). BS 1976, Kansas St. U.

OTTE, ERIC T., Sedgwick County (1982). BS 1969, MS 1975, U. of Nebraska.

SIEMENS, CYNTHIA R., Harvey County, Newton (1980). BS 1979, Kansas St. U.

SMITH, JENELL M., Sedgwick County, Wichita (1971). BS 1971, Kansas St. U.

SWISHER, BRIAN A., Montgomery County, Independence (1976). BS 1975, Kansas St. U.

TABOR, LaRETA M., Geary County, Junction City (1985). BS 1982, MS 1984, Kansas St. U.

VANHORN, PAMELA I., Saline County, Salina (1983). BS 1982, Kansas St. U.

VAN SKIKE, WILLIAM V., Barton County, Great Bend (1950). BS 1950, Kansas St. U.; MEd 1965, Colorado St. U.

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County Extension Horticultural Agents

MANNELL, TERRENCE L., Ellis County, Hays (1978). BS 1973, Kansas St. U.; MS 1977, Ohio St. U.

MAYER, STEVEN L., Harvey County, Newton (1980). BS 1977, MS 1979, U. of Wisconsin.

MILLER, CHARLES L., JR., Saline County, Salina (1985). BS 1969, MS 1981, Kansas St. U.

MORRIS, MAX B., Sedgwick County, Wichita (1965). BS 1959, Kansas St. U.

NEIER, ROBERT I., Reno County, Hutchinson (1979). BS 1979, Kansas St. U.

SELL, PHILIP L., Shawnee County, Topeka (1978). BS 1970, MS 1971, Kansas St. U.

STOUSE, LAWRENCE D., Johnson County, Olathe (1966). BS 1963, Kansas St. U.

TITTEL, RONALD L., Butler County, El Dorado (1972). BS 1972, MS 1981, Kansas St. U.

WARMINSKI, NORMAN C., Sedgwick County, Wichita (1968). BS 1964, Oklahoma St. U.; MS 1968, Texas A & M.

Faculty

This listing of KSU faculty identifies each person with a college or administrative division of the University, in some cases with more than one. These are faculty actually employed here as the General Catalog went to press; see individual colleges and offices for possible new appointments.

Abbott, James W., Education
 Abbott, Martha J., Architecture
 Able, Billy V., Agriculture
 Abney, Nancy L., Arts and Sciences
 Acaslo, Ulysses A., Agriculture
 Acker, Duane C., Agriculture
 Adamchak, Donald J., Arts and Sciences
 Adams, Albert W., Agriculture
 Adams, Barry H., Arts and Sciences
 Adams, David L., Arts and Sciences and Student Publications
 Adams, James P., Extension
 Adams, Patricia C., Arts and Sciences
 Adams, William J., Arts and Sciences
 Addlson, Conall E., Extension
 Adler, Karla J., Institutional Advancement
 Adolph, Carol J., Athletics
 Agosta, Lucien L., Arts and Sciences
 Ahern, Michael F., Business Administration
 Alnsworth, Penne L., Business Administration
 Akin, James N., Institutional Advancement
 Akins, Richard G., Engineering
 Akkina, Krishna R., Arts and Sciences
 Aktas, Yildirim, Arts and Sciences
 Albers, Lelsa D., Agriculture
 Albracht, Mary L., Extension
 Albrecht, Mary Lewnes, Agriculture
 Albright, Kenneth B., Extension
 Alexander, Loren R., Education
 Algrlm, Eugene E., Extension
 Alkhatlb, Kassim, Agriculture
 Allen, Coy C., Agriculture
 Allen, David B., Library
 Allen, Eric B., Extension
 Allen, Joyce H., Continuing Education
 Alllson, Max, Agriculture
 Alloway, Jay E., Computing Activities
 Altman, Dana D., Athletics
 Amaya-Tapia, Alejandro, Arts and Sciences
 Ambrosius, Margery M., Arts and Sciences
 Amburgey, Victor A., Agriculture
 Ameenuddln, Syed, Arts and Sciences
 Amos, John M., Engineering
 Amstein, Deanna K., Institutional Advancement
 Amsteln, William G., Jr., Agriculture
 Anderegg, Marvin K., Extension
 Anderson, Cathy L., Arts and Sciences
 Anderson, Darryl, Athletics
 Anderson, Kathleen F., Agriculture
 Anderson, Kenneth E., Agriculture
 Anderson, Nancy C., Arts and Sciences
 Anderson, Neil V., Veterinary Medicine
 Anderson, Patricia L., Business Administration
 Anderson, Phlllip D., Arts and Sciences
 Anderson, Scott J., Extension
 Andrews, Emmett L., Foundation
 Andrus, David M., Business Administration
 Andrus, Lynda E., Arts and Sciences
 Angle, Dennis R., Education
 Annis, Patty J., Human Ecology
 Apel, J. Dale, Extension
 Apel, Mary Dean, Human Ecology
 Appl, Fredric C., Engineering
 Appleby, Mariellen J., Extension
 Applegate, Roberta G., Arts and Sciences
 Arck, William, Jr., Institutional Advancement
 Armagost, James L., Arts and Sciences
 Armbrust, Dean V., Agriculture
 Arnold, Joellen, Extension
 Arpin, Emily B., Human Ecology
 Aseneta, Lydia V., Arts and Sciences
 Aslln, Raymond G., Agriculture

Astroth, Kirk A., Extension
 Atkinson, Eric J., Extension
 Atluru, Durgaprasadarao, Veterinary Medicine
 Auen, Lisa M., Agriculture
 Averell, Robert B., Human Ecology
 Avery, Thomas B., Veterinary Medicine
 Azer, Naim Z., Engineering
 Babcock, Michael W., Arts and Sciences
 Bacon, Susan J., Extension
 Bader, Robert S., Arts and Sciences
 Baharian-Mehr, Claire, Arts and Sciences
 Bailey, E. Virleen, Agriculture
 Bailey, Gerald D., Education
 Bailey, Gwen L., Continuing Education
 Bailie, Wayne E., Veterinary Medicine
 Baker, Doyle C., Administrative Faculty
 Baker, Jon C., Extension
 Baker, Lyman A., Arts and Sciences
 Baker, Marjorie, Arts and Sciences
 Baker, Richard P., Extension
 Balding, James L., Agriculture
 Balfour, Timothy G., Institutional Advancement
 Balk, David E., Human Ecology
 Ball, Herbert D., Engineering
 Ball, Ralph G., Jr., Business Administration
 Ballou, Larry K., Agriculture
 Ballou, Russell S., Extension
 Bandyk, Cathryn A., Agriculture
 Bangs, Kenneth P., Arts and Sciences
 Banner, Betty A., Arts and Sciences
 Banner, Christopher H., Arts and Sciences
 Bao, Xiaoyi, Arts and Sciences
 Barab, Jacqueline E., Arts and Sciences
 Bark, L. Dean, Arts and Sciences
 Barker, Diane, Arts and Sciences
 Barkley, Theodore M., Arts and Sciences
 Barnaby, Glenn A., Jr., Agriculture
 Barnes, Alton A., Jr., Architecture
 Barnes, Howard L., Human Ecology
 Barnes, Jeanette L., Education
 Barnes, John H., Extension
 Barnes, Philip L., Engineering
 Barnett, Francis L., Agriculture
 Barnett, Mark A., Arts and Sciences
 Barrett-Jones, Kathleen, Education
 Barton, David G., Agriculture
 Bartz, Jacquelyn M., Human Ecology
 Bascom, Charles H., Institutional Advancement
 Bascom, Nathanael D., Agriculture
 Bates, Charles T., Jr., Extension
 Bauerle, Carol A., Extension
 Bauernfeind, Robert J., Extension
 Baugher, Earl E., Engineering
 Beason, Eddie J., Agriculture
 Beatty, Daniel D., Administrative Faculty
 Bechtel, Donald B., Arts and Sciences
 Beck, B. Terry, Engineering
 Beck, Timothy J., Extension
 Beckham, Kathryn, Human Ecology
 Bedrosian, Janice L., Arts and Sciences
 Beech, Douglas F., Agriculture
 Beeman, Keith B., Veterinary Medicine
 Beeman, Richard W., Agriculture
 Beeson, Margaret E., Arts and Sciences
 Beethe, Marlene, Education
 Beham, Cheryl B., Arts and Sciences
 Behnke, Keith C., Agriculture
 Behrends, Carla A., Education
 Bell, Kermit O., Jr., Agriculture
 Bell, Warren W., Extension
 Bellizzi, Joseph A., Business Administration
 Bellows-Anderson, Rae A., Arts and Sciences
 Belshe, Dana J., Extension
 Ben-Itzhak, Itzhak, Arts and Sciences
 Bennett, Robert E., Agriculture
 Bennett, Scott S., Athletics
 Benson, Douglas K., Arts and Sciences
 Benson, Janet E., Arts and Sciences
 Benton, Stephen L., Education
 Bequette, Robert K., Agriculture
 Berg, James E., Extension
 Bergen, M. Betsy, Human Ecology
 Berger, Mary Jo, Extension

Best, Cecil H., Engineering
 Besthorn, Jodi L., Extension
 Bettenbrock, Cheryl L., Arts and Sciences
 Betton, Matthew T., Arts and Sciences
 Bhalla, Chander P., Arts and Sciences
 Bhatt, Premal A., Agriculture
 Biby, Virgil H., Extension
 Blehl, Florence F., Extension
 Blere, Arlo W., Agriculture
 Bietau, Stephen A., Athletics
 Biles, Bertram R., Administrative Faculty
 Birney, Deborah D., Administrative Faculty
 Bissey, Charles R., Engineering
 Blttel, Steven G., Extension
 Blixler, Phyllis, Arts and Sciences
 Black, John, Education
 Black, Richard D., Engineering
 Blackburn, Harold, Education
 Blackman, Merrill E., Engineering
 Blair, W. Lawrence, Extension
 Blakeslee, Julie D., Extension
 Blandlng, Sylvia J., Library
 Blecha, Frank, Veterinary Medicine
 Blocker, Henry D., Agriculture
 Blocker, Martha B., Agriculture
 Blocksome, Richard, Agriculture
 Blum, Abraham, Agriculture
 Bockus, William W., Agriculture
 Bode, Vernon C., Arts and Sciences
 Bollman, Stephan R., Human Ecology
 Bolsen, Keith K., Agriculture
 Bolsen, Nancy F., Institutional Advancement
 Bolte, Lerance C., Agriculture
 Bonczkowski, Larry C., Extension
 Bonczkowski, Mary H., Extension
 Bond, Anita Cortez, Institutional Advancement
 Bond, Candace M., Education
 Bonilla, Rodrigo, Arts and Sciences
 Bontrager, Robert D., Arts and Sciences
 Bookwalter, Tom, Arts and Sciences
 Borchers, Carol A., Education
 Borsdorf, Roe E., Agriculture
 Borst, William H., Extension
 Boschetti, Margaret A., Human Ecology
 Bosco, Pat J., Institutional Advancement
 Bower, Merry D., Library
 Bowers, Jane R., Human Ecology
 Boyda, Stephan W., Business Administration
 Boyer, James B., Education
 Boyer, John E., Jr., Arts and Sciences
 Boyer, Lora J., Continuing Education
 Bozworth, Robert W., Extension
 Brace, Steven C., Athletics
 Bradley, Fred O., Education
 Bradshaw, Michael H., Human Ecology
 Bramel-Cox, Paula J., Agriculture
 Branden, Elsie P., Extension
 Brandsberg, George T., Agriculture
 Brandt, Gary W., Veterinary Medicine
 Brandt, Robert T., Jr., Extension
 Bratton, Gerald F., Agriculture
 Braun, James S., Education
 Brazle, Frank K., Extension
 Brede, Richard M., Arts and Sciences
 Breeden, Lowell D., Veterinary Medicine
 Breitweiser, Karen J., Veterinary Medicine
 Brent, Benny E., Agriculture
 Brethour, John R., Extension
 Bretz, Connis N., Extension
 Bretz, Matthew L., Arts and Sciences
 Briggs, Beverly A., Human Ecology
 Briggs, John M., Arts and Sciences
 Brightman, Alan H. II, Veterinary Medicine
 Briles, Scott D., Engineering
 Brink, John T., Agriculture
 Broce, Alberto B., Agriculture
 Brock, Brent L., Arts and Sciences
 Brockhaus, Robert H., Business Administration
 Bromley, Kathryn M., Arts and Sciences
 Brondell, William J., Arts and Sciences
 Brookhart, Ann E., Agriculture
 Brookhart, Charles E., Arts and Sciences
 Brooks, Barbara L., Institutional Advancement

- Brooks, Howard L.**, Agriculture
Brooks, Kenneth R., Architecture
Brotemarkle, Jack K., Agriculture
Browder, Lewis E., Agriculture
Brown, David, Education
Brown, Susan J., Arts and Sciences
Bruckerhoff, David N., Agriculture
Brunner, Robert D., Arts and Sciences
Bryant, Dale A., Architecture
Bryttan, Adrian A., Arts and Sciences
Brzuchalski, Beverly A., Extension
Buchanan, Christine L., Extension
Buchheister, James J., Foundation
Buckert, Leah R., Athletics
Buller, Leroy G., Arts and Sciences
Buller, Orlan H., Agriculture
Bullock, Robert A., Architecture
Burchett, Lowell A., Agriculture
Burckel, Glenna F., Arts and Sciences
Burckel, Robert B., Arts and Sciences
Burden, Paul R., Education
Burdett, Llsa M., Veterinary Medicine
Burge, Norman D., Institutional Advancement
Burke, Jack M., Extension
Burke, Katherine K., Human Ecology
Burke, Lucinda C., Institutional Advancement
Burke, Richard K., Business Administration
Burkhard, R. Kenneth, Arts and Sciences
Burnham, Robert, Architecture
Burns, Erroi G., Extension
Burton, Charles L., Engineering
Burton, Robert O., Jr., Agriculture
Busch, Richard M., Arts and Sciences
Buschman, Lawrent L., Agriculture
Bussing, Charles E., Arts and Sciences
Bussing, Sandra I., Arts and Sciences
Bussman, Derinda G., Extension
Buth, Dennis K., Human Ecology
Butler, Anne S., Institutional Advancement
Butler, Daylin J., Business Administration
Butler, William O., Continuing Education
Buyle, Kenneth R., Arts and Sciences
Byars, Jackson A., Education
Byrne, David R., Education
Cable, Ted T., Agriculture
Caldwell, Diana, Institutional Advancement
Caley, Homer K., Veterinary Medicine
Caihoun, Myron A., Arts and Sciences
Call, Edward P., Agriculture
Calvert, Lee A., Agriculture
Camp, Henry J., Arts and Sciences
Campbell, Caria W., Agriculture
Campbell, Joseph K., Arts and Sciences
Campbell, Ronald W., Agriculture
Campbell, Terry W., Veterinary Medicine
Cann, John R., Arts and Sciences
Cannon, Barbara J., Human Ecology
Canter, Deborah D., Human Ecology
Cantrell, Joyce A., Human Ecology
Capriotti, John J., Athletics
Carlson, Clayton D., Human Ecology
Carlson, Giennis A., Foundation
Carlson, Lois O., Extension
Carnahan, David L., Veterinary Medicine
Carnes, Kevin D., Arts and Sciences
Carpenter, Joseph D., Agriculture
Carpenter, Kenneth H., Engineering
Carpenter, William E., Arts and Sciences
Carr, Diane B., Arts and Sciences
Carr, Linda L., Extension
Carson, Sandra M., Education
Carter, Ann L., Continuing Education
Carter, Douglas C., Agriculture
Carter, Phillip D., Education
Cash, Walter C., Veterinary Medicine
Cashin, William E., Continuing Education
Cave, Klmberly D., Arts and Sciences
Center, Melvin S., Arts and Sciences
Chalman, James A., Veterinary Medicine
Chan-Yu-King, Roch, Arts and Sciences
Chandra, D. V. Satish, Engineering
Chang, Cheng S., Engineering
Chang, Christina L., Arts and Sciences
Chang, Yang Ming, Arts and Sciences
Chapes, Stephen K., Arts and Sciences
Charney, Wayne M., Architecture
Chastain, Meivin L., Education Communications Center
Chaudhuri, Sambhudas, Arts and Sciences
Chaudhuri, U. N., Agriculture
Chee, Yoke Kim, Athletics
Chelz, Anthony W., Architecture
Chen, Hou-Ji, Agriculture
Chermak, Andrew L., Arts and Sciences
Chestnut, Bibiana M., Extension
Cheung, Mei-Po, Institutional Advancement
Chiang, Beiinda, Library
Chou, Song-Tien, Engineering
Chowdhury, Manjur A., Agriculture
Chrisope, Terry A., Arts and Sciences
Christensen, Keith H., Architecture
Christian, Michael L., Extension
Christie, Deborah J., Arts and Sciences
Chung, Do Sup, Engineering
Chung, Koo Min, Agriculture
Chung, Okkyung K., Agriculture
Cipriano, Joann E., Veterinary Medicine
Claassen, Louise K., Arts and Sciences
Claassen, Mark M., Agriculture
Clack, Robert W., Engineering
Clafflin, Larry E., Agriculture
Clarenburg, Rudolf, Veterinary Medicine
Clark, George R. II, Arts and Sciences
Clark, Jane C., Arts and Sciences
Clark, Marcella P., Arts and Sciences
Clark, Michael R., Athletics
Clark, Stanley J., Engineering
Ciarke, Mary P., Human Ecology
Clarkson-Frisbie, Jean, Extension
Clawson, Eldon L., Extension
Clayberg, Carl D., Agriculture
Ciegg, Victoria L., Administrative Faculty
Cieiaand, Marjorie V., Arts and Sciences
Ciem, Michael F., Veterinary Medicine
Clement, Laurence A., Architecture
Clift, Gary W., Arts and Sciences
Clore, Robert A., Arts and Sciences
Coates, Gary J., Architecture
Cochran, Alfred W., Arts and Sciences
Cochran, Mary L., Arts and Sciences
Cochran, Robert C., Agriculture
Cochrane, Todd E., Arts and Sciences
Cocke, Charles L., Arts and Sciences
Cocke, Enid O., Continuing Education
Coffee, E. Guy, Veterinary Medicine
Coffey, Kenneth P., Extension
Coffman, Crystal R., Extension
Coffman, James R., Administrative Faculty
Cogley, Allen C., Engineering
Cohen, Peter Z., Arts and Sciences
Cole, Duane E., Veterinary Medicine
Coie, George W., Agriculture
Cole, Lawrence Darnell, Athletics
Coleman, Margaret M., Arts and Sciences
Coleman, Raymond J., Business Administration
Coleman, Richard P., Business Administration
Coles, Embert H., Jr., Veterinary Medicine
Collins, Bill D., Extension
Collins, Olivia P., Extension
Compton, Doris M., Arts and Sciences
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***Errata:** At the time of printing of this catalog, computer engineering technology is being integrated into electronic engineering technology and industrial engineering technology is being integrated into mechanical engineering technology. No new students will be accepted into CET and IET as such starting with the fall 1988 semester.

Aerospace Studies

John R. Taglieri, Head

Assistant Professor Everett.

The Air Force Reserve Officer Training Corps (AFROTC) 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, **or**

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 113. 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

There is a wide range of scholarships available depending on college major, academic standing, and projected career choices. 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. 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 over \$600 per month.

High school students considering application for 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 make application before December of the senior year. Financial benefits are the same as the earlier mentioned undergraduate scholarships. Applicants should contact an AFROTC officer for applications and further information.

Undergraduate and graduate study

Four-year program

Basic course. Students electing the four-year program normally will begin with the General Military Course (GMC) during the freshman or sophomore year. This program consists of four semesters of one credit hour each, counts toward all bachelor's degrees awarded by KSU, 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 (POC) is the upperclass program and consists of four courses of three 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 (532-6600, 108 Military Science Hall) earlier than but not later than 15 February.

Field training

Cadets practice their leadership and management skills in a cadet group. Those 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, the cadet is paid approximately \$115 per week, and receives 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 (SCP) provides both required and recommended courses designed to enhance the career and officer performance of persons 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 KSU 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 113. 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-113-0-1803

AERO 114. 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-114-0-1803

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-210-0-1803

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-211-0-1803

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. AERO-215-0-1803

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-310-0-1803

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-311-0-1803

AERO 381. Briefing for Air Force Commissioned Service. (1) I, II. Ordinarily taken by POC cadets during their last semester of officer training. Provides specific understanding of processes and procedures incident to entering active duty as an officer in the USAF. AERO-381-3-1803

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-399-3-1803

AERO 400. 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-400-0-1803

AERO 401. 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-401-0-1803

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. AERO-491-1-1803

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